Housing Allowance Demand Experiment

Locational Choice Part 2

Neighborhood Change

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August 1977

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ERRATA

LOCATIONAL CHOICE, PART II:
NEIGHBORHOOD CHANGE

Page 9: Footnote 2 should read:

For a discussion of this point, see Birch et al. (1974).

Page 63: The definition for Boundary Neighborhoods should read:

Contiguous groups of tracts with 15 to 50 percent black population directly adjacent to black neighborhoods

Page 69: The first sentence in the last paragraph should read:

One piece of exploratory analysis indicates that some program effect, however small, on patterns of black concentrations may be found.

Page 88: The entries in the Spanish American Enclave row of Table 3-14 should be 2.2 (percentage at enrollment) and 2.9 (percentage at one year).

Page 96: The last line of footnote 1 should read:

(see Holshouser, 1976, p. B-59).

Page A-12: The superscript "b" to the right of the second number in the first column of Table I-3 should be deleted.

Page A-63: The table references in the first sentence of the second paragraph should be Tables IV-7 and IV-8.

Page A-73: The first entry in the first row of Table IV-13 should be 47.54.

Pages A-83 and A-84: The following should be added to the list of references:

Boyce, Ronald R. (1969), "Residential Mobility and Its Implications for Urban Spatial Change," Proceedings of the Association of American Geographers, Vol. I.

Greenberg, Michael R., and Thomas D. Boswell (1972), "Neighborhood Deterioration as a Factor in Intra-Urban Migration," The Professional Geographer, Vol. 24, No. 1.

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Morrison, Peter A. (1972), Population Movement and the Shape of Urban Growth: Implications for Public Policy, Santa Monica, California, Rand Corporation, R-1072-CPG.

Stegman, Michael A. (1969), "Accessibility Models and Residential Location," Journal of the American Institute of Planners, Vol. 35.

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LOCATIONAL CHOICE

PART II

NEIGHBORHOOD CHANGE IN THE HOUSING ALLOWANCE DEMAND EXPERIMENT

Contract H-2040R
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ABSTRACT

This report describes the locational choices of movers in the first year of the Housing Allowance Demand Experiment. Neighborhood changes are indicated by use of Census data on the concentration of low-income households and of minority households in the origin and destination Census tracts of movers. Evaluation of neighborhood conditions was provided by households in the experiment during regular interviews and offer subjective measures of neighborhood change. Maps are provided which show initial locations of enrollees by race and the net changes in geographic patterns of location resulting from moves.

The analysis of program effects is limited and, in some cases, sharply curtailed by small sample sizes. The overall impression is one of small changes, where they exist, consistent with the experience of the housing allowance demonstrations in Kansas City, Missouri and Wilmington, Delaware and with the eight-city results of the Administrative Agency Experiment (a component of the Experimental Housing Allowance Program).

Observations based on the full two years of experimental data will permit extensions of the analyses presented.

ACKNOWLEDGEMENTS

A most pleasant reponsibility of authorship is recognition of the efforts and encouragement of the people who helped to make the work possible. Particular thanks go to David Napior who conceived and carried out the construction and testing of the summary scores for perceived neighborhood quality and wrote most of the technical account of these measures in Appendix IV. Both David and Bradford Wild helped and encouraged us in our attempts to find, understand, and apply the analysis techniques appropriate for pursuing often elusive program effects. Jorge Vernazza developed and applied the computer plotting routines used to create the maps.

James Wallace, Director of Design and Analysis, along with Chris Hamilton contributed substantially to bringing focus and organization to the report and to rewriting portions of the text.

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Nouna Kettaneh, Irma Rivera-Veve and Yi-Shan Cheng assisted in performing the computer analyses. Tables were prepared by Martha Proctor, who also assisted with the editing of early drafts. Michael Trend assisted with both writing and editing. Janet Maranz edited the final draft. David Andrews and Wendy Kupferman were responsible for proofreading. Sandra Richardson, Phyllis Bremer, Nora Pemberton, and Billie Renos produced the numerous drafts.

Antony Phipps was primarily responsible for the formulation and conduct of the analysis of perceived neighborhood quality (Chapter 4) and was analyst/cartographer for the development of the maps. Reilly Atkinson

performed the analyses of low-income concentration (Chapter 2) and of minority concentration (Chapter 3).

Reilly Atkinson
Antony Phipps

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES -- Continued

LIST OF TABLES -- Continued

LIST OF TABLES -- Continued

LIST OF FIGURES

LIST OF MAPS

SUMMARY

This report is one of a series describing the first-year results of programs tested in the Housing Allowance Demand Experiment. The Demand Experiment is one of three experiments being conducted by the Department of Housing and Urban Development as a part of the Experimental Housing Allowance Program (EHAP). These experiments, authorized by Congress in the Housing Act of 1970, are designed to test the concept of direct cash assistance to low-income households to enable them to live in suitable housing. The purpose of the Demand Experiment is to provide information on how households use their allowances. The experiment, conducted in Pittsburgh, Pennsylvania, and Phoenix, Arizona, offered allowances to approximately 1,200 households selected at random from each area. The focus of this report is on the effect a housing allowance program has on the kinds of neighborhoods in which participants live. The households studies are low-income, renter households in Pittsburgh and Phoenix and include both Experimental households--those offered a housing allowance--and Control households.[1]

The programs tested in the Demand Experiment will be evaluated primarily on the basis of data from two years of program operations. Reports such as this lay the groundwork for that evaluation by examining first-year responses to the experimental offers[2] and by identifying key analytic issues. The findings presented here must therefore be regarded as partial and preliminary.

Unlike many other forms of housing assistance, a housing allowance is not tied to particular housing units or projects. The household may rent housing

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[1]The Housing Allowance Demand Experiment tests several different formulations of a housing allowance program. The analyses of first-year data presented in this report, however, focus solely on the differences between Experimental and Control households, without distinguishing among Experimental subgroups.

[2]All Experimental households were offered the opportunity to participate in a housing allowance program. In some cases, however, the households had to meet specified conditions (such as occupying a unit that would meet program housing standards) in order to receive allowances. Thus, although all Experimental households received an offer, many of them never participated in a housing allowance program in the sense of receiving payments. Most of the analysis in this report is based on the responses of all households enrolled in the experiment.

of its choice (generally subject to some quality requirements) in the location of its choice. The freedom to choose locations raises two important possibilities. First, an individual household might be able to improve the quality of its living environment by moving to an area with more desirable characteristics. Second, participating households in the aggregate might alter existing residential patterns; possibilities hypothesized in the literature have been dispersion of low-income concentrations, dispersion of racial or ethnic concentrations, and movement from the central city to the suburbs. This report examines the first-year evidence from the Demand Experiment pertaining to these locational issues.

1. The evidence does not indicate that the housing allowance offer brought about major improvements in households' neighborhood quality.

> The measures of neighborhood quality included Census data describing the proportion of low-income households in the Census tract and survey data in which households evaluated the characteristics of their neighborhoods. Both Experimental and Control households moved, on the average, to neighborhoods with reduced concentrations of low-income households and neighborhoods that ranked higher in subjective assessments. But there were no major differences in the average changes for Experimental and Control households.
>
> There is some evidence that the housing allowance program may have influenced neighborhood choices for some subgroups of households or households in particular conditions. Analyses of low-income concentration in the destination neighborhoods indicate that Experimental and Control households behaved differently. There is some suggestion that the program may be useful in helping households living in heavily concentrated low-income areas to move to areas with reduced low-income concentrations. Analysis of two-year data will be required to confirm the stability of the Experimental/Control differences and explore them further.

2. The housing allowance offer does not appear to have induced statistically significant changes in the residential distribution of households.

> Experimental households that moved did not differ significantly from Control movers in terms of racial or ethnic dispersion, dispersion of low-income concentrations, or central city to suburban movement.
>
> Black households and Spanish American households that moved chose neighborhoods of slightly lower racial/ethnic concentration, on the average. Among Spanish American households (in Phoenix), the patterns were essentially the same for

Experimental and Control groups. Among black households (both sites), those in the Experimental group moved to areas of somewhat lower black concentration than those in the Control group, but the difference was not statistically significant. Black households in the Experimental group that actually received allowance payments moved to areas of lesser black concentration than those that did not receive payments, but the number of cases available for analysis was very small. Analysis of the two-year data will pay particular attention to the change in concentration of black households, to determine whether these patterns are found to be significant with a larger number of cases. (The first-year analysis was based on 74 Experimental households and 28 Control households.) However, the first-year data suggest that even if a significant effect is found, it is likely to be small.

There was almost no change in the city/suburban distribution of households enrolled in the experiment, and certainly no major program effect. Households for the most part seemed to move short distances; about a quarter of those that moved stayed within the same Census tract. Although there were some areas (groups of Census tracts) that experienced a net loss of a few households, nearby areas generally showed a net gain, and in any case the net changes were quite small.

In general, the analysis of the first-year data suggests that a housing allowance does not have a major influence upon the locational choices of households or the residential distribution of the low-income or minority population. The findings are generally consistent with those in previous housing allowance experiments and demonstrations, which also found small improvements in neighborhood quality consistent with general mobility patterns in the local areas. It should be noted, of course, that a housing allowance is not intended to bring about specific locational changes (unlike the objective of improvement in housing unit quality, where specific quality levels are often required). Rather, the housing allowance is intended to remove constraints on locational choice, which other forms of housing assistance reinforce. The first-year data imply that the allowance neither induces nor constrains changes. The comparison of constraints on locational choice between housing allowances and conventional federally assisted housing programs at the experimental sites is the subject of a separate study in this series.

Source of Statements

The following indicates the source in the text of the summary points made above.

1. For comparison of Experimental and Control household mean changes in low-income concentration see Table 2-8 in Section 2.2. Evidence to suggest possible experimental effects is found in Tables 2-14 through 2-18 and Figures 2-3 and 2-4 in Section 2.3. Comparisons of changes in perceived neighborhood quality for Experimental and Control households are in Tables 4-3 and 4-4.

2. Indications of the lack of statistically significant minority dispersal stimulated by the Demand Experiment are found in Table 3-4 in Section 3.2 for black households, and in Tables 3-12 and 3-13 in Section 3.3 for Spanish American households. A discussion of the choices of destination neighborhood racial concentrations for black Experimental households by payment status is found in Section 3.2. Experimental and Control household choices of neighborhoods categorized by low-income concentration are found in Table 2-9 in Section 2.2 and of city/suburban locations in Table 2-11 in Section 2.2.

CHAPTER 1

INTRODUCTION

A major purpose of the Housing Allowance Demand Experiment is to determine the extent to which a housing allowance broadens the scope of housing choices for low-income renters. Under a housing allowance low-income households typically would receive regular cash payments provided that they were able to meet certain housing requirements. Although there would be no locational requirements, participants might be enabled to move to better neighborhoods; if so, they could alter existing patterns of concentration of low-income households or of minorities. As a HUD document puts the issue,

> Will the freedom to choose lead allowance recipients to disperse, or will geographic concentration along racial or socioeconomic lines persist? (HUD PD&R, 1974.)

These locational outcomes are addressed in this report on the basis of data from the first year of the Demand Experiment.

The concept of housing includes, in a very general sense, location and neighborhood attributes; neighborhood quality is almost universally considered to be an important attribute of housing (for example, see Isler, 1970). The Congress, in the Housing Act of 1949, asserted the right of every American family to a "decent home and a suitable living environment." Therefore, one issue addressed in the Demand Experiment is the extent to which receipt of or potential receipt of a housing allowance leads low-income households to move to better neighborhoods. This report deals with neighborhood improvement by considering the Census tract attributes of the origin and destination neighborhoods of households that moved in the first year of the experiment and by considering their own perceptions about their neighborhoods.

Existing residential patterns of low-income and minority household concentration suggest that the range of locational choices available to such households has been restricted. To the extent that households are forced to live in certain areas either because they lack rent-paying ability or because of discrimination in the housing market, their possible living environments are presumed to be limited with respect to neighborhood quality and access to schools, jobs, and both public and private services. (Public objectives

such as racial balance in the schools may also be complicated by geographic patterns of racial concentration.)

Traditional, supply-oriented housing assistance programs, with neighborhood choice limited to the locations of the subsidized projects, have not provided much relief for these limitations in locational choice for low-income and minority households. For example, public housing has been built primarily in central cities, often in low-income neighborhoods or areas of high minority concentration, although court decisions have exerted pressure toward dispersal of these projects. Similar, though less extreme, observations hold for the Section 236 projects providing subsidized housing for moderate-income households. Political resistance to location of both public housing and Section 236 projects outside central cities has been thought to originate at least partly in the fear of wholesale resettlement of poor or minority households to these projects.[1]

Housing allowance proponents have argued that such locational limitations could be overcome and that an allowance program could give recipients relatively free choice in the existing private housing stock (for example, see Solomon, 1974). Skeptics have assumed that housing allowance recipients would be hampered by the extant housing market problems of economic and racial/ethnic segregation and discrimination (for example, see Hartman and Keating, 1974, or Weaver, 1975). Some have feared that even if allowances enabled moves out of the worst housing, they would thereby accelerate abandonment and decay in some urban areas.[2] Others feel that housing allowances

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[1] The general pattern of location of subsidized housing projects in poor and minority areas of cities is described in a publication by the National Committee Against Discrimination in Housing (1967) and by Frieden (1971). Similar observations are made about leased housing by Lazen (1976). The limited geographic locations in Pittsburgh of public housing, Section 221(d)(3) and Section 236 rental projects, and the Section 235 program for homeowners are documented by ACTION Housing Inc. (1973). A future report in this series will directly compare the locations at the experimental sites of public housing, Section 23 leased housing, and Section 236 projects with existing residential patterns and with the neighborhood patterns of housing allowance recipients. This report deals only with the locations of households in the Demand Experiment.

[2] Weaver (1975) discusses this problem in general and Kain (1974) provides a model indicating possible substantial declines in demand for certain types of housing under a full-entitlement housing allowance program. Interestingly, the Kaiser Committee Report (President's Committee on Urban Housing, 1968) assumed that a housing allowance might actually provide the resources to support housing improvement through upgrading of slum properties.

would encourage suburban "invasion" by the poor and minorities or maintain segregated housing patterns by encouraging "white flight."

For all these reasons, it is important to know whether a housing allowance encourages changes in population distribution, especially with respect to low-income households and minorities. Previous experience suggests that there is little basis for either the proponents' hopes or the skeptics' fears. Demonstration housing allowance programs in Kansas City and Wilmington, Delaware, (Heinberg et al., 1975) and the experience in the eight cities where the Administrative Agency Experiment (AAE) was conducted (Holshouser, 1976) indicate little change from existing patterns and trends.

In Kansas City, enrollees were required to move as a condition of participation, and most participants were black. Participants generally went to areas somewhat better than their original neighborhoods:

> With respect to measures of quality of neighborhoods, "before" and "after" moves, the areas to which families moved in Kansas City were significantly better on a number of Census measures of socioeconomic characteristics of residents...and characteristics of housing stock. (Phipps, 1973.)

But approximately 70 percent of the participating families were within the "black corridor" both before and after they were on the program. The picture presented by the Kansas City analysis, at least as far as blacks are concerned, is one of housing allowances improving the lot of individual households, but doing little to break up existing patterns of racial segregation (Phipps, 1973).

Similar patterns of limited locational change were found in the AAE component of the Experimental Housing Allowance Program.

> Patterns of locational change in the AAE were similar to those reported in Kansas City. White movers tended to move to many parts of the program areas; black movers usually remained within black or transitional areas. Blacks did move to somewhat more integrated neighborhoods, but they rarely broke free of traditional patterns... Much the same is true with regard to the question of whether moves by participants would weaken already decaying neighborhoods. Although a substantial minority lived in suburban areas at enrollment, most AAE movers came from the central city. This pattern tended to persist. Most moves took place within central cities rather than from central cities to suburbs; all AAE moves resulted in

> only a one percent net increase in the number of suburban recipient households. Nevertheless, recipients did tend to move out of the poorest areas into others that were somewhat better. These experimental results appear merely to reflect moving trends in the general population. It is impossible to say that they resulted from either the subsidy or the services offered. (Holshouser, 1976, pp. 36-37.)

Neither of the studies cited above were controlled experiments. Thus, there is no direct means to know whether the limited change in geographic concentrations observed in Kansas City and the AAE would have occurred even in the absence of the housing allowances. The Demand Experiment has a Control group, which allows a more definitive analysis of the effects of the housing allowance.

Analysis of the first year's experience in the Demand Experiment indicates modest but significant increases in housing expenditures in response to the allowance offers, as reported by Mayo (1977) and Friedman and Kennedy (1977). Further work is in progress to identify the nature of housing change associated with these increased expenditures. In the light of the Kansas City and Wilmington demonstrations and of the AAE experience, it is quite possible that more of the housing consumption response was in dwelling unit improvement, even for movers, than in neighborhood improvement.

The analysis of neighborhood choices presented in this report suggests that the experiment has had a limited influence upon those choices. Because the analysis is exploratory and covers only the first year's experience, however, no final conclusions can yet be drawn. The analysis focuses upon those households that moved in the first year and does not attempt to estimate the impact of eventual movers for the total population of enrollees.[1] The relatively small number of households that moved in the first year of the experiment led to some important analytic limitations. Although the Demand Experiment was designed to test variations in the form of allowance, the relationship of these variations to changes in residential patterns is not explored in this report. The analysis aggregates all Experimental households, regardless of the housing allowance plan to which they were assigned. (See

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[1] The apparent lack of program effect upon mobility indicated by Weinberg et al. (1977) permits straightforward comparisons of Experimental and Control movers at this stage of analysis.

Appendix I for a discussion of the plans tested.) In order to maximize sample size, Housing Gap households not meeting their housing requirements at the end of the first year (and thus not receiving full payments) are included in the analysis. Thus in this report the question asked is, "Does the receipt or offer of an allowance influence neighborhood choices for eligible households?" Future analysis will narrow the focus to effects for households actually receiving allowance payments. More extended analysis will be conducted with the additional observations obtained in the second year of the experiment.

Chapter 2 focuses upon whether Experimental households are more likely to move to Census tracts with relatively fewer low-income households. Tract concentrations of low-income households are used as a convenient proxy for related characteristics of neighborhood quality. Chapter 3 identifies the degree of geographic separation of minorities from nonminorities at the two experimental sites and examines whether the housing allowance offers induce moves that alter the existing patterns of minority concentration.

Chapter 4 considers an alternative measure of neighborhood quality: ratings provided by participating households on a number of neighborhood conditions. The extent of change in these perceived characteristics is described for movers and for Experimental households relative to Control households. Chapter 5 discusses the further research being performed to assess possible program effects on neighborhood improvement and locational choice.

Appendix material provides supporting technical detail. Appendix I summarizes the design of the Demand Experiment. Appendix II describes key variables and samples used in the analysis. Appendix III provides the details of the variable reduction procedure used in the regression analysis of program effects. Appendix IV describes the derivation of measurements of perceived neighborhood quality.

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CHAPTER 2

CONCENTRATION OF LOW-INCOME HOUSEHOLDS

An important question in the evaluation of a housing allowance program is the extent to which the offer or receipt of an allowance induces or enables participants to move to "better" neighborhoods. Some insight into this issue can be obtained from an examination of the extent to which households live in "poor" neighborhoods--that is, neighborhoods characterized by substantial concentrations of low-income households.[1] The first section of this chapter defines a measure to be used in such an analysis and presents a baseline description of some of its characteristics. The following two sections use the measure to look at change in households' residential locations.

2.1 INITIAL PATTERNS OF LOW-INCOME CONCENTRATION

The analysis presented in this chapter focuses on the concentration of low-income households in Census tracts. For this analysis "low-income concentration" is defined by the percentage of households in the tract with total household incomes under $5000 (1970 census).

A great many variables may be and have been used to characterize neighborhoods.[2] A study commissioned by the National Commission on Urban Problems noted:

> There are an infinite number of descriptions and standards pertaining to the physical outlines of the dwelling unit itself and to physical environment. If anything, these specifications have been overstandardized to the point of straitjacketing housing development. Yet, "suitable living environment" as it pertains to the neighborhood and community

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[1] No implication is intended that the presence of low-income households reduces the "quality" of a neighborhood. It is an unfortunate but general fact that the poor, on the average, can afford only housing with less valued attributes--including the living environment outside the dwelling unit--than those with more money. A measure of low-income concentration can thus be used to characterize the general quality of neighborhoods as well as the incomes of their residents.

[2] For a discussion of this point, see Birch et al. (1975).

> remains a subjective, vague, and almost meaningless phrase. Descriptions of what is considered a good life for the individual can be found in the literature, but little thought has been given to what constitutes a good community in the total sense, a community to which economic and social as well as physical components can be ascribed (George Schermer Associates, 1968, p. 39).

It is not argued that the low-income concentration measure used here is the perfect, all-purpose descriptor of neighborhood. It is particularly well-suited to the Demand Experiment analysis, however, for two reasons. First, it is a rough parallel to the selection criterion for participation in the Demand Experiment. Eligibility was defined principally in terms of income and household size, and 91 percent of the enrollees had total annual incomes under $5000.[1] Thus, the measure describes the extent to which households are surrounded by people like themselves in terms of the experiment's main eligibility dimension. A reduction in the average low-income concentration, then, can be taken to indicate a process of dispersion. The same dimension also tends to be generally important in describing residential choices and location decisions; as Hoover and Vernon (1962) noted, "Most people prefer to be able to keep up with the local Joneses and tend therefore to seek more or less their own level in incomes" (p. 146).

Second, the low-income concentration measure tends to correspond to measures of neighborhood housing conditions and other potential indicators of neighborhood quality.[2] Thus it may be taken as a rough proxy of both the general quality of the neighborhoods and an important characteristic of the housing

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[1] Because the census was conducted in 1970, household incomes were converted to 1970 dollars for this comparison. For most households the first year of the experiment occurred during 1974 which had seen prices rise 27 percent gauged by the Consumer Price Index (Statistical Abstract, Government Printing Office, 1975). It thus took $6350 in 1974 dollars to purchase $5000 in 1970 dollars' worth of goods and services. Some 70 percent of enrollees had incomes of less than $5000 in 1974 dollars.

[2] Low-income household concentration is rather strongly correlated with other census measures of neighborhood housing conditions and socio-economic status. For example, in Pittsburgh the Pearson correlation of low-income concentration with the percentage of units lacking complete plumbing facilities is 0.55; with the percentage of units built before 1950 it is 0.59; with median educational attainment it is -0.70. The corresponding numbers in Phoenix are 0.55, 0.76 and -0.69. (The unit of observation is the Census tract.)

market the families face.

Defining neighborhoods in terms of Census tracts corresponds to the general intent of the Census Bureau's efforts,[1] but still requires some caveats. Not all tracts are in fact homogeneous, so that the average tract characteristics may not describe the section where a participant lives.[2] Further, census boundaries may not correspond to the intuitive neighborhood boundaries in the minds of the households, or they may be misleadingly abrupt indicators of what is really a "fuzzy" and flexible demarcation between neighborhoods. Nonetheless, tract data may be taken as reasonable indicators of average patterns of locational change within a city. The extent to which these patterns reflect the circumstances of individual households can be judged only after further examination of household-level data, such as the data on perceptions of neighborhood quality discussed in Chapter 4. The time lapse between the 1970 census and the Demand Experiment (which began in 1973) also requires a caveat. The analysis must assume that neighborhoods evolve slowly: that tracts that were (relatively) low-income in 1970 were still (relatively) low-income tracts in 1974-5.

As background to the analysis of low-income concentration, the remainder of this section discusses the distribution of households in the experiment in terms of the low-income concentration measure and the correspondence between low-income concentration and housing conditions.

Low-Income Concentration in Pittsburgh and Phoenix

In examining the concentration of households with income under $5000, it is useful to establish the following four categories:

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[1] According to the Census Bureau (1970 Census User's Guide), "Census tracts are small, relatively permanent areas into which large cities and adjacent areas are divided for the purpose of providing comparable small-area statistics." Further, "Tracts are originally designed to be relatively homogeneous with respect to population characteristics, economic status and living conditions; the average tract has about 4,000 residents."

[2] The problems of possible lack of homogeneity could be partly overcome through use of block group (First Count) or block (Third Count) Census data, either of which give finer geographic resolution than do tract data. However, tract data are more complete, less subject to radical change in the period between the census and the experiment, and more convenient to use.

Higher-Income Neighborhoods:	Those with low-income concentration between 0 and 25 percent.
Low-Poverty Neighborhoods:	Those with low-income concentration between 25 and 35 percent.
Medium-Poverty Neighborhoods:	Those with low-income concentration between 35 and 50 percent.
High-Poverty Neighborhoods:	Those with low-income concentration above 50 percent.

In both Pittsburgh and Phoenix, most low-income households live in rather high concentrations. In 1970, roughly 25 percent of all households in Pittsburgh and Phoenix had incomes under $5000. Approximately 70 percent of these households lived in Census tracts in which more than 25 percent of the population was low-income. The geographic pattern of low-income neighborhoods in these two cities, along with the distribution of Demand Experiment households, is shown in Map 1 for each site. In Pittsburgh, most low-income neighborhoods are located near the center of the city and along the rivers. Higher-income neighborhoods, those with relatively low concentrations of the poor, are largely in the suburbs. In Phoenix, low-income areas lie mainly in the South Phoenix area; substantial portions of the city itself are higher-income neighborhoods.

The maps suggest that most of the Demand households lived at the time of enrollment in low-income neighborhoods. In fact, even those living in higher-income areas were not far from relatively high concentrations of low-income households. In Pittsburgh roughly 68 percent and in Phoenix roughly 70 percent of the households living in higher-income areas lived in Census tracts immediately adjacent to low-income tracts.[1] The enrolled households were not confined to the central city areas: 46 percent in Pittsburgh and 21 percent in Phoenix were in the suburbs.

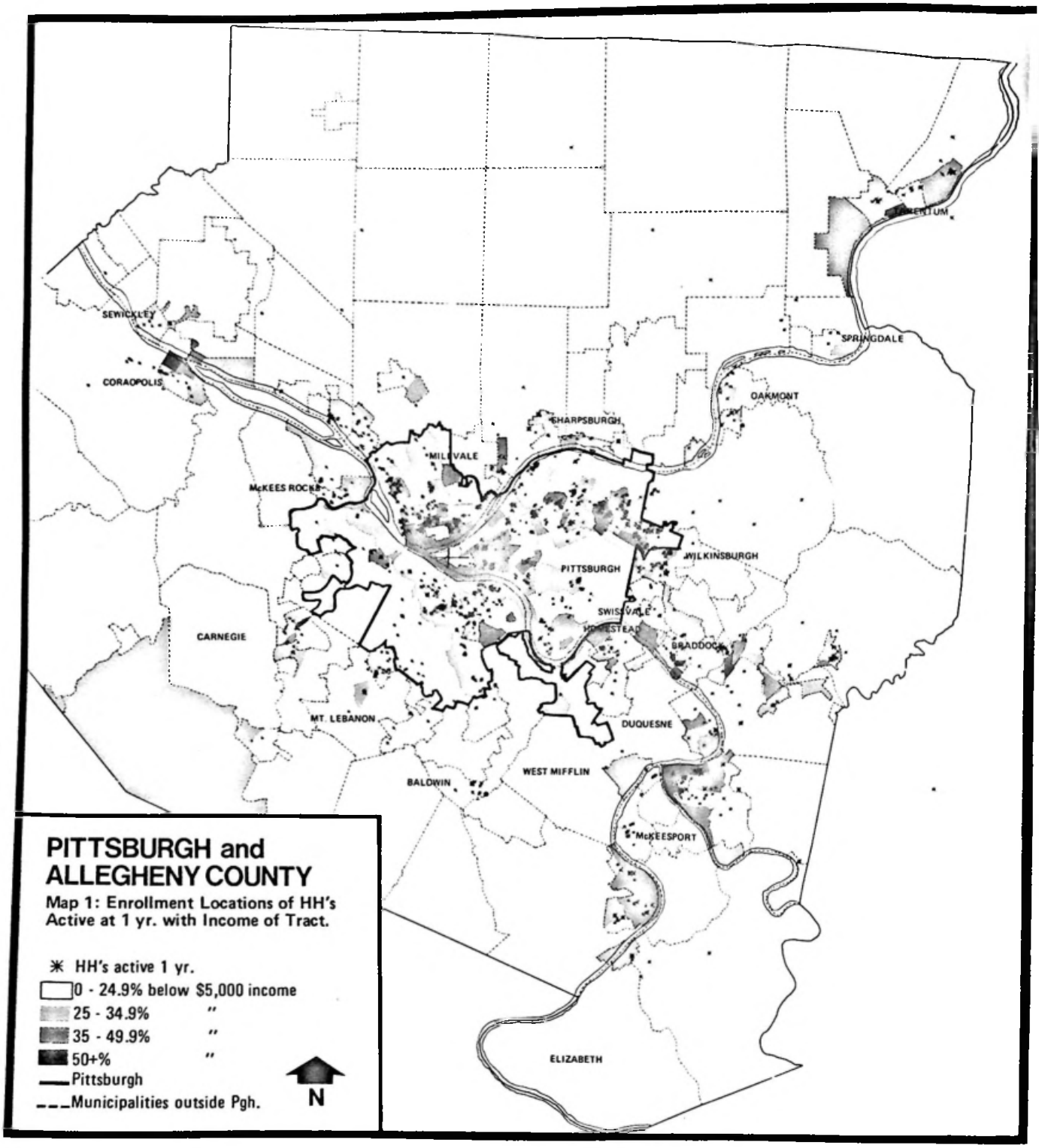
Table 2-1 summarizes the information on the maps concerning the location of Demand Experiment households. In both Pittsburgh and Phoenix 82 percent

[1] This finding suggests that many Demand Experiment households in the higher-income neighborhoods were actually living in low-income sections of those neighborhoods. Experimental data can neither confirm nor refute this suggestion. However, as will be shown later, households in the higher-income neighborhoods tended to occupy better-quality housing, suggesting that the tract characteristics are at least a reasonable measure of relative status.

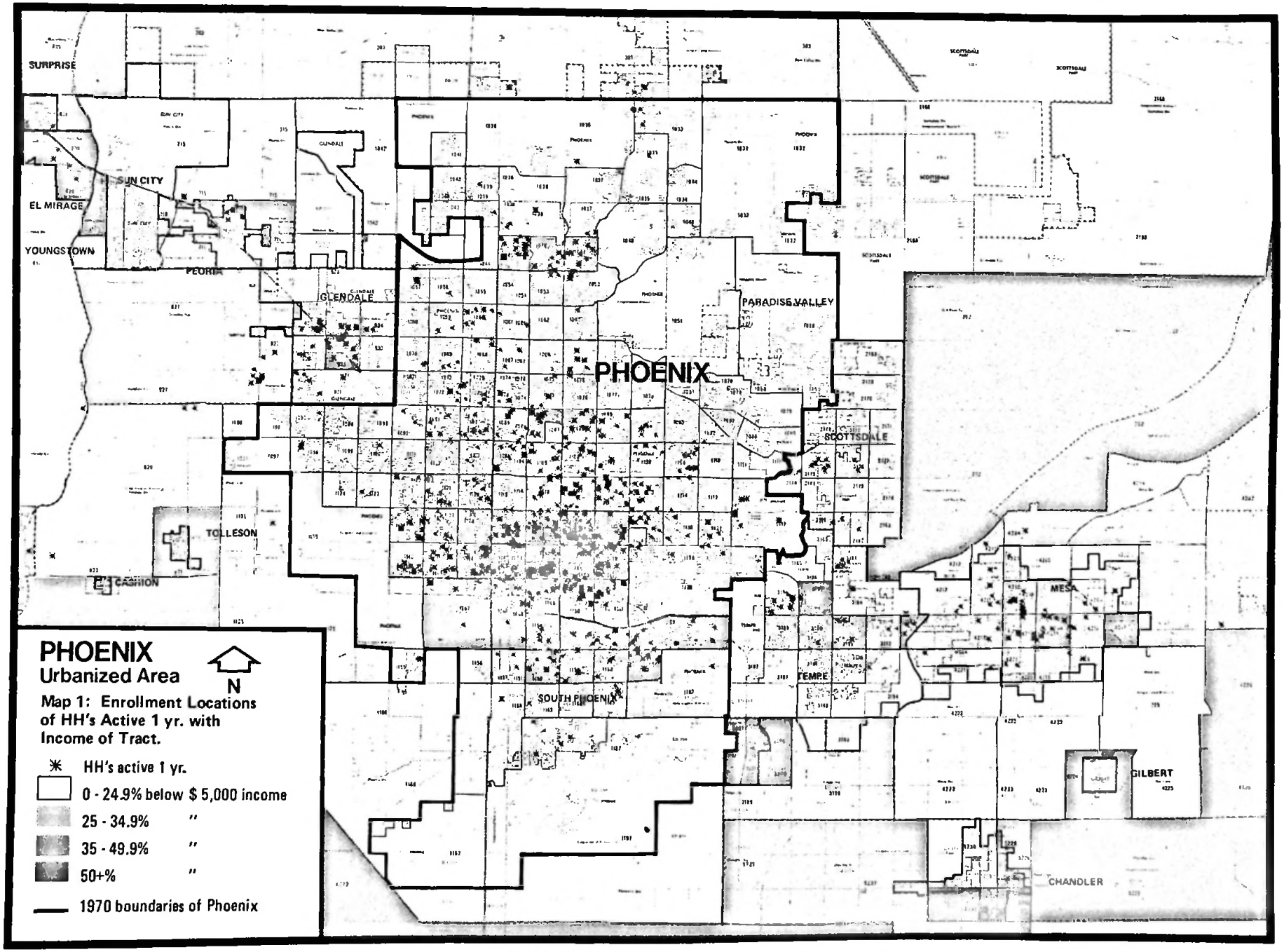
MAP 1

PITTSBURGH AND PHOENIX

ENROLLMENT LOCATIONS OF HOUSEHOLDS
ACTIVE AT ONE YEAR WITH INCOME OF TRACT



scale: 1 inch = 4 miles



scale: 1 inch = 3.7 miles

Table 2-1

DISTRIBUTION OF HOUSEHOLDS AT ENROLLMENT
BY NEIGHBORHOOD TYPE

NEIGHBORHOOD TYPE[a]	PITTSBURGH PERCENTAGE IN NEIGHBORHOOD TYPE	PHOENIX PERCENTAGE IN NEIGHBORHOOD TYPE
Higher-Income	18%	19%
Low-Poverty	38	24
Medium-Poverty	28	31
High-Poverty	15	26
Sample Size	(1,112)	(1,118)

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

NOTE: Percentages may not add to 100 percent because of rounding.

a. In this and subsequent tables in this chapter, neighborhood type categories are defined as follows:

Higher-income: those with low-income concentration between 0 and 25 percent.

Low-Poverty: those with low-income concentration between 25 and 35 percent.

Medium Poverty: those with low-income concentration between 35 and 50 percent.

High-Poverty: those with low-income concentration at or above 50 percent.

of these households were located in tracts in which more than one-quarter of the families had incomes under $5000 (slightly more than the overall concentration of low-income households in the cities). The concentration was roughly comparable in the two cities, with Phoenix households somewhat more concentrated in high-poverty areas.

Minority households in the experiment tended to be more highly concentrated in low-income areas than nonminorities, as shown in Table 2-2. The concentration was particularly high for black households in Phoenix, but in all cases the proportion of minority households in high-poverty tracts was much higher than the proportion of nonminority households. Table 2-3 shows that, for all races, Demand Experiment households' average incomes corresponded to the concentration of low-income households; that is, the average incomes were higher where the proportion of low-income households was smaller.

What is startling about the figures in Table 2-3 is that in Pittsburgh the mean income for black households in the high-poverty neighborhood category is higher than that of white households in the higher-income neighborhood category. The overall means are not very different: $3,634 for white households and $3,947 for black households. The distributions of households by race among the neighborhood types are, however, quite different so that the overall mean for white households is close to the mean for white households in low-poverty neighborhoods, while for black households the overall mean is close to that of black households in medium-poverty neighborhoods. This difference in overall mean incomes between black and white households is an artifact of the particular sample used in this report.[1] In fact, for the entire enrolled sample (not limited to those still active at one year and to households below the low-income eligibility limit) the means ($4,352 for white households and $4,326 for black households) are approximately equal for both racial groups, but the pattern of higher mean incomes for black households than for white households in each neighborhood category persists.

Low-Income Concentration and Housing Characteristics

The measure of low-income concentration used in this analysis tends to

[1] Because of differences for all enrolled households between black households and white households in the relationship between household size and income, the low-income eligibility requirements exclude proportionately more high-income white than black households.

Table 2-2

HOUSEHOLDS IN HIGHER-INCOME AND HIGH-POVERTY NEIGHBORHOODS AT ENROLLMENT BY RACE/ETHNICITY

RACE/ ETHNICITY	PITTSBURGH			PHOENIX		
	PERCENTAGE IN HIGHER-INCOME NEIGHBORHOODS	PERCENTAGE IN HIGH-POVERTY NEIGHBORHOODS	SAMPLE SIZE	PERCENTAGE IN HIGHER-INCOME NEIGHBORHOODS	PERCENTAGE IN HIGH-POVERTY NEIGHBORHOODS	SAMPLE SIZE
White	22%**	10%**	(830)	26%**	14%**	(699)
Black	6	30	(273)	0	72	(85)
Spanish American	NA[a]	NA	(NA)	7	41	(305)

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

a. NA = not applicable

** Chi-square statistic comparing racial/ethnic groups significant at the 0.01 level.

Table 2-3

MEAN HOUSEHOLD INCOME BY RACE BY NEIGHBORHOOD TYPE AT ENROLLMENT

PITTSBURGH

NEIGHBORHOOD TYPE	WHITE Mean Income	WHITE Sample Size	BLACK Mean Income	BLACK Sample Size
Higher-Income	$3,712	(180)	$4,172	(15)
Low-Poverty	3,673	(362)	4,141	(62)
Medium-Poverty	3,661	(198)	3,978	(113)
High-Poverty	3,212	(81)	3,719	(83)
F-statistic (degrees of freedom)	3.62*(3/817)		1.27 (3/269)	

PHOENIX

NEIGHBORHOOD TYPE	WHITE Mean Income	WHITE Sample Size	BLACK Mean Income	BLACK Sample Size	SPANISH AMERICAN Mean Income	SPANISH AMERICAN Sample Size
Higher-Income	$5,078	(183)	0	(0)	$5,185	(20)
Low-Poverty	4,665	(215)	3,907	(9)	4,808	(43)
Medium-Poverty	4,400	(197)	3,784	(15)	4,561	(114)
High-Poverty	3,864	(96)	3,594	(61)	4,311	(121)
F-statistic (degrees of freedom)	11.2**(3/687)		0.11 (3/81)		1.78 (3/274)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

* F-statistic significant at the 0.05 level.

** F-statistic significant at the 0.01 level.

reflect the quality of housing in the Census tracts. Table 2-4 shows this pattern for Pittsburgh and Phoenix as a whole. The neighborhoods with greater low-income concentrations have more rental housing, and that housing is older, more likely to lack complete plumbing facilities, and has lower rental values than the housing in the higher-income areas.

Particularly dramatic is the drop in the Rent-Quality Index[1] with increasing low-income concentration. The Rent-Quality Index is the proportion of rental units in a Census tract with complete plumbing facilities and rent above the C* level.[2] Although the Index is at best a crude proxy for housing quality, the chances of finding adequate housing diminish rapidly as rents decrease below the C* level.[3] Thus, the data suggest that households in higher-poverty areas might find that good housing could be relatively difficult to locate there.

These general patterns were reflected in the housing occupied by Demand Experiment households at the time of enrollment. Table 2-5 measures the units occupied at enrollment against the criteria used for Minimum Standards households. Only 12 percent of the units in high-poverty areas of Phoenix and 17 percent in Pittsburgh met the standards, compared with 51 percent and 47 percent respectively in the higher-income areas.

Given this difference in physical quality, it is not surprising that Demand Experiment households paid higher rents where there were lower concentrations of low-income households. Table 2-6 shows this pattern and indicates that difference in average rent was not an artifact of the number of rooms--rent per room also generally increased as the concentration of low-income households decreased. Further, although average incomes corresponded to the proportion of low-income households, as shown earlier, rent did not simply follow income. The households in higher-income neighborhoods spent a greater proportion of their income for rent than those where the low-income

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[1] See Appendix II for a more detailed definition of the Rent-Quality Index and its derivation.

[2] The C* rent level was estimated by local panels of housing experts at the cost of modest, adequate housing and is used as a basic payment level in the Housing Gap part of the experiment (see Appendix I).

[3] For estimates of the dependence on rent level of the probability of passing Minimum Standards, see Abt Associates Inc. (1975).

Table 2-4

MEAN VALUE OF SELECTED CENSUS TRACT CHARACTERISTICS
BY NEIGHBORHOOD TYPE
(Sample Size in Parentheses)

CENSUS TRACT CHARACTERISTIC	PITTSBURGH					PHOENIX				
	HIGHER-INCOME	LOW-POVERTY	MEDIUM-POVERTY	HIGH-POVERTY	F-STATISTIC (DEGREES OF FREEDOM)	HIGHER-INCOME	LOW-POVERTY	MEDIUM-POVERTY	HIGH-POVERTY	F-STATISTIC (DEGREES OF FREEDOM)
Median Gross Rent	$128 (204)	$ 98 (144)	$ 89 (86)	$ 78 (47)	75.8** (3/477)	$156 (113)	$127 (47)	$ 94 (37)	$ 71 (22)	59.8** (3/215)
Rent-Quality Index[a]	0.70 (158)	0.46 (128)	0.32 (82)	0.21 (46)	89.5** (3/410)	0.62 (81)	0.41 (45)	0.19 (34)	0.12 (21)	40.4** (3/177)
Percentage of Renter-Occupied Units	21% (218)	41% (144)	54% (87)	65% (47)	15.47** (3/492)	21% (119)	36% (49)	45% (38)	50% (24)	36.7** (3/226)
Percentage of Units Lacking Complete Plumbing	2 (218)	4 (144)	7 (87)	17 (47)	76.9** (3/492)	1 (119)	1 (49)	5 (38)	18 (24)	39.7** (3/226)
Percentage of Units Built Before 1950	55 (218)	87 (144)	91 (87)	85 (47)	132.2** (3/492)	9 (119)	24 (49)	39 (38)	56 (24)	79.2** (3/226)

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes).
NOTE: The sample size (number of Census tracts) varies due to missing data.
a. See Appendix II for the definition and derivation of the Rent-Quality Index.

** F-statistic significant at the 0.01 level.

Table 2-5

HOUSEHOLDS PASSING MINIMUM STANDARDS PHYSICAL REQUIREMENTS AT ENROLLMENT BY NEIGHBORHOOD TYPE

NEIGHBORHOOD TYPE	PITTSBURGH		PHOENIX	
	PERCENTAGE PASSING STANDARDS**	SAMPLE SIZE	PERCENTAGE PASSING STANDARDS**	SAMPLE SIZE
Higher-Income	47%	(199)	51%	(212)
Low-Poverty	32	(427)	36	(269)
Medium-Poverty	22	(313)	18	(334)
High-Poverty	17	(164)	12	(284)

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

** Chi-square statistic comparing neighborhood type for households passing or not passing the standards is significant at the 0.01 level.

Table 2-6

MEAN RENT AND RENT-PER-ROOM AT ENROLLMENT
BY NEIGHBORHOOD TYPE

NEIGHBORHOOD TYPE	RENT	SAMPLE SIZE	RENT/ROOM	SAMPLE SIZE
		PITTSBURGH		
Higher-Income	$129	(195)	$29.7	(195)
Low-Poverty	112	(424)	26.7	(423)
Medium-Poverty	101	(308)	24.4	(306)
High-Poverty	95	(160)	24.8	(160)
F-statistic (degrees of freedom)	44.1**(3/1083)		15.9**(3/1080)	
		PHOENIX		
Higher-Income	$167	(202)	$38.2	(202)
Low-Poverty	141	(264)	38.6	(263)
Medium-Poverty	116	(330)	31.2	(327)
High-Poverty	99	(280)	26.9	(279)
F-statistic (degrees of freedom)	136.1**(3/1072)		65.4**(3/1067)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

** F-statistic significant at the 0.01 level.

concentration was greater, as shown in Table 2-7.

Thus, the low-income concentration measure appears to characterize the housing conditions of tracts as well as of the people who live there. The next two sections examine the experience of Demand Experiment participants with respect to this measure.

2.2 CHANGES IN LOW-INCOME CONCENTRATION AND GEOGRAPHIC DISTRIBUTION

Using the measure of low-income concentration described above and taking into account the geographic patterns of moves, this section describes the changes in residential location that occurred for Experimental and Control households in the Demand Experiment. For the most part, the data show modest improvement in neighborhood quality--as reflected in household income of Census tract residents and housing conditions in the Census tracts--for both Experimental and Control households. The data also show no large-scale shifts in geographic patterns of household location.

Changes in Low-income Concentration

On the average, Demand Experiment households that moved chose neighborhoods with slightly lower concentrations of low-income households than their neighborhoods of origin.[1] The patterns are summarized in Table 2-8. At the time of enrollment, households in both Pittsburgh and Phoenix lived in tracts in which the average proportion of low-income families ranged from 35 to 41 percent. One year later, the average concentration ranged from 30 to 35 percent.

The patterns were essentially equivalent for Experimental and Control households. Although Table 2-8 indicates that Control households showed marginally greater changes, the difference in average changes for Experimental and Control households was not statistically significant. These figures suggest that the offer of a housing allowance subsidy had no strong effect on the general quality of the neighborhoods in which households chose to live.

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[1] Analyses in this report deal only with households that moved. Because only a fraction of the households moved (slightly less than one-half the Phoenix households and about one-quarter of those in Pittsburgh), the figures presented here cannot be taken as descriptive of an overall change in population distribution.

Table 2-7

MEAN RENT-INCOME RATIO AT ENROLLMENT
BY NEIGHBORHOOD TYPE

NEIGHBORHOOD TYPE	PITTSBURGH		PHOENIX	
	MEAN RENT-INCOME RATIO	SAMPLE SIZE	MEAN RENT-INCOME RATIO	SAMPLE SIZE
Higher-Income	0.48	(197)	0.46	(205)
Low-Poverty	0.41	(424)	0.41	(265)
Medium-Poverty	0.36	(311)	0.40	(332)
High-Poverty	0.36	(161)	0.36	(282)
F-statistic (degrees of freedom)	10.5**(3/1089)		4.4**(3/1080)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

** F-statistic significant at the 0.01 level.

Table 2-8

NET CHANGE IN LOW-INCOME CONCENTRATION
FOR EXPERIMENTAL AND CONTROL MOVERS

MEAN PERCENTAGE OF LOW-INCOME HOUSEHOLDS	PITTSBURGH			PHOENIX		
	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC (DEGREES OF FREEDOM)	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC (DEGREES OF FREEDOM)
In Enrollment Tract	36%	35%	-0.7 (272)	38%	41%	1.84 (500)
In Final Tract	34	30	2.17* (272)	34	35	1.0 (500)
Net Change in Low-Income Concentration[a]	-2	-5	1.37 (272)	-4	-6	0.9 (500)
Sample Size	(214)	(60)		(361)	(141)	

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. The net change is equal to the final low-income concentration minus the initial low-income concentration; therefore, a negative value indicates neighborhood improvement.

* t-statistic significant at the 0.05 level.

The patterns of change in low-income concentration are shown in somewhat more detail in Table 2-9, using the neighborhood categories defined earlier. The figures conform to the impressions derived from the comparison of means: most households did not make large changes in the character of the neighborhood they occupied, but more households moved to less-concentrated than to more-concentrated neighborhoods.

Using the four-way categorization of low-income concentration, it can be seen that most households moved to areas with low-income concentrations roughly similar to their origin neighborhoods.[1] In general, a majority of households moved to a neighborhood in the same category as their initial one. (The exceptions were Phoenix households in low-poverty areas and Pittsburgh households in high-poverty areas [Experimental households] and medium-poverty areas [Control households]). Households that did change categories generally moved to the adjacent category; that is, they moved up or down only one step on the scale.[2]

Not all households moved in the same direction, but somewhat more moved to neighborhoods with reduced low-income concentration than to neighborhoods with increased low-income concentration. Households at the ends of the scale could of course move in only one direction (that is, those in higher-income areas could only stay in that category or move to an area with more low-income families, and those in high-poverty areas could change only by reducing the concentration). However, the proportion of households in the higher-income areas moving down the scale was smaller than the proportion of those in high-poverty areas moving up. And among those in low-poverty and medium-poverty areas, the tendency was for more to move up than down.

Examination of Table 2-9 reveals no important differences between Experimental and Control households, although in some cases the small number of cases prohibits firm conclusions. Both the patterns described above--the high incidence of within-category moves and the tendency to reduce the low-income concentration--occurred for both groups alike. In most cases, the proportion

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[1] The sample includes households that moved but did not change Census tracts; overall, about one-quarter of the households that moved did so within their original tract.

[2] In addition, a majority of the households moving to higher-income tracts chose tracts immediately adjacent to lower-income tracts.

Table 2-9

DISTRIBUTION OF FINAL NEIGHBORHOOD TYPE
BY ENROLLMENT NEIGHBORHOOD TYPE

FINAL NEIGHBORHOOD TYPE	ENROLLMENT NEIGHBORHOOD TYPE							
	HIGHER-INCOME		LOW-POVERTY		MEDIUM-POVERTY		HIGH-POVERTY	
	Experimental Households	Control Households	Experimental Households	Control Households	Experimental Households	Control Households	Experimental Households	Control Households
				PITTSBURGH				
Higher-Income	62%	[90%]	20%	25%	9%	25%	12%	[17%]
Low-Poverty	21	[10]	53	61	25	31	36	[17]
Medium-Poverty	14	0	19	7	55	44	24	[17]
High-Poverty	3	0	7	7	11	0	27	[50]
Sample Size	(29)	(10)	(88)	(28)	(64)	(16]	(33]	(6)
				PHOENIX				
Higher-Income	62	79	37	33	19	22	12	7
Low-Poverty	18	12	45	33	22	24	12	10
Medium-Poverty	16	8	14	27	52	50	23	24
High-Poverty	4	0	4	7	6	4	53	58
Sample Size	(71)	(24)	(98)	(30)	(109)	(46)	(83]	(41]

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

NOTE: Brackets indicate percentages based on 15 or fewer observations.

staying within their original category and the distribution across other categories were quite similar for Experimental and Control households.

As might be expected from the patterns of change in low-income concentration, households also registered small gains in the housing conditions of their neighborhoods (as indicated by Census tract data). Table 2-10 shows that households on the average moved to tracts with a higher median rent and a higher Rent-Quality Index. Similarly, they moved to tracts with a smaller proportion of units lacking complete plumbing facilities and a lower median age of units. None of the differences between origin and destination neighborhood means are strikingly large, however. As in the case of low-income concentration, Control households show slightly larger gains than Experimental households, but generally not with statistical significance.

Changes in Geographic Distribution

The relatively small changes seen with the measure of low-income concentration suggest that there should also be little effect on the geographic distribution of families at the program sites. This impression was confirmed by spatial analysis of the locational changes of Demand Experiment households.

Pittsburgh and Phoenix Maps 1a illustrate the limited impact of household moving patterns. The maps were constructed by dividing the cities into one-mile squares, and calculating the net change due to moving of households for each square. The numbers show the net gain or loss of households; shading represents the concentration of low-income households. Contiguous groups of squares with net gains or net losses have been outlined. The maps indicate that few areas within the experimental sites experienced any discernible change in experimental population. In most cases, the net change was a gain or loss of fewer than three households.

In both Pittsburgh and Phoenix, however, it is possible to identify areas comprising several map squares that were gaining or losing residents. In most cases, the two types of areas seem to be paired--that is, an area characterized by a net loss of participants is close or immediately adjacent to an area showing a net gain. This suggests that households may have been "bailing out" of poor areas, but moving only short distances. One might speculate that households forgo more substantial gains in neighborhood quality in order to remain close to their original location.

Table 2-10

CHANGES IN NEIGHBORHOOD HOUSING CHARACTERISTICS FOR MOVERS
(Sample Size in Parentheses)

	MEAN AT ENROLLMENT			MEAN CHANGE AT ONE YEAR		
	Experimental Households	Control Households	t-Statistic (Degrees of Freedom)	Experimental Households	Control Households	t-Statistic (Degrees of Freedom)
			PITTSBURGH			
Median Gross Rent	$95 (214)	$94 (60)	0.25[b] (116)	$1.8 (214)	$5.4 (59)	-0.96 (271)
Rent-Quality Index[a]	0.41 (207)	0.41 (59)	0 (264)	1.4 (205)	1.8 (54)	-0.09 (257)
Percentage of Units Lacking Plumbing	7 (214)	5 (60)	-2.17*[b] (172)	-1.2 (214)	-1.1 (60)	0.13[b] (208)
Median Age of Dwelling Units	44 (214)	44 (60)	0.04 (272)	-1.0 (214)	-4.7 (60)	2.20* (272)
			PHOENIX			
Median Gross Rent	$106 (351)	$101 (141)	1.6 (500)	$7.2 (360)	$7.9 (140)	-0.23 (498)
Rent Quality Index[a]	0.32 (351)	0.29 (139)	1.32 (488)	2.4 (329)	3.2 (133)	-0.31 (460)
Percentage of Units Lacking Plumbing	4 (361)	5 (141)	1.65[b] (220)	-0.7 (361)	-0.8 (141)	-0.17[b] (286)
Median Age of Dwelling Units	20 (361)	21 (141)	-.42 (500)	-2.4 (361)	-3.5 (141)	1.26 (500)

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

NOTE: Sample sizes vary due to missing data.

a. See Appendix II for the definition and derivation of the Rent-Quality Index.

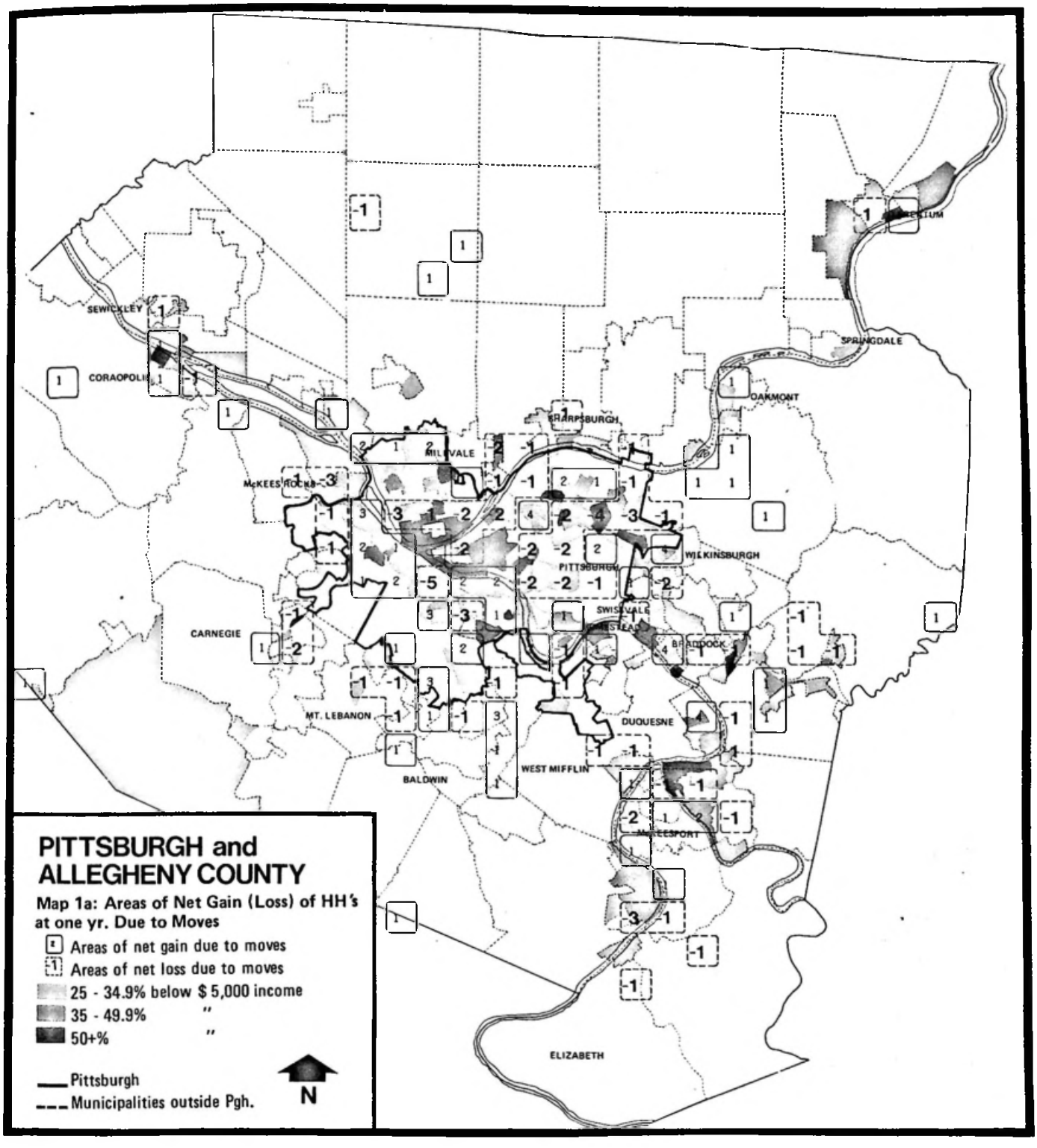
b. Because of unequal variances, the t-statistic is computed with separate variance estimates, and the degrees of freedom is computed approximately. See, for example, Blalock (1972), p. 226,227.

* t-statistic significant at the 0.05 level.

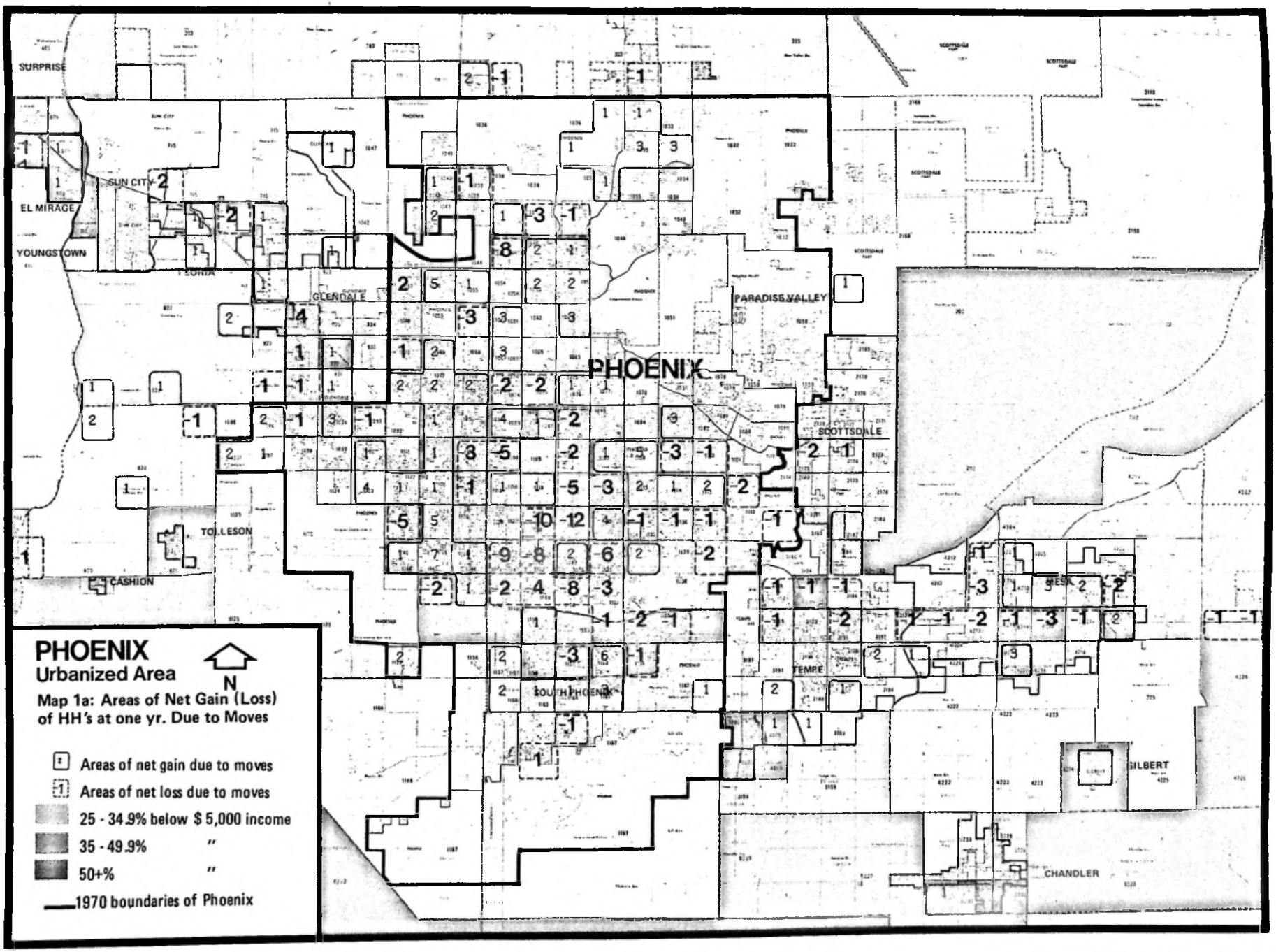
MAP 1a

PITTSBURGH AND PHOENIX

AREAS OF NET GAIN (LOSS) OF HOUSEHOLDS
AT ONE YEAR DUE TO MOVES



scale: 1 inch = 4 miles



scale: 1 inch = 3.7 miles

The relatively short moves imply that there was no substantial population movement from central city to suburbs. Table 2-11 illustrates the pattern further: with the exception of the Control households in Phoenix, the distribution of households between city and suburbs remained essentially unchanged.

The data confirm the notion that the neighborhoods that lose households generally have lower socioeconomic standing and lower housing quality than those gaining residents. Table 2-12 shows that the tracts with a net loss of Demand Experiment households were, on the average, characterized by lower household incomes and poorer housing conditions than the tracts gaining recipients; in most cases, the differences were statistically significant at the 0.05 level.

The analysis of geographic patterns has grouped Experimental and Control households because the number of Control households that moved is too small to examine separately. However, neither visual examination of the data nor the average changes examined above suggest any important difference between the locational outcomes for Experimental and Control households. In other words, the data provide no evidence that the offer of the housing allowance subsidy altered the patterns of residential change that would occur in the absence of the program.

2.3 FACTORS INFLUENCING CHANGES IN CONCENTRATION OF LOW-INCOME HOUSEHOLDS

The data presented above indicate that no large, overall differences exist between Experimental and Control households in their locational choices. It is still possible, however, that the program might influence the choices of particular kinds of households or of households in particular situations--that is, there could be interactions between program variables and other factors related to households' location decisions. This section presents some preliminary regression analyses suggesting that such experimental effects do exist. Because of the small overall differences between Experimental and Control households and the relatively small number of cases in some categories, however, further analysis using the two-year data base will be required for any firm conclusions about the nature and magnitude of the program effects.

Table 2-11

PERCENTAGE OF EXPERIMENTAL AND CONTROL MOVERS LIVING IN SUBURBS

HOUSEHOLD TYPE	PITTSBURGH			PHOENIX		
	PERCENTAGE IN SUBURBS AT ENROLLMENT	PERCENTAGE IN SUBURBS AT ONE YEAR	SAMPLE SIZE	PERCENTAGE IN SUBURBS AT ENROLLMENT	PERCENTAGE IN SUBURBS AT ONE YEAR	SAMPLE SIZE
Experimental Households	43%	45%	(214)	19%	19%	(361)
Control Households	53	52	(60)	23	30*	(141)

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

* Chi-square statistic comparing final and initial city-suburban distribution significant at the 0.05 level.

Table 2-12

MEAN VALUES OF SELECTED CENSUS TRACT CHARACTERISTICS
FOR TRACTS LOSING OR GAINING HOUSEHOLDS
(Sample Size in Parentheses)

CENSUS TRACT CHARACTERISTICS	PITTSBURGH MEAN VALUES FOR			PHOENIX MEAN VALUES FOR		
	Tracts With a Net Loss	Tracts With a Gain or No Change	t-Statistic[b] (degrees of freedom)	Tracts With a Net Loss	Tracts With a Gain or No Change	t-Statistic[b] (degrees of freedom)
Percentage of Units Lacking Complete Plumbing Facilities	7% (86)	5% (198)	2.37* (127)	4% (52)	4% (87)	0.35 (137)
Rent-Quality Index[a]	0.42 (83)	0.43 (188)	-0.33 (269)	0.35 (51)	0.37 (75)	-0.37 (124)
Median Gross Rent	$ 97 (86)	$ 99 (198)	-0.61 (282)	$109 (52)	$119 (86)	-1.66 (136)
Percentage of Renter-Occupied Units	48 (86)	42 (198)	2.46* (282)	46 (52)	35 (87)	3.75** (137)
Percentage of Units Built Before 1950	87 (86)	80 (198)	3.23** (282)	36 (52)	24 (87)	3.12** (137)
Percentage of Households With Incomes of Less than $5,000	36 (86)	32 (198)	2.59** (282)	37 (52)	30 (87)	2.79** (137)

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligiblity limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First, and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

NOTE: Loss or gain defined as loss or gain of Demand Experiment households that moved during the first year. The sample size varies due to missing data.

a. See Appendix II for the definition and derivation of the Rent-Quality Index.

b. Because of unequal variances, the t-statistic is computed with separate variance estimates, and the degrees of freedom is determined approximately. See, for example, Blalock (1972), p. 226,227.

* t-statistic significant at the 0.05 level.

** t-statistic significant at the 0.01 level.

Analytic Framework

The dependent variable used in the regression analyses was low-income concentration (as defined in Section 2.1) for the area in which the household lived approximately one year after enrollment in the experiment. The exploratory analysis focused on three groups of independent variables: variables describing the neighborhood in which the household lived at the time of enrollment, variables describing the housing unit in which the household lived at that time, and demographic variables.[1]

The two neighborhood variables used were low-income concentration and racial concentration in the initial tract. The analysis presented in Section 2.1 indicates a close relationship between initial and final low-income concentration. Subsequent sections suggest similar links between initial and final racial/ethnic composition of neighborhoods (see Chapter 3). Analysis of the Pittsburgh data therefore included a variable representing the proportion of tract households that were black; the Phoenix analysis included an equivalent variable for the proportion of Spanish American households in the initial tract.

Two variables related to housing quality were included: rent and whether the unit would meet the quality standards used to judge the acceptability of units for households in the Minimum Standards treatment groups. These variables describe one set of initial conditions (housing unit quality) that might be related to the extent and nature of location changes that households seek. (For example, Housing Gap households not meeting standards might be motivated to concentrate on obtaining adequate quality housing rather than satisfying their locational preferences.) Further, because Housing Gap households were required to find units passing program requirements to receive a subsidy, and Percent of Rent households received payments proportional to their rent level, these factors might be expected to influence

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[1] One might also postulate that subjective measures of neighborhood and possibly housing unit conditions, which are important in the analysis of search behavior (Weinberg et al., 1977), play a role in determining a household's choice of neighborhood. Preliminary work with variables describing perceptions of neighborhood quality is presented in Chapter 4 and Appendix IV. Analysis of two-year data will explore the importance of the perceived neighborhood quality variable, as well as other attitudinal data in neighborhood choice decisions.

program participants' decisions about where to live.[1]

The demographic variables included a variety of factors that might be expected to be related to people's locational decisions. Age, household size, and sex of household head were hypothesized to be related to "life cycle" stages during which households differ in their mobility and perhaps their neighborhood preferences. Income and educational attainment are socioeconomic factors that might lead households to choose neighborhoods of a particular socioeconomic standing. Racial/ethnic background--whether the household head is black or Spanish American--might be related either to the household's choice of locations or to the market response (that is, the forces causing residential segregation may restrict the household's choices).

Initial regression equations were estimated using all the variables described above. When all variables are included, some multicollinearity occurs; possible steps to reduce it, including exploratory work with a reduced-form equation, are discussed later. Initial analyses pooled Experimental and Control households at each site. Because some simple-product interaction terms involving the Experimental/Control dummy variable proved to be significant, it was decided to estimate separate equations for Experimental and Control households. The results of that estimation are shown below.

Results of Initial Regression Analyses

The variables chosen for the regression analyses are indicated in Table 2-13. The results of the initial regression analyses are presented in Tables 2-14 for Pittsburgh and 2-15 for Phoenix. Two interesting patterns emerged from the analysis.

First, the explanatory power of the equation appears to be greater for Control households than for Experimental households. The coefficient of determination (R^2) is 0.57 for Control households in Pittsburgh and 0.47 in Phoenix, compared to 0.25 and 0.39 for the Experimental groups. The difference in the R^2 for the Experimental equation compared to the Control equation is

[1]For example, Weinberg et al. (1977) find that whether the unit would meet program standards is significantly related to the decision to search for new housing.

Table 2-13

VARIABLES USED IN REGRESSION ANALYSIS

VARIABLE	DESCRIPTION
Initial Low-Income Concentration	Percentage of households in the Census tract with total household income under $5,000 (1970 Census)
Proportion of Black Population in Census Tract	Proportion of black population in the Census tract (1970 Census)
Rent ($10)	Rent in tens of dollars
Passed Minimum Standards Requirements	=1 if unit passes Minimum Standards requirements =0 if otherwise
Age of Head of Household	Age (years) of household head
Education (Years)	Education (years) of head of household
Sex	=1 if head of household is male =0 if otherwise
Income ($100s)	Annual household income ($100)
Household Size	Household size (number of persons)
Black Head of Household	=1 if head of household is black =0 if otherwise
Spanish American Head of Household	=1 if head of household is Spanish American =0 if otherwise

Table 2-14

REGRESSION COEFFICIENTS OF FINAL LOW-INCOME CONCENTRATION ON NEIGHBORHOOD, HOUSING AND DEMOGRAPHIC VARIABLES: PITTSBURGH
(Standard Error in Parentheses)

VARIABLE[a]	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC[b,c] (DEGREES OF FREEDOM)
Initial Low-Income Concentration	0.2543** (0.0778)	0.7887** (0.1783)	-2.774** (64)
Proportion of Black Population in Census Tract	-2.3982 (5.0241)	3.2964 (9.7593)	-0.524 (71)
Rent ($10s)	-0.2255 (0.2892)	0.1337 (0.4424)	-0.685 (89)
Passed Minimum Standards Requirements	-3.6187 (2.0457)	9.3755** (3.4143)	-3.293** (81)
Age of Head of Household	0.0976 (0.0597)	-0.0449 (0.1065)	1.178 (76)
Education (Years)	-0.3072 (0.3386)	-1.459 (0.7026)	1.085 (68)
Sex	0.8654 (1.7614)	-6.0906 (3.3353)	1.861 (73)
Income ($100s)	-0.1390 (0.0986)	0.1062 (0.1529)	-1.359 (88)
Household Size (Persons)	2.0121** (0.7036)	-0.7313 (1.2878)	1.886 (75)
Black Head of Household	7.4140* (2.9005)	4.8318 (4.7938)	0.465 (82)
Constant	25.1648	11.8270	
R^2	0.249	0.574	
Overall F-Statistic	6.480**	6.073**	
Standard Error	11.365	10.007	
Sample Size	(206)	(56)	

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interview, Initial Household Report Form, Housing Evaluation Form.

a. All variables measured at enrollment.

b. Because of unequal variances, the t-statistic is computed with separate variance estimates, and the degrees of freedom is determined approximately. See, for example, Blalock (1972), pp. 226-27.

c. Comparing Experimental and Control household regression coefficients.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

Table 2-15

REGRESSION COEFFICIENTS OF FINAL LOW-INCOME CONCENTRATION ON NEIGHBORHOOD, HOUSING AND DEMOGRAPHIC VARIABLES: PHOENIX
(Standard Error in Parentheses)

VARIABLE[a]	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC[b,c] (DEGREES OF FREEDOM)
Initial Low-Income Concentration	0.2621** (0.0613)	0.4156** (0.1041)	1.285 (202)
Proportion of Spanish American Population in Census Tract	9.769* (4.317)	8.347 (7.887)	0.159 (191)
Rent ($10s)	-0.5722** (0.1990)	-0.8568* (0.3830)	0.661 (183)
Passed Minimum Standards Requirements	-2.169 (1.656)	-0.1274 (2.839)	-0.623 (200)
Age of Head of Household	0.1079 (0.0462)	0.335 (0.0840)	0.779 (191)
Education (Years)	0.0322 (0.2455)	-0.2945 (0.4380)	0.653 (194)
Sex	0.5306 (1.473)	3.485 (2.467)	-1.03 (205)
Income ($100s)	0.0200 (0.0479)	-0.0407 (0.0756)	0.681 (216)
Household Size (Persons)	0.2813 (0.4454)	1.142 (0.7431)	0.997 (205)
Black Head of Household	12.49** (2.951)	0.8968 (3.878)	2.39* (259)
Spanish American Head of Household	4.246* (1.763)	-4.528 (3.176)	2.42* (192)
Constant	21.28	25.17	
R^2	0.388	0.473	
Overall F-Statistic	18.6**	9.5**	
Standard Error	12.2	12.3	
Sample Size	(335)	(128)	

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. All variables measured at enrollment.

b. Because of unequal variances, the t-statistic is computed with separate variance estimates and the degrees of freedom is determined approximately. See, for example, Blalock (1972), pp. 226-27.

c. Comparing Experimental and Control household regression coefficients.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

significant at the 0.01 level in Pittsburgh, and not significant in Phoenix.[1] The factors included in the analysis are more effective in explaining the choices made by Control households than those made by Experimental households in Pittsburgh. This suggests for Pittsburgh households that the introduction of the housing allowance program alters the process of locational choice in such a way that factors omitted from the specified regression become important influences on the choice of locations.

Second, there are some differences in the coefficients for the Experimental and Control equations, although caution must be exercised in interpreting the differences owing to multicollinearity. In Pittsburgh, for example, there are significant differences between the Experimental and Control equation coefficients for the variables describing initial low-income concentration and whether the initial unit would have passed program standards. In Phoenix, the variables defining the racial/ethnic origin of the head of household are significantly different for Experimental and Control equations. These differences imply that the offer of a housing allowance subsidy alters the pattern of factors that influence households' locational choices.

Further Analysis Required

The results of the initial regressions indicate a need for additional analysis, both to confirm the apparent differences between Experimental and Control households (that is, to be completely sure that they are not statistical artifacts) and to understand the implications of the differences. Most of the additional analyses will be undertaken on the two-year data base, which is expected to offer a somewhat larger number of cases for analysis (by including households that moved in the second year), and which will be more definitive in the measurement of locational changes.

Some analyses have already been undertaken on the one-year data base, however, to provide at least a preliminary confirmation of the stability of the differences between the factors influencing locational choices of Experimental and Control households. To reduce multicollinearity, regression equations were estimated using a subset of the variables included in the

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[1] The test for the difference (Rao, 1970, pp. 112-113) is a rather conservative test on whether the regression lines of the two equations differ from a common regression line.

initial regression analysis. The procedure for selecting the subset of variables is described in Appendix III. In addition, separate equations were estimated for white households and Spanish American households in Phoenix. The results are shown in Tables 2-16, 2-17, and 2-18.

As the tables show, differences remain in the explanatory power of the analyses for Experimental and Control households. For Control households the R^2 is 0.51 in Pittsburgh, 0.32 for whites in Phoenix, and 0.48 for Spanish Americans in Phoenix; the corresponding statistics for Experimental households are 0.23, 0.20, and 0.23 respectively.[1] The pattern of differences in the coefficients is less clear, however. A significant difference in the coefficients for initial low-income concentration for Experimental and Control households exists in Pittsburgh and for white households in Phoenix. The constant terms in the Experimental and Control cells differ substantially for Pittsburgh and for Spanish Americans in Phoenix. The coefficient for initial housing quality differs significantly in Pittsburgh but not elsewhere. No other differences are significant.

The variable describing initial low-income concentration presents a particularly interesting case for further analysis. In all three of the analyses (Tables 2-16 through 2-18), initial concentration was positively and significantly related to final concentration. This would be expected, given the patterns of relatively small change shown in Section 2.2. More interesting is the fact that in all three cases the coefficient for the Control group is larger than that for the Experimental group, and in two of the three cases that difference in coefficients is significant.

The larger coefficient for Control households implies that the housing allowance offer acts in a compensatory fashion. That is, Experimental households living in poor neighborhoods (neighborhoods with heavy concentrations of low-income households) are likely to be less affected by the condition of their origin neighborhood than Control households starting in similar situations. For households initially living in neighborhoods with lesser low-income concentrations, the difference between Experimental and Control households diminishes.

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[1] Again, the difference in R^2 for the Experimental and Control equations is significant at the 0.01 level in Pittsburgh, but not significant for the Phoenix equations.

Table 2-16

REGRESSION COEFFICIENT ANALYSIS OF FINAL LOW-INCOME CONCENTRATION FOR EXPERIMENTAL AND CONTROL HOUSEHOLDS: PITTSBURGH
(Standard Error in Parentheses)

VARIABLE[a]	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC[b,c] (DEGREES OF FREEDOM)
Low-Income Concentration	0.2730** (0.0669)	0.7432** (0.1253)	3.34** (83)
Passed Minimum Standards Requirements	-4.6970* (1.9065)	8.3527* (3.2983)	3.45** (89)
Age of Head of Household	0.1167* (0.0521)	0.0358 (0.0923)	0.77 (87)
Black Head of Household	6.3688** (1.9866)	8.9050* (3.6838)	0.61 (84)
Household Size (Persons)	1.3510* (0.5268)	-0.5477 (0.9520)	1.76 (86)
Constant	15.38	1.198	
R^2	0.229	0.510	
Overall F-Statistic	12.0**	10.6**	
Standard Error	11.4	10.1	
Sample Size	(209)	(57)	

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. All variables measured at enrollment.

b. Because of unequal variances, the t-statistic is computed with separate variance estimates and the degrees of freedom is determined approximately. See, for example, Blalock (1972), pp. 226-27.

c. Comparing Experimental and Control household regression coefficients.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

Table 2-17

REGRESSION COEFFICIENTS OF FINAL LOW-INCOME CONCENTRATION FOR EXPERIMENTAL AND CONTROL WHITE MOVERS: PHOENIX
(Standard Error in Parentheses)

VARIABLE[a]	EXPERIMENTAL MOVERS	CONTROL MOVERS	t-STATISTIC[b,c] (DEGREES OF FREEDOM)
Initial Low-Income Concentration	0.3439** (0.0652)	0.6314** (0.1185)	2.14* (128)
Passed Minimum Standards Requirements	-3.0228 (1.7055)	-1.3958 (3.440)	0.426 (119)
Age of Head of Household	0.1489** (0.0508)	-0.0397 (0.096)	1.746 (124)
Income ($100s)	0.0351 (0.0518)	-0.0411 (0.0885)	0.747 (135)
Constant	11.368	-12.805	
R^2	0.199	0.315	
Overall F-Statistic	12.99**	8.96**	
Standard Error	11.8	13.4	
Sample Size	(214)	(83)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligiblity limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. All variables measured at enrollment.

b. Because of unequal variances, the t-statistic is computed with separate variance estimates and the degrees of freedom is determined approximately. See, for example, Blalock (1972), pp. 226-27.

c. Comparing Experimental and Control household regression coefficients

* Significant at the 0.05 level.

** Significant at the 0.01 level.

Table 2-18

REGRESSION COEFFICIENTS OF LOW-INCOME CONCENTRATION FOR EXPERIMENTAL AND CONTROL SPANISH AMERICAN MOVERS: PHOENIX
(Standard Error in Parentheses)

VARIABLE[a]	EXPERIMENTAL MOVERS	CONTROL MOVERS	t-STATISTIC[b,c] (DEGREES OF FREEDOM)
Initial Low-Income Concentration	0.4702** (0.0982)	0.5928** (0.1396)	0.728 (57)
Passed Minimum Standards REuqirements	-4.6622 (3.991)	-0.0818 (5.6122)	0.674 (58)
Age of Head of Household	0.0092 (0.1373)	0.3086 (0.1609)	1.434 (71)
Income ($100s)	-0.0634 (0.0842)	0.0004 (0.1068)	0.475 (65)
Constant	22.15	0.6154	
R^2	0.231	0.480	
Overall F-Statistic	6.90**	6.24**	
Standard Error	13.8	10.8	
Sample Size	(97)	(32)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. All variables measured at enrollment.

b. Because of unequal variances, the t-statistic is computed with separate variance estimates and the degrees of freedom is determined approximately. See, for example, Blalock (1972), pp. 226-27.

c. Comparing Experimental and Control household regression coefficients.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

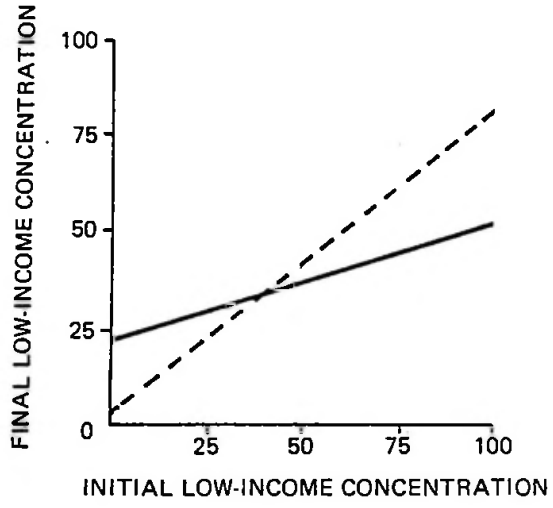
A curious implication of the equations estimated is that, for households originally residing in the relatively higher-income neighborhoods, the pattern is actually reversed: Control households at the end of one year lived in somewhat better neighborhoods than Experimental households. The point is illustrated in Figure 2-1: regression lines are plotted for Experimental and Control households using the equations presented in Tables 2-16 and 2-17, evaluating the equations with all variables set at their mean values except original low-income concentration. The intersection of the lines corresponds to the fact that Control households in the relatively higher-income neighborhoods were more likely than Experimental households to move to neighborhoods with equivalent or reduced low-income concentrations (this pattern can also be seen in Tables 2-9 and 2-10). Given the small numbers involved,[1] this phenomenon of apparently opposite program effects depending on location may be unstable or unimportant. Alternatively, it may represent a real influence of the program: for example, households who had accepted low-quality units in order to live in good neighborhoods might be reversing that tradeoff in order to meet program standards for unit quality. These and similar issues must be explored with the two-year data base to determine more precisely the ways in which the housing allowance program can influence locational choices.

[1] If only a few more Control households beginning in higher-income areas had moved to areas with higher low-income concentrations, the overall pattern might change.

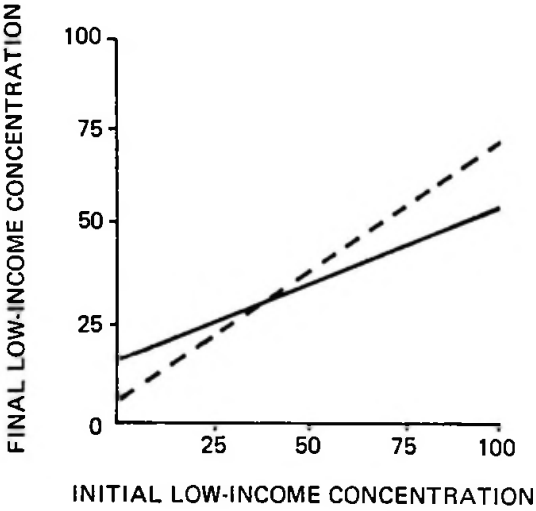
Figure 2–1

FINAL LOW-INCOME CONCENTRATION vs INITIAL LOW-INCOME CONCENTRATION FOR EXPERIMENTAL AND CONTROL MOVERS

Pittsburgh (All Households)



Phoenix (White Households)



Sample: Experimental and Control Movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

Data Sources: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form.

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CHAPTER 3

RACIAL AND ETHNIC CONCENTRATION

An important issue in the Demand Experiment is the extent to which a housing allowance increases the housing and neighborhood choices available to minority households. One of several possible ways to approach this issue is to investigate the extent to which a housing allowance stimulates minority households to break out of the patterns of minority concentration existing at both sites.[1] The assumption behind this approach is that the residential concentration of minorities is the result of a restriction of residential choices.[2]

This chapter identifies the existing degree of racial or ethnic separation at the experimental sites by examining concentrations of black and Spanish American households at the Census tract level and, subject to limitations of sample size, explores the extent to which a housing allowance program leads participants to reduce the degree of racial or ethnic concentration. The analysis of changes in concentration was based on households moving in the first year of the experiment. The initial focus was upon black households because they constitute the largest racial minority at both experimental sites. Spanish Americans are the largest minority group in Phoenix and are discussed later in this chapter.

Unfortunately, the analysis of program effects is severely constrained by sample size, especially for analysis of black households.[3] Households

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[1]For a discussion of problems in searching for housing and in moving perceived by minority households see Weinberg et al. (1977).

[2]No attempt is made in this report to determine the extent to which racial or ethnic concentration is the result of discrimination.

[3]For the sample used in this report, 62 Pittsburgh black households (of which only 12 were Control households) moved during the first year. Black households that moved in Phoenix amounted to 24 Experimental households and 16 Control households. The sample of Spanish American movers available for this analysis was somewhat larger, 142 (including 36 Control households).

offered the various housing allowances in the Demand Experiment did not necessarily move, even though for many the offers could best be realized by moving. Instead, normal mobility rates persisted (see Weinberg et al., 1977). Because an analysis of changes in racial or ethnic concentration is based upon movers, the sample for analysis is small. Even the additional moves made by households in the second year are not likely to relieve this limitation of the analysis.[1]

The incidence of racial concentration in the two experimental sites is presented in Section 3.1. Even though limited by small samples, the analysis in Section 3.2 explores changes in black concentration between origin and destination Census tracts for both black and white Experimental and Control households that moved in the first year. Section 3.3 describes the corresponding results for Spanish American households in Phoenix.

3.1 INITIAL PATTERNS OF RACIAL CONCENTRATION

The Working Paper on Early Findings (Abt Associates Inc., 1975) showed that there were generally patterns of racial separation and concomitant patterns of black concentration at both sites for the total population and for Demand Experiment enrollees.[2] Maps 2 and 3 display those patterns in Pittsburgh and Phoenix for the total population and for the sample of black and white households analyzed in this report.[3] A comparison indicates

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[1] For example, even if the number of black Control movers in Pittsburgh over the two-year period amounts to double the present number (24), there will be limited opportunity to disaggregate the sample.

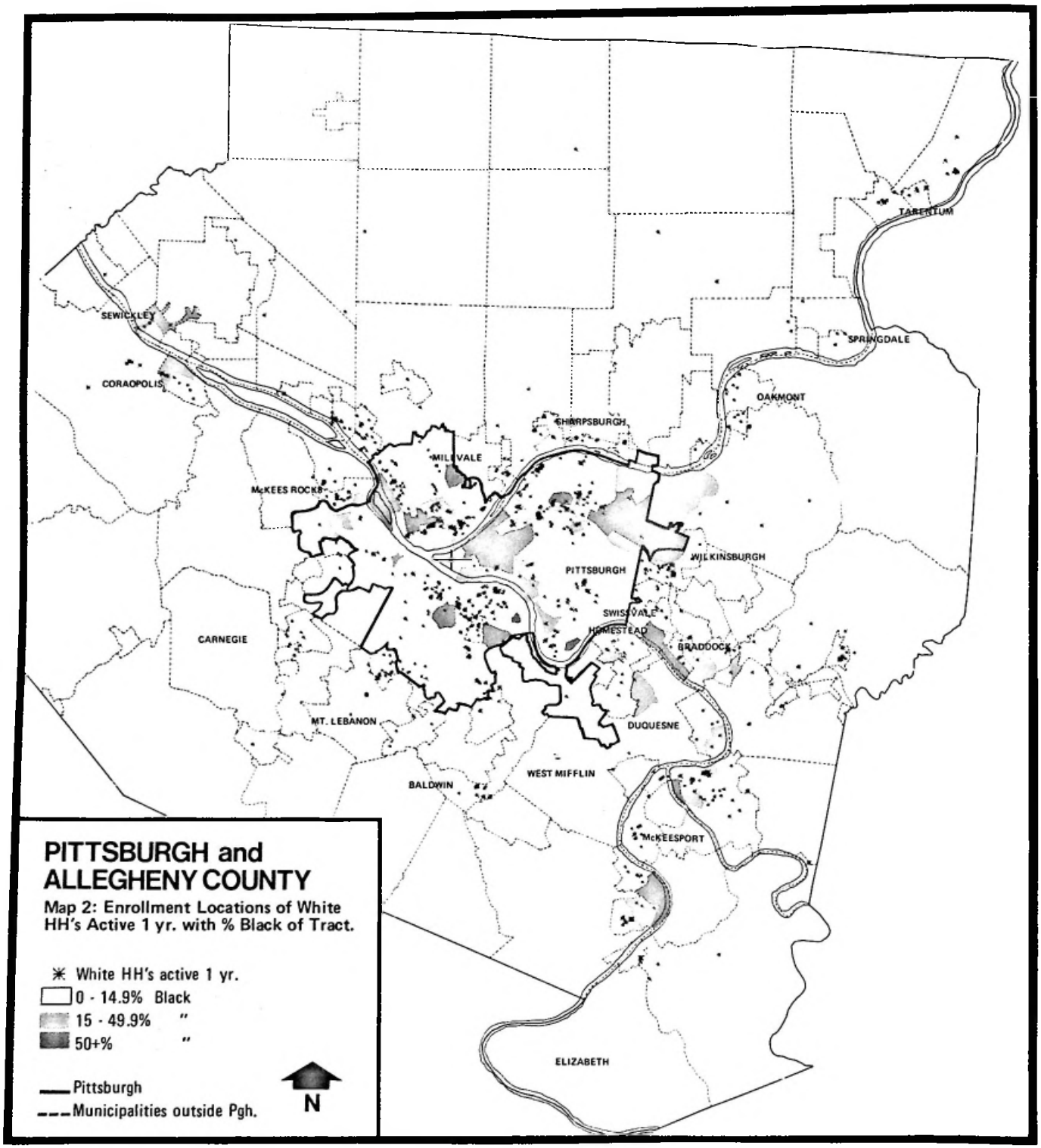
[2] The Working Paper on Early Findings also pointed out that especially in Pittsburgh the locations of black and white enrollees suggested a fine scale of racial separation. In most Census tracts where there were black households, the blacks were separated from whites. Such microstructure is not of fundamental concern here where the issues relate to gross patterns of racial concentration and to accessibility rather than the racial identity of proximate neighbors.

[3] The sample differs only slightly from the one used in the Working Paper on Early Findings. Here only households that were still active in the experiment after a year are shown. To remain active a household had to continue to satisfy the reporting requirements whether or not the household also qualified for an allowance payment. It is these households for which change data are available. The current sample is also truncated on household income (see Appendix II). This was necessary to achieve
(footnote continued on page 63)

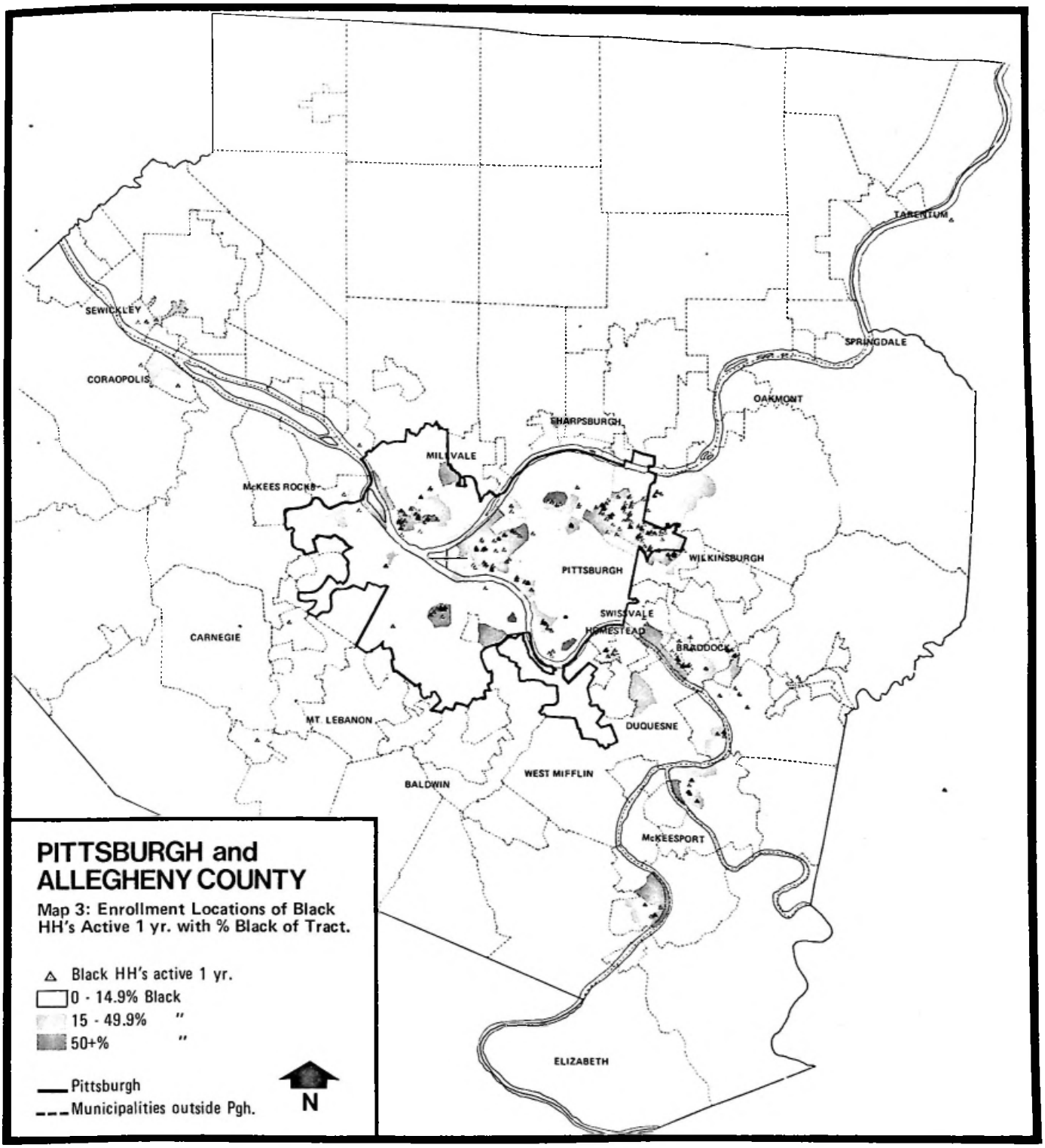
MAPS 2 AND 3

PITTSBURGH

COMPARISON OF LOCATIONS
OF BLACK AND WHITE HOUSEHOLDS



scale: 1 inch = 4 miles

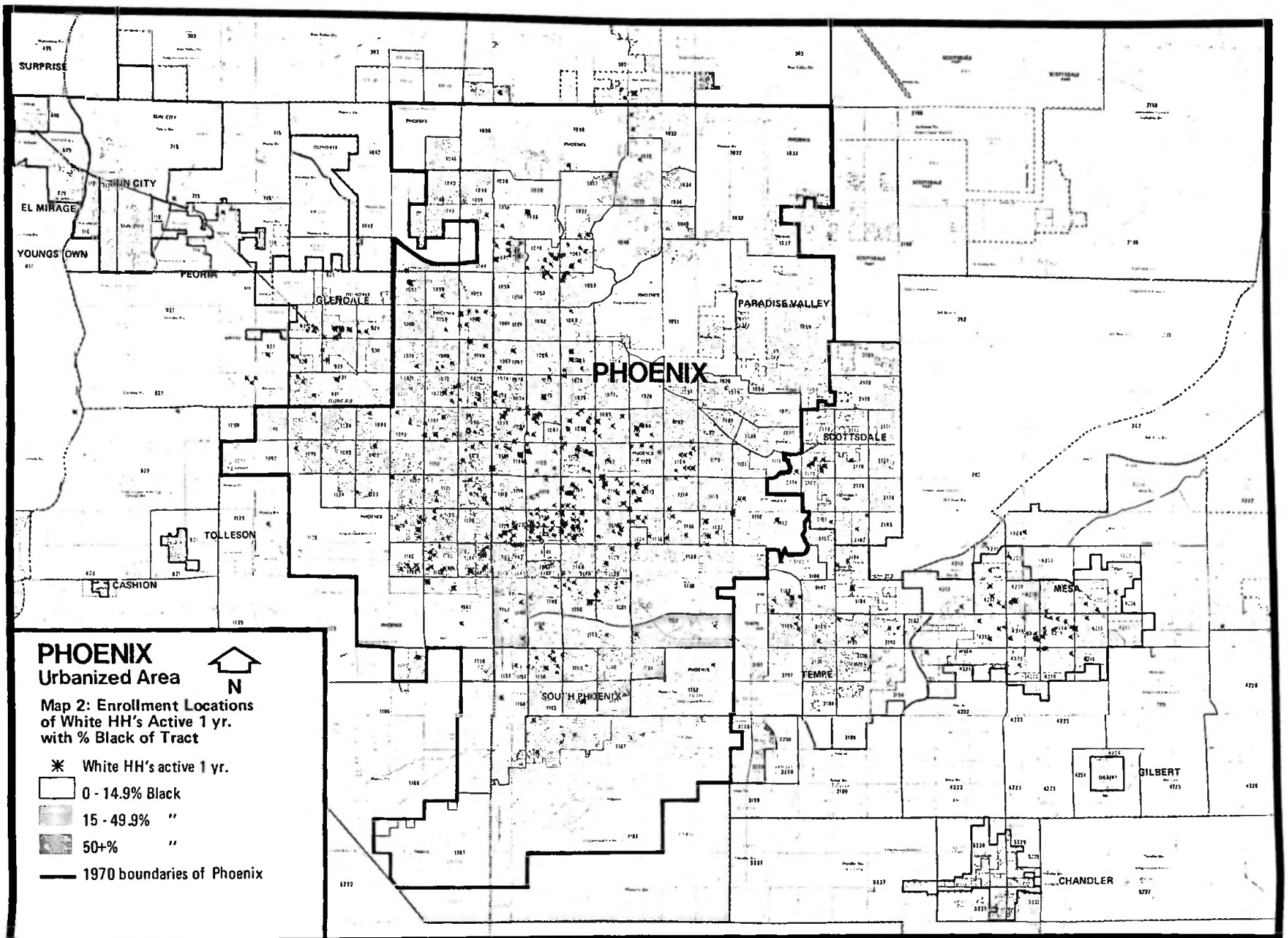


scale: 1 inch = 4 miles

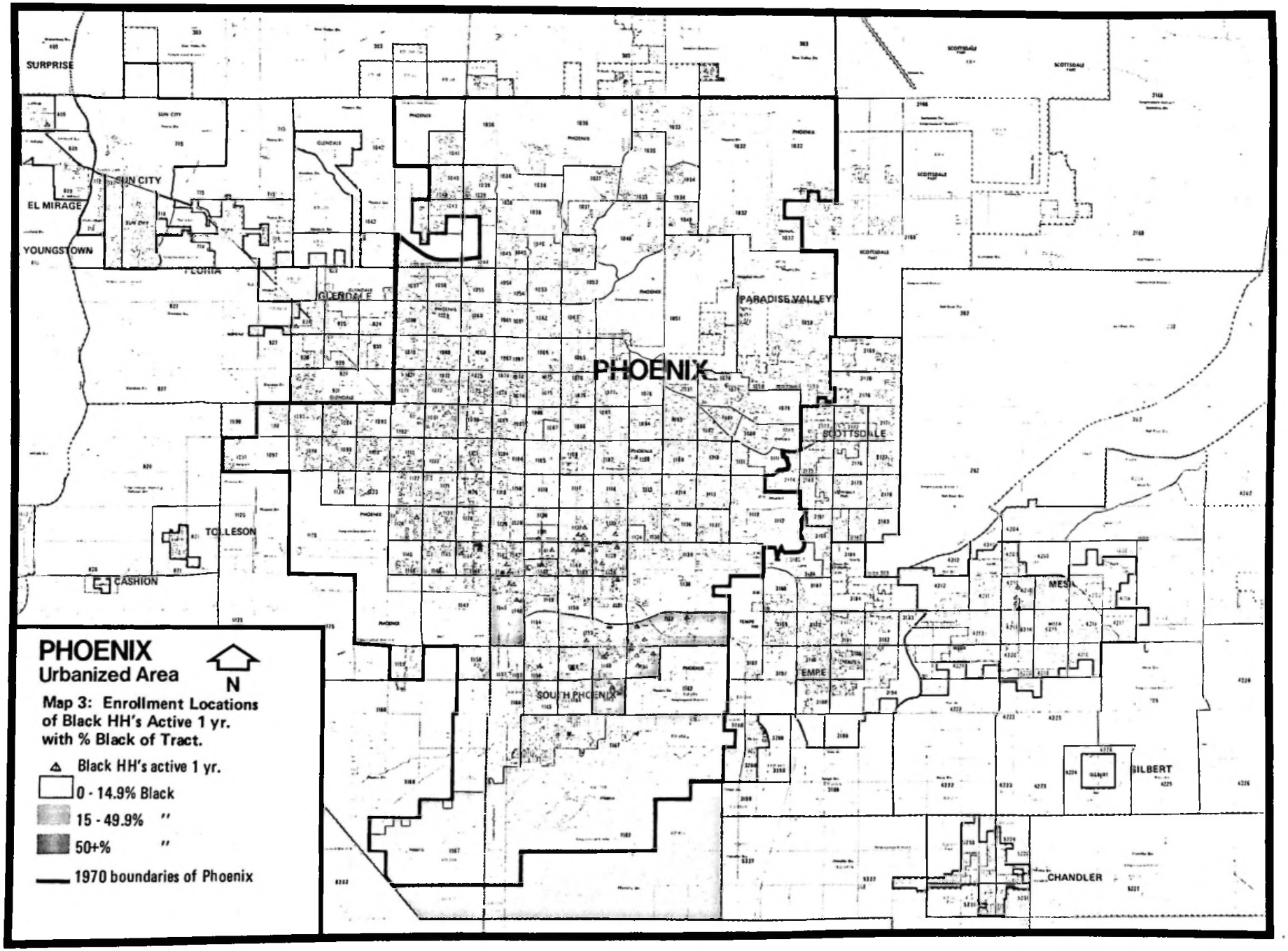
MAPS 2 AND 3

PHOENIX

COMPARISON OF LOCATIONS
OF BLACK AND WHITE HOUSEHOLDS



scale: 1 inch = 3.7 miles



scale: 1 inch = 3.7 miles

that black households generally live in areas different from white households.

The measure used in the Working Paper on Early Findings and in this report to characterize racial concentration is the percentage of black population in the Census tract in 1970.[1] In the absence of racial separation, one would expect that the distribution of blacks and whites or Spanish Americans would be similar.[2] They are not. Figures 3-1 and 3-2 show that black households in the Demand Experiment were, at the time of enrollment, generally living in areas with higher concentrations of blacks than were white households.

In order to facilitate further discussion and in order to distinguish clustering of black households, four types of tracts or neighborhoods are defined:

Black Neighborhoods:	Contiguous groups of tracts with 50 percent or more black population.
Boundary Neighborhoods:	Contiguous groups of tracts with 15 or 50 percent black population directly adjacent to black neighborhoods.

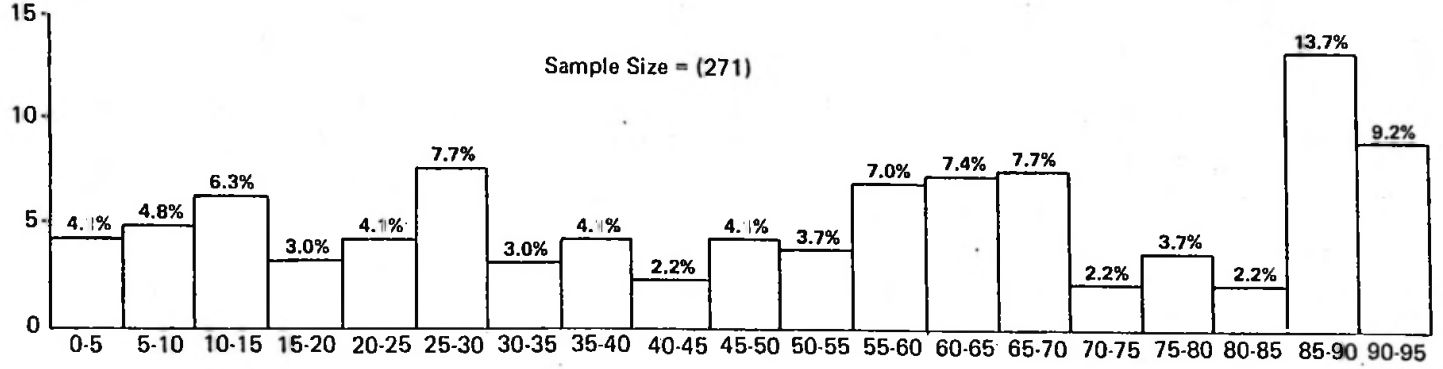
(footnote continued from page 54)
comparability across Experimental and Control households, because households were enrolled under differing rules for income eligibility.

[1]The characterization is approximate, of course, as a descriptor of the Census tracts in which households in the Demand Experiment were located during the period of observation (late 1973 through early 1975). Informal discussions with knowledgeable persons at both sites indicate that in all likelihood the intervening changes in racial concentration did not markedly diminish black concentrations in tracts with high black concentrations in 1970. Boundary tracts, that is, those adjacent to tracts with a high percentage of black population, may have had increases in racial concentration since 1970. The upshot is that the 1970 Census tract concentrations may underestimate the racial concentrations of those in boundary tracts and that changes for black movers in the experiment may be overestimated, if they moved from highly concentrated tracts to adjacent ones.

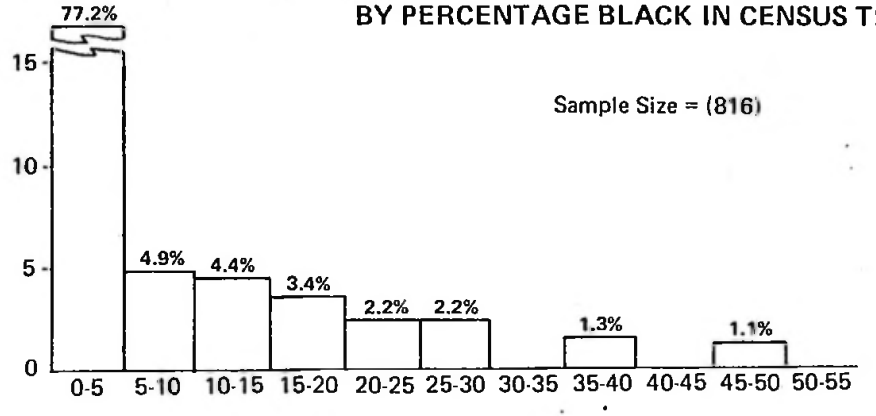
[2]Economic segregation probably does not explain the racial separation observed. The study by the Taeubers (1968) established that in most American cities racially segregated patterns of residence are not the result of economic segregation, since higher-income blacks also live separately from whites.

Figure 3–1

DISTRIBUTION OF BLACK HOUSEHOLDS AT ENROLLMENT
BY PERCENTAGE BLACK IN CENSUS TRACT: PITTSBURGH



DISTRIBUTION OF WHITE HOUSEHOLDS AT ENROLLMENT
BY PERCENTAGE BLACK IN CENSUS TRACT



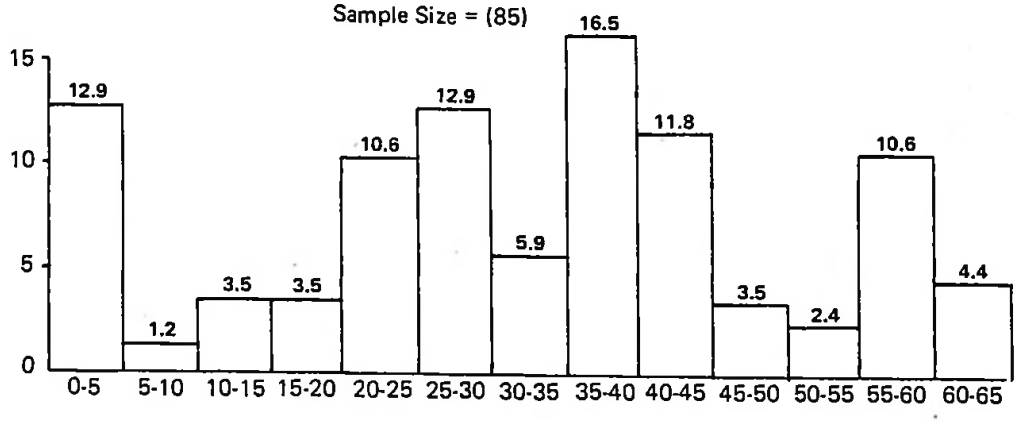
SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form.

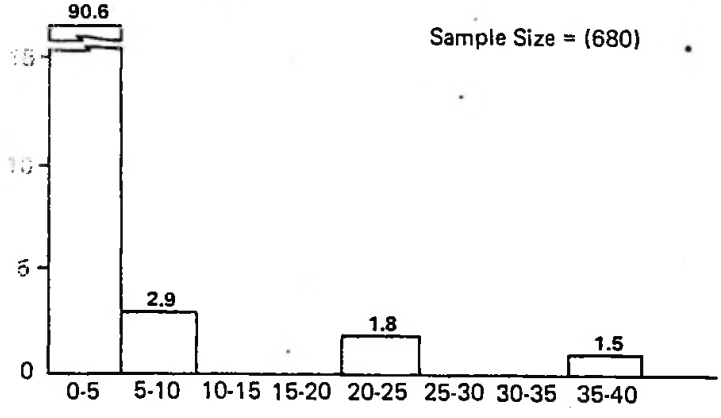
NOTE: Percentages less than one are not shown.

Figure 3–2

DISTRIBUTION OF BLACK HOUSEHOLDS AT ENROLLMENT
BY PERCENTAGE BLACK IN CENSUS TRACT: PHOENIX



DISTRIBUTION OF WHITE HOUSEHOLDS AT ENROLLMENT
BY PERCENTAGE BLACK IN CENSUS TRACT



SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form.

NOTE: Percentages less than one are not shown.

Black Enclaves:	Contiguous groups of tracts with 15 to 50 percent black population not directly adjacent to black neighborhoods.
White Neighborhoods:	All tracts with less than 15 percent black population.

Boundary neighborhoods are distinguished from black enclaves primarily because the two are geographically distinct. Either type of neighborhood is probably subject to a more rapid racial transition than the extreme black or white neighborhoods and therefore to be somewhat less accurately classified on the basis of 1970 Census data.

The distribution of black households among these four neighborhood types is shown in Table 3-1. Although the distributions by site between black and boundary neighborhoods are dissimilar, at each site roughly 80 percent of the blacks live in either black or boundary neighborhoods. There are 10 distinct black neighborhood areas in Pittsburgh and two in Phoenix. The largest one in Pittsburgh is the Homewood-Brushton section in the eastern portion of the city, adjacent to Wilkinsburg, together with portions of Wilkinsburg, in which a relatively large number (124) of black Demand Experiment households live. In Phoenix, the two black neighborhood areas are physically close to each other in South Phoenix, the portion of the city that also has high concentrations of Spanish Americans.

The initial housing situation of black enrollees can also be characterized in terms of the measures for neighborhood quality and dwelling unit quality used in Chapter 2. With respect to neighborhood conditions, black households tended to be at the time of enrollment in neighborhoods with both high black concentrations and high low-income household concentrations, more so in Phoenix than in Pittsburgh (see Table 3-2). With respect to dwelling unit conditions, mean rents show little variation across neighborhood types, but there was considerable variation in the percentage of enrollees' housing units passing the physical standards imposed on households in the Minimum Standards part of the experiment. In Pittsburgh, units occupied by black enrollees in white neighborhoods were not appreciably more likely to meet the Minimum Standards than were units in black neighborhoods in Pittsburgh. In contrast, few units

Table 3-1

DISTRIBUTION OF BLACK HOUSEHOLDS AT ENROLLMENT
BY RACIAL NEIGHBORHOOD TYPE

RACIAL NEIGHBORHOOD TYPE[a]	PITTSBURGH PERCENTAGE IN NEIGHBORHOOD TYPE	PHOENIX PERCENTAGE IN NEIGHBORHOOD TYPE
Black	57	29
Boundary	23	48
Black Enclave	4	4
White	16	19
SAMPLE SIZE	(273)	(85)

SAMPLE: Black Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

NOTE: Percentages may not add to 100 percent because of rounding.

a. In this and subsequent tables in Sections 3.1 and 3.2, racial neighborhood type categories are defined as follows:

1. Black: contiguous groups of tracts with 50 percent or more black population.
2. Boundary: contiguous groups of tracts with 15 to 50 percent black population, directly adjacent to black neighborhoods.
3. Black Enclave: contiguous groups of tracts with 15 to 50 percent black population, not directly adjacent to black neighborhoods.
4. White: all tracts with less than 15 percent black population.

Table 3-2

DISTRIBUTION OF BLACK HOUSEHOLDS AT ENROLLMENT
CLASSIFIED JOINTLY BY RACIAL AND LOW-INCOME CONCENTRATION

RACIAL NEIGHBORHOOD TYPE	PITTSBURGH				PHOENIX			
	Number in Higher Income	Number in Low Poverty	Number in Medium Poverty	Number in High Poverty	Number in Higher Income	Number in Low Poverty	Number in Medium Poverty	Number in High Poverty
Black	0	18	67	71	0	2	0	23
Boundary	6	20	27	10	0	0	9	32
Black Enclave	0	6	5	0	0	3	0	0
White	9	18	14	2	0	4	6	6

SAMPLE: Black Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

meeting Minimum Standards were occupied by black enrollees in Phoenix except in white neighborhoods (see Table 3-3). It can never be assumed with certainty that a household moving to an area with a high average housing quality will actually find a high-quality unit; the data in Table 3-3 suggest that such an assumption would be particularly tenuous for black households moving to white areas in Pittsburgh.

3.2 CHANGES IN RACIAL CONCENTRATIONS FOR MOVERS

As shown by mean black concentrations for Census tracts at enrollment and one year later, black households in the Experimental group moved on average to areas of lesser black concentration than did Control households, but neither the final concentrations nor the changes in concentration were significantly different for the two groups (see Table 3-4).[1,2] Given the small number of black Control households, only very large differences between the Experimental and Control households would be significant. The experiences, cited in Chapter 1, of the Kansas City and Wilmington demonstrations and of the Administrative Agency Experiment suggest that any program effects on population distributions would be small. Thus, the larger sample provided by additional moves in the second year of observation is not likely to show large program effects on racial concentrations although it might show a small effect such as that seen here at a statistically significant level.

One piece of exploratory analysis indicates that some program effect, however, small, no patterns of black concentration may be found. Using the first-year data for Pittsburgh, black households that were able to satisfy the program requirements and receive a full allowance payment

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[1]For the entire enrolled sample of black households, the mean black concentration for Census tracts at enrollment is significantly lower for Control households than it is for Experimental households. The Experimental-Control pattern at enrollment shown in Table 3-4 is thus not peculiar to the sample used in this report (that is, limited to those active at one year with incomes below the low-income eligibility limit).

[2]Black households participating in the Administrative Agency Experiment (AAE) also moved, on the average, to areas with lower proportions of black households. The AAE did not include a Control group, however, so there is no evidence that those locational choices would have been different in the absence of the housing allowance program (see Post, 1977).

Table 3-3

MEAN VALUE AT ENROLLMENT OF SELECTED HOUSING AND INCOME CHARACTERISTICS FOR BLACK HOUSEHOLDS BY RACIAL NEIGHBORHOOD TYPE

RACIAL NEIGHBORHOOD TYPE	MEAN PERCENTAGE PASSING MINIMUM STANDARDS	SAMPLE SIZE	MEAN RENT	SAMPLE SIZE	MEAN INCOME	SAMPLE SIZE
		PITTSBURGH				
Black	20%	(154)	$105	(151)	$3825	(156)
Boundary	29	(62)	110	(57)	3974	(63)
Black Enclave	[9]	(11)	[102]	(11)	[4679]	(11)
White	19	(43)	100	(43)	4163	(43)
F Statistic (degrees of freedom)	1.2 (3/266)		0.89 (3/258)		1.7 (3/269)	
		PHOENIX				
Black	4%	(23)	$94	(23)	$3545	(25)
Boundary	8	(40)	101	(40)	3604	(41)
Black Enclave	[0]	(3)	[89]	(3)	[4369]	(3)
White	[40]	(15)	[116]	(15)	3856	(16)
F Statistic (degrees of freedom)	5.1**(3/78)		1.5 (3/77)		0.26 (3/81)	

SAMPLE: Black Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

NOTE: Brackets indicate entries based on 15 or fewer observations.

** F-statistic significant at the 0.01 level.

Table 3-4

NET CHANGE IN RACIAL CONCENTRATION
FOR BLACK EXPERIMENTAL AND CONTROL MOVERS

MEAN PERCENTAGE OF BLACK HOUSEHOLDS	PITTSBURGH			PHOENIX		
	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC (DEGREES OF FREEDOM)	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC (DEGREES OF FREEDOM)
In Enrollment Tract	56%	41%	-1.61 (60)	48%	35%	-1.51 (38)
In Final Tract	47	44	-0.25 (60)	39	36	-0.36 (38)
Net Change in Percentage Black	-9	3	0.99 (60)	-9	0.4	0.9 (38)
Sample Size	(50)	(12)		(24)	(16)	

SAMPLE: Black Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

NOTE: Statistical tests comparing the differences between means for Experimental and Control households in enrollment tract concentrations, in final tract concentrations, and in the net change in black concentrations not significant at the 0.05 level.

by the end of the first year were compared with those not on full payments in terms of whether they moved to areas of higher or lower black concentration.[1] Although not quite significant at the 0.05 level, a higher proportion of the households receiving full payments at the end of the first year had also moved to areas of lower black concentration. Of the 38 black movers receiving full payments at the end of the year, 30 had moved to tracts of lower black concentration, while of the 12 black movers not receiving full payments, only 6 had moved to lower concentrations. This crude test for possible program effects could bear refinement. Distinctions need to be made among the types of allowance plans offered and the initial (enrollment) payment status of households. A larger sample of Control movers is necessary for attempting such distinctions. The continuing analysis will attempt these distinctions using the expanded sample available from the additional moves by black households in the second year.

The possibility of a program effect on movement of white households with respect to racial concentration has also been examined. The comparison corresponding to that for black households on relative changes in black concentration indicates that there is no significant Experimental-Control difference in the change for white households (see Table 3-5). Thus, at this stage of the analysis there is not a significant program effect for either black or white movers on changes in the neighborhood (tract) concentrations of black households. While the observed changes suggest that both blacks and whites may be moving to areas of lower black concentration, they do not provide firm evidence either of black dispersal or of white flight.

Even though an overall program effect has not been found, the patterns of change occurring for Experimental and Control households combined provide additional background information for the continuing analysis. Tables 3-6 and 3-7 offer additional detail on the mean change in black concentration by neighborhood type; the number of black households in predominantly white tracts increased as a result of moving, and the number living in black neighborhoods decreased. Within the slight overall tendency for black households to move to areas of lower con-

[1] Small sample sizes obviated a similar comparison in Phoenix.

Table 3-5

NET CHANGE IN RACIAL CONCENTRATION
FOR WHITE EXPERIMENTAL AND CONTROL MOVERS

MEAN PERCENTAGE OF BLACK POPULATION	PITTSBURGH			PHOENIX		
	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC (DEGREES OF FREEDOM)	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC (DEGREES OF FREEDOM)
In Enrollment Tract	6%	9%	1.03[a] (55)	2%	6%	2.50[a] (108)
In Final Tract	7	7	-0.17 (207)	2	4	0.93 (305)
Net Change in Percentage Black	1	-2	-1.42 (207)	-0.1	-2	-1.56[a] (104)
Sample Size	(162)	(47)		(221)	(86)	

SAMPLE: White Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. Because of unequal variances, the t-statistic is computed with separate variance estimates and the degrees of freedom is determined approximately. See, for example, Blalock (1972), p. 226,227.

Table 3-6

INITIAL AND FINAL DISTRIBUTION OF BLACK MOVERS
BY RACIAL NEIGHBORHOOD TYPE

RACIAL NEIGHBORHOOD TYPE	PITTSBURGH		PHOENIX	
	PERCENTAGE AT ENROLLMENT	PERCENTAGE AT ONE YEAR	PERCENTAGE AT ENROLLMENT	PERCENTAGE AT ONE YEAR
Black	52%	48%	35%	25%
Boundary	27	21	40	32
Black Enclave	8	8	2	5
White	13	23	22	38
Sample Size	(62)	(62)	(40)	(40)

SAMPLE: Black Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

NOTE: Chi-square statistic comparing distribution at enrollment and at one year not significant at the 0.05 level.

Table 3-7

INITIAL AND FINAL DISTRIBUTION OF WHITE MOVERS
BY RACIAL NEIGHBORHOOD TYPE

NEIGHBORHOOD TYPE	PITTSBURGH		PHOENIX	
	PERCENTAGE AT ENROLLMENT	PERCENTAGE AT ONE YEAR	PERCENTAGE AT ENROLLMENT	PERCENTAGE AT ONE YEAR
Black	2%	1%	1%	1%
Boundary	11	10	3	2
Black Enclave	2	3	1	2
White	84	86	94	95
Sample Size	(209)	(209)	(307)	(307)

SAMPLE: White Experimental and Control movers active at one year, not living in own or subsidized housing and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

NOTE: Chi-square statistic comparing distribution at enrollment and at one year not significant at the 0.05 level.

centration there are considerable crosscurrents between neighborhood categories. While some black households moved to areas of higher black concentration, still more moved to areas of lower black concentration (see Table 3-8).

There are substantial differences in the change in neighborhood characteristics between those black households that moved to areas of greater black concentration and those that moved to lesser concentration (see Table 3-9). For each group the average change in the black proportion between original and destination neighborhoods was over 30 percentage points--a very substantial change indeed. Those moving to tracts of lesser black concentration moved to tracts with less low-income concentration, and increased their rent more, particularly in Pittsburgh, than did those moving to tracts with higher black concentration.

Although speculative at this stage, the implication is that further analysis that distinguishes high-impact groups might reveal a relationship between the financial assistance provided by the allowance program and the ability to move to areas of lower black concentration and to better neighborhoods (at least as indicated by low-income household concentration).

3.3 PATTERNS OF ETHNIC CONCENTRATION IN PHOENIX

Spanish American households are the predominant minority group in Phoenix. Geographic concentration of these households raises issues essentially parallel to those discussed for black households earlier in this chapter. Program effects on ethnic concentration were analyzed using Experimental and Control movers.[1] The first subsection addresses indications of ethnic concentration and otherwise characterizes the starting position of Spanish American enrollees. The second subsection indicates the degree of change for Spanish American movers in terms of the Census tract Spanish American concentration of the original and destination neighborhoods, and addresses the issue of whether the allowance results in moves to areas of lesser ethnic concentration.

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[1]The analysis in Weinberg et al. (1977) indicated that moving rates for Experimental and Control households were not different for Spanish American enrollees.

Table 3-8

DISTRIBUTION OF FINAL RACIAL NEIGHBORHOOD TYPE
FOR BLACK MOVERS BY ENROLLMENT NEIGHBORHOOD TYPE

ENROLLMENT NEIGHBORHOOD TYPE	FINAL NEIGHBORHOOD TYPE				TOTAL DISTRIBUTION AT ENROLLMENT
	Black	Boundary	Black Enclave	White	
			PITTSBURGH		
Black	20	4	0	8	32
Boundary	7	9	0	1	17
Black Enclave	0	0	4	1	5
White	3	0	1	4	8
Total Distribution At One Year	30	13	5	14	62
			PHOENIX		
Black	7	5	0	2	14
Boundary	2	7	0	7	16
Black Enclave	0	0	1	0	1
White	1	1	1	6	9
Total Distribution At One Year	10	13	2	15	40

SAMPLE: Black Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

Table 3-9

MEAN VALUES OF CHANGES IN NEIGHBORHOOD CHARACTERISTICS
AND RENT OF BLACK MOVERS BY INCREASE/DECREASE IN PERCENTAGE BLACK

VARIABLE	PITTSBURGH			PHOENIX		
	INCREASE IN PERCENTAGE BLACK	DECREASE IN PERCENTAGE BLACK	t-STATISTIC (DEGREES OF FREEDOM)	INCREASE IN PERCENTAGE BLACK	DECREASE IN PERCENTAGE BLACK	t-STATISTIC (DEGREES OF FREEDOM)
Change in Percentage Black	36% (17)	-35% (30)	-8.67** (45)	32% (12)	-35 (17)	-8.73** (27)
Change in Low-Income Concentration	10 (17)	-10 (30)	-3.58 (45)	-4 (12)	-10 (17)	-1.05 (27)
Change in Rent	$7 (16)	$52 (26)	2.99** (40)	$10 (11)	$27 (16)	1.22 (25)

SAMPLE: Black Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

** t-statistic significant at the 0.01 level.

Indications of Ethnic Separation

Spanish Americans in Phoenix accounted for roughly 14 percent of the total population in 1970.[1] According to the 1970 census, these persons were substantially concentrated in tracts with well above the area-wide Spanish American concentration. These areas are shown in Map 3a, in which it can be seen that South Phoenix is the area of largest concentration, and that, generally speaking, the Spanish Americans tend to live in the southern and western portions of the Phoenix SMSA. Also shown in Map 3a is the distribution at enrollment of the Spanish American households participating in the Demand Experiment, a large proportion of whom initially lived in the South Phoenix area--an expected result of the proportional sampling for the experiment. Most Spanish American enrollees in the Demand Experiment lived in areas with above area-wide concentration of Spanish American households, as shown in Table 3-10. The neighborhood categories used in this table are similar to those used to characterize black household concentrations and are defined as follows:

Spanish American Neighborhoods:	All tracts that in 1970 had 50 percent or more Spanish Americans.
Boundary Neighborhoods:	Groups of tracts with 15 to 50 percent Spanish Americans in 1970 contiguous to Spanish American neighborhoods.
Spanish American Enclaves:	Isolated groups of tracts with 15 to 50 percent Spanish Americans in 1970.
Other Neighborhoods:	All tracts with less than 15 percent Spanish Americans in 1970.

Note that the Spanish Americans in Phoenix were concentrated to approximately the same extent as black households in Pittsburgh. In both cases nearly 80 percent of the minority enrollees lived in boundary or racial/ethnic neighborhoods.

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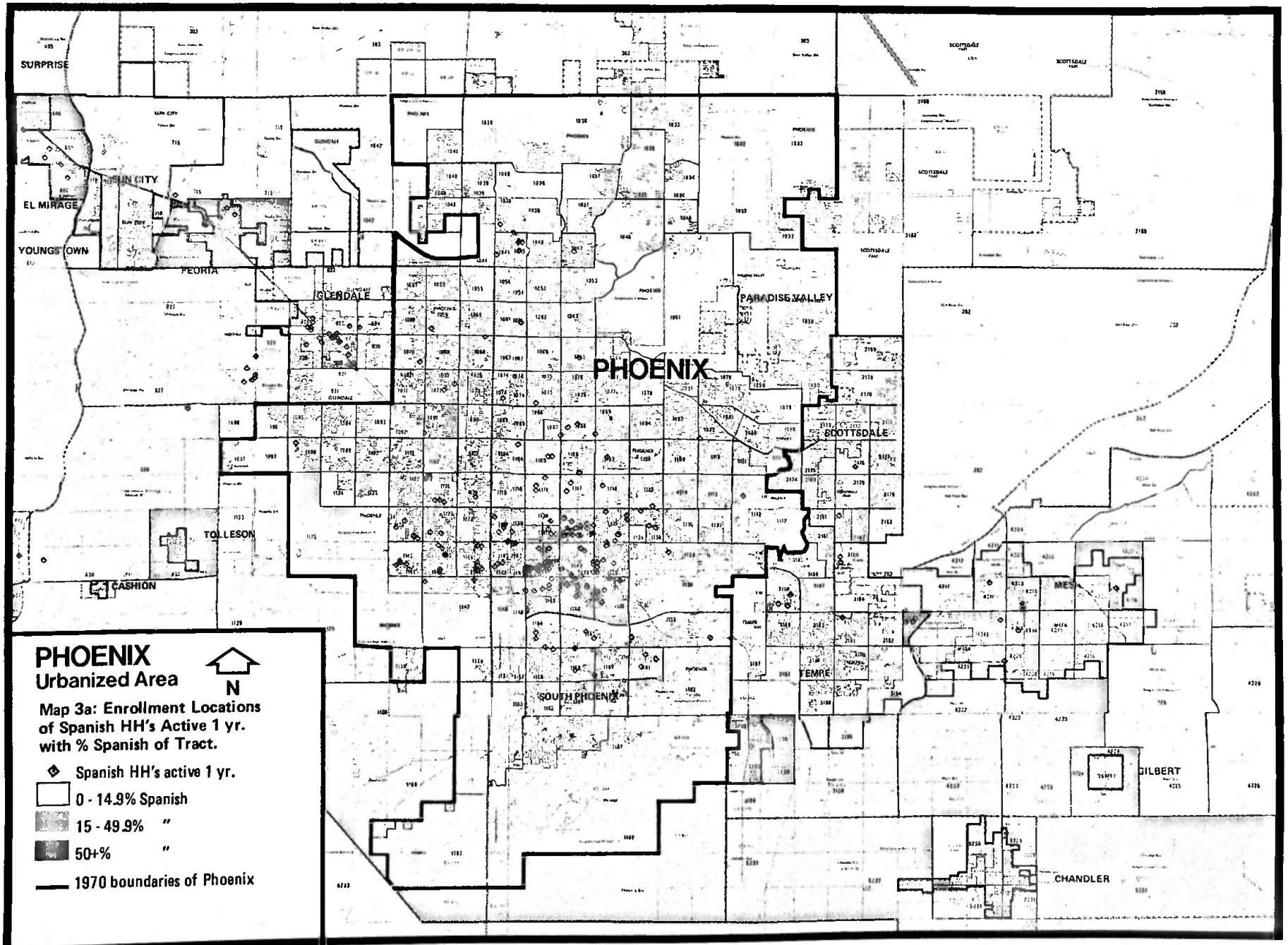
[1] This figure comes from the 1970 census, which classified a household as Spanish American if the head had a Spanish surname or if the head was Spanish speaking. In the Demand Experiment, Spanish American households are those with Spanish surnames. The proportion of Spanish Americans among enrollees differs from that in the total population because enrollees were drawn from the subset of income-eligible households.

MAP 3a

PHOENIX

ENROLLMENT LOCATIONS OF SPANISH HOUSEHOLDS
ACTIVE ONE YEAR WITH PERCENTAGE SPANISH OF TRACT



scale: 1 inch = 1 mile

Table 3-10

ETHNIC NEIGHBORHOOD TYPE OF SPANISH AMERICAN ENROLLEES

ETHNIC NEIGHBORHOOD TYPE[a]	PERCENTAGE IN NEIGHBORHOOD TYPE
Spanish American	39%
Boundary	39
Spanish American Enclave	3
Other	19
Sample Size	(305)

SAMPLE: Spanish American Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit (Phoenix only).

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

a. Ethnic neighborhood type categories are defined as follows:

1. Spanish American Neighborhoods: all tracts in 1970 that had 50 percent or more Spanish Americans.
2. Boundary Neighborhoods: groups of tracts with 15 to 50 percent Spanish Americans contiguous to Spanish American neighborhoods.
3. Spanish American Enclaves: isolated groups of tracts with 15 to 50 percent Spanish Americans in 1970.
4. Other Neighborhoods: all tracts with less than 15 percent Spanish Americans in 1970.

Differences in original housing characteristics across the neighborhood types are more pronounced for the Spanish American minority than for blacks (see Table 3-11). Spanish American households in high-concentration neighborhoods had markedly poorer housing (as indicated by the ability of their dwelling units to pass the Minimum Standards used as a requirement in parts of the experiment) than their counterparts in other neighborhoods. These households also paid considerably lower rents.

Neighborhood Changes for Spanish American Movers

Experimental Spanish American households that moved started on the average from neighborhoods with lower ethnic concentration and showed a smaller (but not significantly so) net change in ethnic concentration than did Control Spanish American households that moved (see Table 3-12). Because one would expect origin neighborhood conditions to influence neighborhood choice, interpretation of the impact of the experiment on these data is problematic.[1]

Further analysis of experimental effects was conducted in a fashion similar to that used in Chapter 2 by using a regression approach based on heuristic considerations.[2] In the present case controlling for original ethnic tract concentrations seems especially important.[3] Initial analysis suggested

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[1]For the total sample of Spanish American enrollees, including non-movers, the initial tract concentrations are not significantly different for Experimental households compared with Control households. Preliminary analysis suggests that initial tract Spanish American concentrations are significantly different for Experimental households that moved and stayed--33 percent compared to 45 percent. No such difference is observed for Control households. A better understanding of this difference is required before program effects can be fully analyzed.

[2]For black households regression analysis was not attempted in the analysis of program effects for lack of an adequate sample. There were only 12 black Control movers in Pittsburgh, for example.

[3]The other control variables included are roughly representative of collinear sets of related housing and household characteristics. The first set of variables on which final ethnic concentration was regressed included initial proportion of Spanish American, rent, household size, educational level of head of household, and age and sex of household head. The first set of variables was reduced following the procedure discussed in Appendix III. The current selection of variables is quite exploratory and is not regarded as final.

Table 3-11

MEAN VALUE AT ENROLLMENT OF SELECTED HOUSING AND INCOME CHARACTERISTICS FOR SPANISH AMERICAN HOUSEHOLDS BY ETHNIC NEIGHBORHOOD TYPE

ETHNIC NEIGHBORHOOD TYPE	MEAN PERCENTAGE PASSING MINIMUM STANDARDS	SAMPLE SIZE	MEAN RENT	SAMPLE SIZE	MEAN INCOME	SAMPLE SIZE
Spanish American	3%	(116)	$92	(117)	$4280	(116)
Boundary	14	(117)	113	(115)	4717	(117)
Spanish American Enclave	20	(10)	128	(10)	4639	(10)
Other	28	(57)	145	(56)	4677	(55)
F-Statistic (degrees of freedom)	27.75** (3/296)		28.4** (3/294)		1.25 (3/294)	

SAMPLE: Spanish American Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit (Phoenix only).

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

** F-statistic significant at the 0.01 level.

Table 3-12

NET CHANGE IN SPANISH AMERICAN CONCENTRATION
FOR SPANISH AMERICAN EXPERIMENTAL AND CONTROL MOVERS

	PHOENIX		
MEAN PERCENTAGE OF SPANISH AMERICAN HOUSEHOLDS	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC (DEGREES OF FREEDOM)
In Enrollment Tract	33%	43%	2.11* (140)
In Final Tract	30	36	1.36 (140)
Net Change in Percentage Spanish American	-3	-7	-.93 (140)
Sample Size	(106)	(36)	

SAMPLE: Spanish American Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

* t-statistic significant at the 0.05 level.

that there was no reason to suppose heterogeneity of regression existed for Experimental and Control groups; experimental status was therefore indicated by a dummy variable and the two groups were analyzed in a single equation. The results of the reduced form regression, presented in Table 3-13 imply that experimental status did not influence neighborhood choice as far as ethnic concentration is concerned. A similar analysis comparing Experimental Spanish American movers receiving full payments by the end of the first year also gives no indication of an experimental effect.

Given the indications of living conditions in Spanish American areas provided by the above data, it is not surprising to find that when moving, many households move out of these neighborhoods, as shown in Tables 3-14 and 3-15. There is a clear tendency for Spanish American movers to move to areas of lower ethnic concentration, especially from the extreme Spanish American neighborhoods. Just over half the movers from these neighborhoods moved out and a very small proportion moved from other neighborhoods to these neighborhoods.

In summary, there were no significant program effects on patterns of racial and ethnic concentration for either black or Spanish American households. Both black and Spanish American households at enrollment were living in patterns of concentration typical of the experimental sites. Program effects were small and not significant for the relative changes of racial or ethnic concentration by Experimental and Control households. Overall there was an apparent general, although not significant, shift by black and Spanish American movers toward lower racial or ethnic concentrations.

The marginal overall shifts concealed movement both downward and upward in racial or ethnic concentration. Black households that moved to areas of lower racial concentration also moved to generally better neighborhoods (as indicated by low-income household concentration) and paid higher rents than did those moving to areas of higher racial concentration.

The lack of evidence of a program effect on minority locations in the Demand Experiment should not be construed as a necessary consequence of a housing allowance program. In the Administrative Agency Experiment some evidence was found that if agency services were intentionally

Table 3-13

REGRESSION OF FINAL SPANISH AMERICAN CONCENTRATION

VARIABLE	COEFFICIENT	F-STATISTIC
Initial Proportion Spanish American	0.409	29.36**
Rent ($105)	-0.007	1.88
Household Size (persons)	0.008	0.94
Education (years)	-0.012	5.72*
Treatment Group Status	0.004	0.01
Constant	0.31	
Sample Size	(133)	
R^2	0.372	
F-Statistic of Regression	15.08*	
Standard Error	0.186	

SAMPLE: Spanish American Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

Table 3-14

INITIAL AND FINAL DISTRIBUTION
OF SPANISH AMERICAN MOVERS BY ETHNIC NEIGHBORHOOD TYPE

ETHNIC NEIGHBORHOOD TYPE	PERCENTAGE AT ENROLLMENT	PERCENTAGE AT ONE YEAR*
Spanish American	32.4	20.1
Boundary	41.0	46.8
Spanish American Enclave	24.5	30.2
Other	24.5	30.2
Sample Size	(139)	(139)

SAMPLE: Spanish American Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit (Phoenix only).

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

* A goodness of fit Chi-square test showed that distribution at one year was significantly different from the distribution at enrollment at the 0.05 level.

Table 3-15

DISTRIBUTION OF FINAL ETHNIC NEIGHBORHOOD TYPE
FOR SPANISH AMERICAN MOVERS BY ENROLLMENT NEIGHBORHOOD TYPE

ENROLLMENT NEIGHBORHOOD TYPE	FINAL NEIGHBORHOOD TYPE				TOTAL DISTRIBUTION AT ENROLLMENT
	ETHNIC	BOUNDARY	ETHNIC ENCLAVE	OTHER	
Spanish American	22	18	0	5	45
Boundary	5	40	0	12	57
Spanish American Enclave	0	0	2	1	3
Other	1	7	2	24	34
Total Distribution At One Year	28	65	4	42	139

SAMPLE: Spanish American Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

structured to guide participants to or away from particular areas, they might have a substantial effect. (Post, 1976.) The Demand Experiment, having no such special efforts by the administering office, provides evidence on what might happen in the absence of such special efforts.

It is of course possible that the experiment has influenced neighborhood choice behavior in a fashion too subtle for this exploratory analysis to detect. No attempt has so far been made, for example, to study the influence of the different program offers on neighborhood choice.

Analysis using the full two-year sample of movers will check for significant program effects, although any effects are likely to be small, and will explore possible differential effects for different types of housing allowance offers. These topics will be addressed in the second-year analysis to the extent permitted by the increased sample of movers. Again, there is no reason to think that the basic patterns will be different from those discussed here.

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CHAPTER 4

SUBJECTIVE ASSESSMENTS OF NEIGHBORHOOD QUALITY

In the absence of any explicit and widely accepted definition of what constitutes a "suitable living environment," it is important to consider what households say about their neighborhoods as a means of complementing or substantiating inferences about neighborhood quality drawn from other sources such as the census. The purpose of this chapter is to measure changes in neighborhood quality as perceived by households enrolled in the Demand Experiment. Seven measures of perceived neighborhood quality were derived from Baseline and Periodic Interview data.[1] These measures were then used as dependent variables in analyzing neighborhood choices.

Perceived neighborhood quality is based on what participants say about the areas in which they live--regardless of the neighborhood's spatial dimensions or "objective" description. The seven measures derived from these evaluations fulfill three important functions. First, they complement Census data in describing the neighborhoods in which participants live. Second, changes in the way households rated their neighborhoods provide one measure of neighborhood improvement and thus afford some insight into whether households receiving the allowance were more likely than others to move to suitable living environments. Third, the measures may help to identify which aspects of neighborhood motivate people to search for, or move to, a new place to live, and the way in which a housing allowance program may influence mobility.

Thus, the seven measures of perceived neighborhood quality may be considered both as independent (or explanatory) variables relative to participant behavior and neighborhood choice and as dependent outcomes of direct policy interest. The primary focus of this chapter is on changes in perceived neighborhood quality as indicators of program effects.

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[1] The Baseline Interview was given prior to enrollment and was not related to the enrollment offer. Periodic Interviews were given to participants at approximately six months, one year and two years after enrollment. Results of the Third Periodic Interview, given at two years, are not reported here.

This chapter is divided into three sections. Section 4.1 defines perceived neighborhood quality, describes the seven measures, and summarizes the procedures used to derive them. Section 4.2 discusses the relation between perceived neighborhood quality scores and the four neighborhood categories developed in Chapter 2, as well as household income levels and race. Finally, Section 4.3 compares perceived neighborhood quality scores of Experimental and Control households at the end of one year. The primary sample used for analysis was households that moved during the first year, since significant changes in perceived neighborhood quality would be expected to occur only in conjunction with household mobility.

4.1 DEVELOPMENT OF SUBJECTIVE MEASURES OF NEIGHBORHOOD QUALITY

Approaches to defining neighborhood quality are as varied as the disciplines from which they emerge. While there appears to be a certain degree of overlap in terms of the kinds of data used to develop measures of neighborhood quality (Census data, school data, police crime reports, and the like), no single "best" answer to the question of what constitutes a suitable living environment has emerged. The approach followed here was based upon the premise that what households say about various aspects of their neighborhoods provides an important vehicle for assessing neighborhood quality and further, that these subjective evaluations may be used to identify and measure a number of policy-relevant dimensions of neighborhood quality about which other more objective kinds of data are lacking.

The term "perceived neighborhood quality" is used to describe the way in which participant households rate their neighborhoods with regard to 31 separate neighborhood features and services. The sources for these ratings are the Baseline and Periodic Interviews. The individual neighborhood items for which evaluations were obtained are detailed in Appendix IV.

The analytical problem in using these data is twofold. On the one hand, the 31 items are far too many to deal with on an individual basis in measuring and interpreting changes in assessments of neighborhood quality. On the other hand, the construction of a single score (for example, by adding up the number of "good" responses) would ignore most of the information in the ratings and would fail to distinguish which aspects of neighborhood are most salient to households. Hence, it is important to distill from the 31

item ratings a coherent and limited set of summary measures that enhance the interpretability of results, and at the same time preserve information about the different dimensions of neighborhood quality.

Toward this end, principal-components analysis was used to collapse the original 31 item ratings into seven summary measures referring to different aspects of neighborhood quality. The derivation of these measures, together with an analysis of their reliability and validity, are presented in Appendix IV. The seven measures together with their constituent items are:

GENERAL NEIGHBORHOOD DECAY[1]

- vacant lots filled with trash
- litter in the streets
- abandoned houses
- streets in poor repair
- crimes in the area
- presence of drugs and drug users

PUBLIC SERVICES

- responsiveness of the fire department
- garbage collection
- police protection

CONVENIENCE TO OTHER SERVICES

- access to public transportation
- medical care facilities
- grocery shopping
- places of worship

RECREATIONAL FACILITIES

- recreational facilities for adults
- recreational facilities for teenagers
- play areas for children under 12
- day care services

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[1] In this chapter the seven cluster names are in capital letters in order to distinguish their use as analytic variables from their normal substantive meaning.

SCHOOLS

elementary schools
junior high schools
senior high schools

TRAFFIC CONGESTION

heavy traffic in the streets
availability of parking
noise in the area

NEIGHBORS

presence of neighbors with same background as repondent
presence of relatives in the neighborhood
how well respondents know their neighbors

In order to facilitate interpretation of the scores, all seven measures were derived with a lowest-to-highest/worst-to-best order of values. For example, a high relative to a low score on the GENERAL DECAY measure reflects a more favorable evaluation by the respondent on that aspect of the perceived quality of his neighborhood.

These measures of perceived neighborhood quality provide quite different kinds of information about neighborhood from that available in the census.[1] There are a number of other distinctions as well. First, these measures of perceived neighborhood quality are not fixed geographically. They vary according to the individual's experience in, and perceptions of, his local neighborhood environment. Hence, no explicit geographic definition of neighborhood is used as a referent for these measures. Notwithstanding the well-established geographic identity of some neighborhoods, it seems plausible that people living next door to each other may have entirely different per-

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[1] These clusters are, however, quite comparable to those obtained from similar items in the Administrative Agency Experiment. There, six clusters were extracted, four of which are practically identical to the CONVENIENCE, RECREATION, SCHOOLS and NEIGHBORS clusters described here. The other two AAE clusters, "RESIDENTIAL" and "SAFE AND CLEAN," tend to overlap the three Demand Experiment clusters of DECAY, PUBLIC SERVICES, and TRAFFIC CONGESTION (see Holshouser, 1977, p. B-59).

ceptions of where "their" neighborhood begins and where it ends.[1] For some purposes the absence of spatial limits introduces a number of analytical difficulties. (How, for example, is it possible to tell when a household moves to a "new" neighborhood?) Nonetheless, the boundary dilemma implicit in the use of Census data (for example, is a tract a neighborhood?) is obviated, since for the present purpose a neighborhood's geographic identity is whatever the household feels it is. Further, since the unit of observation is the household, aggregations can be made over any desired group of households rather than over common geography as in Census tract data.[2]

Measures of perceived neighborhood quality also differ from Census data inasmuch as household ratings are purely subjective in nature. That is, a question about police protection in the neighborhood may mean different things to different people according to their own experiences and expectations. The fact that the subjective measures discussed here are significantly correlated with a number of important Census tract characteristics, including low-income household concentration, and with neighborhood satisfaction as well tends to enhance their credibility as indicators of neighborhood quality.

On the basis of analyses presented in Appendix IV, it is felt that the seven summary measures represent a coherent and intuitively reasonable synthesis of the original 31 items. The multidimensional structure of the items is reasonably consistent between sites and highly stable over time. In addition, the individual measures exhibit acceptable levels of internal consistency and temporal stability. (An exception to the latter is the SCHOOLS score.) Finally, the seven measures appear to be valid in the sense that they are significantly correlated in the expected direction with search behavior, overall neighborhood satisfaction, and various Census tract characteristics, especially the concentration of low-income households; pro-

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[1] A number of studies indicate that household spatial definitions of a given neighborhood are likely to vary a great deal depending upon activity patterns and familiarity. (See, for example, Johnson, 1972.)

[2] Another application of the neighborhood perception data involved the construction of a hedonic index to be used as a measure of overall housing quality. Data were aggregated over areas consisting of several Census tracts for that application (see Merrill, 1976).

portion of minority populations in the tract; tract income, education, and rent levels; percentage of standard[1] dwelling units and location of the tract in the central city or suburbs.

One flaw in the perceived neighborhood quality measures lies in their moderately high degree of skewness. In five of the seven measures a disproportionate number of respondents' scores are grouped at the upper end of the distribution. This skewness results from the fact that many respondents gave "good" ratings to most or all of the items comprising a given measure, thus creating a "ceiling effect" in the data collection instrument. This situation presents a problem with respect to interpretation of changes in the scores, since a change of five points at the upper end of the distribution may mean something quite different from a 5-point change at the lower end of the distribution. Until the effects of this skewness have been examined in greater detail, findings based on these measures should be regarded with some caution.[2]

In reviewing the baseline positions of various respondent subgroups it should be kept in mind that each perceived neighborhood quality measure was arbitrarily scored with a baseline mean of 50 with a standard deviation of 10 for the full sample of respondents at both sites[3] (see Appendix IV).

4.2 INITIAL DISTRIBUTIONS OF PERCEIVED NEIGHBORHOOD QUALITY

This section addresses two main questions. First, were perceptions of neighborhood quality at the time of the Baseline Interview related to the kinds of neighborhoods in which respondents lived as measured by the relative concentration of low-income households? Second, were baseline perceptions of neighborhood quality related to the racial characteristics and/or

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[1] As used here, a "standard" dwelling is heated, with complete plumbing facilities, complete kitchen facilities, and direct access (Census Bureau definitions).

[2] The initial distributions of item responses, together with a discussion of the skewness of the measures are presented in Appendix IV.

[3] This sample comprises households active at the time of the Second Periodic Interview, not enrolled over-income and with no move between baseline and enrollment.

income levels of respondents?

The first of these questions is important for two reasons. First, to the extent that the measures of perceived neighborhood quality are positively correlated with low-income household concentrations, then use of the latter item in Chapter 2 as a general surrogate measure of neighborhood quality is supported. Second, the distribution of mean neighborhood quality scores across the four neighborhood types provides an important descriptive summary of the starting positions of respondents according to the kinds of neighborhoods in which they were living prior to enrollment.

With respect to the second question, it seems reasonable to expect that minority and low-income households would report lower evaluations of their neighborhoods than their nonminority and higher-income counterparts. Fulfillment of this expectation provides not only a partial check on the validity of the seven measures, but also an important frame of reference for evaluating shifts in the perceived neighborhood quality scores over time as a result of moves by different kinds of households.

While the principal focus of this chapter is on changes in perceived neighborhood quality among Experimental and Control movers only, these Baseline Interview comparisons of scores by neighborhood type, and by race and income level of respondents afford a useful context against which Experimental and Control differences may be viewed.

Perceived Neighborhood Quality and Neighborhood Type

Table 4-1 and Figure 4-1 summarize the distribution of mean perceived neighborhood quality scores across the four neighborhood types discussed in Chapter 2. The scores showed a relatively consistent inverse relationship to neighborhood low-income household concentrations. Scores tended to be highest in higher-income neighborhoods and lowest in high-poverty neighborhoods. The notable exceptions are CONVENIENCE and NEIGHBORS. These results provide some support for the use of low-income household concentration as a surrogate measure of neighborhood quality. Further, it is not surprising to see the slight positive correlation between neighborhood type and the NEIGHBORS measure (higher ratings in poverty neighborhoods), since a priori there would appear to be little reason to suspect that respondents' social ties to their neighborhoods would be greater in tracts

Table 4-1

MEAN CLUSTER SCORES BY NEIGHBORHOOD TYPE

CLUSTER SCORE	NEIGHBORHOOD TYPE				SIGNIFICANCE LEVEL[a]
	HIGHER-INCOME	LOW-POVERTY	MEDIUM-POVERTY	HIGH-POVERTY	
			PITTSBURGH		
General Decay	53.8	50.1	46.9	44.2	0.01
Public Services	52.5	50.4	47.8	46.9	0.01
Convenience	50.8	52.4	53.1	52.5	0.05
Recreation	50.7	49.7	49.4	49.0	NS
Schools	52.9	50.8	50.0	49.7	0.01
Traffic	52.2	48.0	46.9	45.7	0.01
Neighbors	49.8	51.2	51.7	51.5	NS
Sample Size	(182)	(399)	(295)	(157)	
			PHOENIX		
General Decay	52.6	52.8	51.2	48.4	0.01
Public Services	51.5	51.2	50.5	49.1	0.05
Convenience	47.5	49.1	47.3	46.6	NS
Recreation	51.6	51.4	49.6	49.3	0.05
Schools	51.5	51.4	48.7	45.9	0.01
Traffic	53.8	52.1	52.6	50.1	0.01
Neighbors	47.4	48.2	49.5	49.7	NS
Sample Size	(183)	(237)	(299)	(256)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

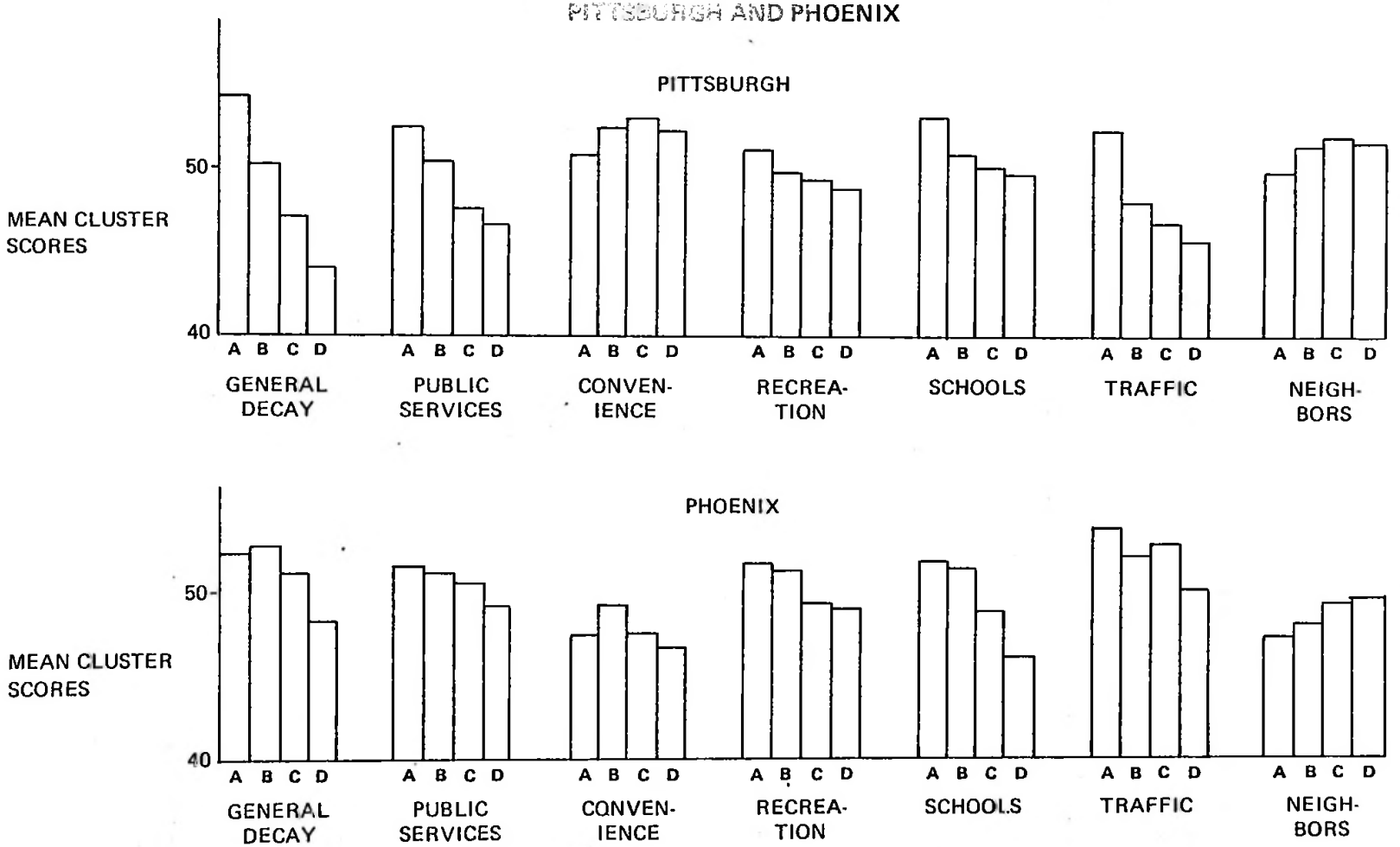
DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form, Housing Evaluation Form.

NOTE: For each category overall mean of sites combined is equal to 50.0. No such restriction holds for an individual site.

a. Significance level of F-test of differences in mean among cluster scores.

Figure 4–1

MEAN BASELINE CLUSTER SCORES BY NEIGHBORHOOD TYPE: PITTSBURGH AND PHOENIX



SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and did not move between the time of the Baseline Interview and enrollment.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline Interview, Initial Household Report Form.

CODE: A – Higher Income
B – Low-Poverty
C – Medium-Poverty
D – High-Poverty

with low proportions of households having yearly incomes under $5000. Indeed, a number of studies of social relations in low-income areas indicate that attachments to neighbors represent an important adaptation to the difficulties of living in poverty neighborhoods (see Liebow, 1967).

Perceived Neighborhood Quality by Race

Table 4-2 summarizes the Baseline distributions of perceived neighborhood quality measures by the race of respondents. Since the principal focus of the remaining analysis in this chapter is on the changes in scores of households that moved during the first year of the experiment, these distributions are examined with reference to movers only.

The table shows the relative positions of the two racial groups in Pittsburgh and three racial/ethnic groups in Phoenix on the perceived neighborhood quality measures at the time of the Baseline Interview. Nonminorities generally gave higher evaluations of their neighborhoods than minorities. These differences are significant in the case of GENERAL DECAY, PUBLIC SERVICES, CONVENIENCE and (in Phoenix only) SCHOOLS. Of the three racial/ethnic groups in Phoenix, blacks tended to have the lowest scores with Spanish American households having scores only slightly lower than whites. (The exceptions to this are the TRAFFIC CONGESTION and NEIGHBORS scores where blacks had the highest average scores.)

No differences were found in the mean neighborhood quality scores of different income groups. Households in the lowest-income category (below $2000) tended to have scores not significantly different from those of households in the highest-income category (above $8000).

In summary, the observed correlation of the seven perceived neighborhood quality scores with low-income household concentration tends to support the use of the latter measure as a surrogate for neighborhood quality. The Baseline distribution of the seven scores by the race of respondents indicates that racial/ethnic minorities regarded their neighborhood less highly than white households. No significant differences in scores were observed across various income groups. With respect to race/ethnicity and neighborhood type, it may be important to take these initial differences in scores into account in a full analysis of program effects for second-year data.

Table 4-2

BASELINE CLUSTER SCORES OF MOVERS BY RACE

CLUSTER	PITTSBURGH		PHOENIX		
	WHITE	BLACK	WHITE	BLACK	SPANISH AMERICAN
General Decay	48.89	42.63**	51.07	46.65	50.55*
Public Services	50.46	38.79**	51.09	45.40	49.16**
Convenience	52.59	49.62*	48.34	43.58	47.47**
Recreation	49.86	49.08	50.36	47.56	50.18
Schools	51.42	49.09	50.75	44.74	48.65**
Traffic Congestion	47.74	47.73	51.73	52.79	51.23
Neighbors	49.69	50.84	46.27	49.62	47.87
Sample Size	(194)	(56)	(272)	(33)	(118)

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form.

* Differences between racial group means significant at the 0.05 level (F-test).

** Differences between racial group means significant at the 0.01 level (F-test).

4.3 EXPERIMENTAL AND CONTROL COMPARISONS

Households offered a housing allowance presumably will be more likely to move to a suitable living environment than similar households not offered an allowance. If this hypothesis is true, the neighborhood scores of the Experimental group (allowance recipients) would be significantly higher than those of the Control group after a given period of time. Further the changes in scores for Experimental movers would be greater than those for Control movers.

Given the complexity of the experimental design, payments mechanisms, housing requirements and (possibly) differential rates of attrition among demographic subgroups and between Experimental and Control groups, a definitive testing of experimental effects has not been undertaken. A comparison of one-year differences in scores between Experimental and Control households is presented here as a preliminary analysis of program effects.

Tables 4-3 and 4-4 compare the mean Baseline and Second Periodic neighborhood quality scores of Experimental and Control movers. The sample comprised all eligible households active at one year that moved between enrollment and the Second Periodic Interview, and that did not move between the time of the Baseline Interview and enrollment.[1] As demonstrated more fully in Appendix IV, movers generally showed positive shifts in perceived neighborhood quality scores that were larger than those observed for households that did not move.[2] In the case of GENERAL DECAY, RECREATION, TRAFFIC CONGESTION and (in Phoenix only) CONVENIENCE, these differences in scores between Baseline and Second Periodic were significant at the 0.01 level using the t-test for correlated samples (see Appendix IV-3).

Tables 4-3 and 4-4 indicate, first of all, that there are some differences in Baseline cluster scores between Experimental and Control respondents. These include NEIGHBORS in Pittsburgh and GENERAL DECAY, RECREATION, and

[1] It was necessary to exclude from this sample households that had moved between the time of the Baseline Interview and enrollment in order that all Baseline Interview responses would correspond to the locations of households at the time of enrollment.

[2] As is the case with housing and neighborhood satisfaction, several of the neighborhood scores for households that searched without moving showed declines relative to Baseline Interview positions, indicating, perhaps, frustration in search.

Table 4-3

MEAN BASELINE AND SECOND PERIODIC INTERVIEW
NEIGHBORHOOD SCORES FOR EXPERIMENTAL AND CONTROL MOVERS: PITTSBURGH

CLUSTER	GROUP	BASELINE INTERVIEW	SECOND PERIODIC INTERVIEW	CHANGE AT ONE YEAR	SAMPLE SIZE
General Decay	Experimental	47.65	51.68	4.03	(197)
	Control	47.13	52.06	4.93	(56)
Public Services	Experimental	47.85	48.89	1.03	(197)
	Control	47.90	50.71	2.81	(56)
Convenience	Experimental	51.85	52.57	0.72	(197)
	Control	52.22	50.82	-1.40	(56)
Recreation	Experimental	49.63	51.82	2.19	(197)
	Control	49.72	51.01	1.29	(56)
Schools	Experimental	51.02	50.76	-0.26	(197)
	Control	50.20	51.46	1.26	(56)
Traffic Congestion	Experimental	47.61	52.12	4.51	(197)
	Control	47.66	52.80	5.15	(56)
Neighbors	Experimental	49.25*	48.76*	-0.48	(197)
	Control	52.30	51.40	-0.90	(56)

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between the Baseline Interview and enrollment.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

* t-test of differences in group means significant at the 0.05 level.

Table 4-4

MEAN BASELINE AND SECOND PERIODIC INTERVIEW
NEIGHBORHOOD SCORES FOR EXPERIMENTAL AND CONTROL MOVERS: PHOENIX

CLUSTER	GROUP	BASELINE INTERVIEW	SECOND PERIODIC INTERVIEW	CHANGE AT ONE YEAR	SAMPLE SIZE
General Decay	Experimental	51.04*	53.24*	2.19	(308)
	Control	49.01	51.39	2.38	(128)
Public Services	Experimental	50.26	50.81	0.55	(308)
	Control	49.00	49.59	0.59	(128)
Convenience	Experimental	48.02	49.66**	1.64	(308)
	Control	46.21	45.92	-0.29	(128)
Recreation	Experimental	50.66*	52.88*	2.22	(308)
	Control	48.17	51.04	2.87	(128)
Schools	Experimental	50.00*	49.35	-0.65	(308)
	Control	48.09	48.32	0.23	(128)
Traffic Congestion	Experimental	51.80	55.34	3.54	(308)
	Control	50.88	53.91	3.03	(128)
Neighbors	Experimental	46.81	47.02*	0.21*	(308)
	Control	47.09	49.18	2.09	(128)

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between the Baseline Interview and enrollment.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

* t-test of differences in group means significant at the 0.05 level.

** t-test of differences in group means significant at the 0.01 level.

SCHOOLS in Phoenix. With the exception of the NEIGHBORS score in Pittsburgh, Baseline means for Experimental households tended to be higher than those for Control households. These differences in scores prior to the allowance offer may be artifacts of differential rates of attrition between the two mover groups, rather than reflecting true score differences for the initial samples.

Second, Tables 4-3 and 4-4 show a number of differences between Experimental and Control movers at the end of one year (column 2). Most of these differences are observed only in Phoenix (where, it should be noted, the sample of movers is much larger than in Pittsburgh). These differences include NEIGHBORS in both Pittsburgh and Phoenix, and GENERAL DECAY, CONVENIENCE, and RECREATION in Phoenix only. In the case of NEIGHBORS, Control scores were higher than Experimental scores. However, it should be noted that three of these five differences in scores were also observed in the case of their respective Baseline Interview scores. Thus, while the comparison of mean scores for Experimental and Control movers reveals several significant differences, the majority of these may simply reflect continuation of differentials existing prior to the allowance offer.

In terms of relative changes in scores (column 3), only the change with regard to NEIGHBORS in Phoenix is significantly different for the two groups at the 0.05 level. The remaining first-year mean score changes were roughly the same for Experimental and Control movers at the two sites.

In summary, while these preliminary comparisons indicate the possibility of a program effect on perceived neighborhood quality outcomes, judgments as to the magnitude of this effect must be withheld until the differential starting points (perhaps due to attrition) are better accounted for. With the additional observations from second-year data these traces of a program effect can be more completely explored, especially with respect to variations in the program offers and the initial payment status of enrollees. It will also be important to investigate the possibility that most of the changes in perceived neighborhood quality occur as a result of moving. If this is true, program effects will be evident primarily through their impact on mobility. However, the preliminary results reported by Weinberg (1977) indicate few, if any, program effects on moving. The possible connection between effects of the program on mobility and direct program impacts on

perceived neighborhood quality should be investigated in the continuing analysis.

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CHAPTER 5

CONTINUING ANALYSIS

Analysis of data drawn from the first year of the Housing Allowance Demand Experiment indicates that the offer or receipt of a housing allowance did not have a large impact on households' neighborhood choices. The central task of the continuing analysis will be to determine whether this finding is borne out by the combined two-year data.

Two years may not be a sufficient period to capture the complete pattern of household adjustment to the offer or receipt of an allowance but it will clearly be an improvement over the one-year period analyzed in this report. Not only will the adjustment period be longer, but the households that moved during the second year will provide a sample somewhat larger than the one used in this report. This larger sample size should allow experimental effects to be identified in the second year analysis with somewhat increased precision.

The initial analyses of two-year data, then, will replicate analyses presented in this report. Mean changes between original and destination neighborhood conditions for Experimental and Control households that moved will be compared in terms of low-income concentration, racial/ethnic concentration, and subjective assessment of neighborhood conditions. The regression analysis of final low-income concentration will be repeated.

The findings of these initial inquiries will largely determine what additional analysis is required. If the findings indicate no important difference between Experimental and Control households--that is, no program effect--additional analysis will be limited and mainly oriented toward confirming the finding. For example, to the extent that the increased number of cases permits such analysis, Experimental households will be subdivided into major treatment groups and examined separately.[1] If possible, Housing Gap households will be further subdivided into those

[1] Some preliminary work of this sort was done with first-year data. Although there were too few cases for firm conclusions, the data give no reason to believe that substantially different patterns will be found for the different treatment groups.

that did and did not meet the housing requirements at enrollment. Likewise, demographic or other population subgroups of potential policy interest (such as the elderly, minorities, or those in very poor initial housing) will be examined separately where possible to determine whether the absence of program effects is consistent for all important groups.

Should the analysis of two-year data suggest important experimental effects, further analysis will attempt both to confirm the findings and to determine the factors contributing to the effects or the conditions under which they occur. The analyses presented in this report suggest that if significant effects exist, they are most likely to be found in the factors related to low-income concentration or in the extent of change in racial segregation.

The regression analyses presented in Chapter 2 have already indicated differences between Experimental and Control households in the factors related to the extent of low-income concentration in the neighborhoods to which they moved. The number of cases in the first-year data is too small, however, to permit firm conclusions about the importance or meaning of the differences. If the two-year data reveal significant differences, the analysis must be extended and alternative formulations attempted. The set of factors considered as potential independent variables can be expanded to include subjective assessments of neighborhood conditions (such as the measures presented in Chapter 4) and additional factors describing the status of individual households (such as prior moving experience or data describing the journey to work). In addition, the influence of program factors such as subsidy level will be explored to the extent that sample size will allow.

The analyses of changes in racial concentration presented in Chapter 3 do not reveal statistically significant differences. Nonetheless, they do show a fairly consistent pattern, with black households in the Experimental group showing on the average somewhat larger changes in racial concentration than those in the Control group. With a larger number of cases, this pattern might well prove to be significant. If so, the regression analysis reported in Chapter 3 for Spanish Americans will be replicated and expanded for both black and Spanish American households to examine the experimental effect more precisely. Analyses in this case will be much like those described above for the concentration of low-income

households. In addition, survey data describing the locations in which households searched and their reasons for moving or not moving to particular locations may provide insights into the extent to which the experimental effect is related to patterns of housing market discrimination.

Finally, if significant Experimental-Control differences are found on any of the dimensions examined--low-income concentration, racial/ethnic concentration, or subjective assessment of neighborhood conditions--further analysis will be required to establish the relationships among these various measures of neighborhood quality. If significant changes are found on all dimensions, the analysis will attempt to determine whether they are in fact different dimensions or are all acting as proxies for the same kind of change. If some are significant and some not, the objective will be to understand more precisely exactly what kind of change is occurring, and how it occurs separately from the other dimensions.

APPENDIX I

DESIGN OF THE DEMAND EXPERIMENT

This appendix presents a brief overview of the Demand Experiment's purpose, reports, data collection, experimental design, and sample allocation.

I.1 PURPOSE OF THE DEMAND EXPERIMENT

The Demand Experiment is one of three experiments established by the U.S. Department of Housing and Urban Development (HUD) as part of the Experimental Housing Allowance Program.[1] The purpose of these experiments is to test and refine the concept of housing allowances.

Under a housing allowance program, money (the allowance) is given directly to individual families in need to assist them in obtaining adequate housing. The allowance may be tied to housing by making the amount of the allowance depend on the amount of rent paid or by requiring that households meet certain housing requirements to receive the allowance payment. The initiative in using the allowance and the burden of meeting housing requirements are placed on the individual family rather than on developers, landlords, or the government.

The desirability, feasibility, and appropriate structure of a housing allowance program have not been established. Housing allowances could be less expensive than some other kinds of housing programs because they allow fuller utilization of existing sound housing; the allowance is not necessarily tied to new construction or to special classes of dwelling units. Housing allowances may also be more equitable. The allowance can be adjusted rapidly to changes in income without forcing the family to change units. Recipient families may, if they desire, use their own resources (by either paying higher rent or searching carefully) to obtain better housing than is required to receive the allowance. As long as program requirements are met, housing allowances permit families considerable choice in determining

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[1] The other two experiments are the Housing Allowance Supply Experiment and the Administrative Agency Experiment.

the housing they want--where they live (near schools, near work, near friends, or relatives), or the type of unit they live in (single-family or multi-family). Finally, housing allowances could be less costly to administer. Program requirements need not cover every detail of participant housing. The burden of specifying and administering details that are not essential to the government, and of obtaining housing that meets requirements that are essential, is shifted from program administrators to participants and the private market. Because the program is less visible (the action in the housing market rests with individual families and can be dispersed over the entire market), there may be less public pressure on the administering agency.

These potential advantages are not unquestioned. Critics of housing allowances have suggested that poor families may lack the necessary experience with and knowledge of the private market for better housing to use allowances effectively; that special groups such as the elderly will not be effectively served without direct intervention to change the supply of housing to meet their needs; that administrative costs could rise uncontrollably; and that increasing the demand for housing without direct support for construction of new units will result in a substantial inflation of housing costs.

If housing allowances are desirable, they could be implemented by means of many different program structures. There is a wide range of possible allowance formulas, housing requirements, nonfinancial support (such as counseling), and administrative practices which could substantially affect both the costs and impact of a housing allowance program.

The Demand Experiment addresses issues of feasibility, desirability, and appropriate structure in terms of how individuals (as opposed to the market or administering agencies) react to various allowance formulas and housing standards requirements. The analyses and reports are designed to answer six policy questions:

1. Participation

   Who participates in a housing allowance program? How does the form of allowance affect the extent of participation for various households?

2. Housing Improvements

Do households receiving housing allowances in fact improve the quality of their housing? At what cost? How do households receiving a housing allowance seek to improve their housing--by moving, by rehabilitation? With what success?

3. Locational Choice

For those participants who move, how do the locational choices of allowance recipients compare with existing residential patterns? Are there nonfinancial barriers to effective use of a housing allowance?

4. Administrative Issues

What administrative issues and associated costs are involved in the implementation of a housing allowance program?

5. Form of Allowance

How do the different forms of a housing allowance compare in terms of participation, housing quality achieved, locational choice, costs (including administrative costs), and equity?

6. Comparison with Other Programs

How do housing allowances compare with existing housing programs and with income maintenance in terms of participation, housing quality achieved, locational choice, costs (including administrative costs), and equity?

The first three policy questions ask about the results of a housing allowance program. Participation can substantially affect both program costs and program desirability. Income transfer programs ordinarily do not enroll all those who are eligible. This obviously affects their potential scale and costs. At the same time, if a program fails to reach such key groups as the very poor, it may fail in its purpose, no matter how successful it is for those who do participate.

The issue of participation is particularly important in a housing allowance program. Such a program does not simply offer more money to needy households. It generally requires that they meet certain housing requirements

to participate. The extent and nature of these requirements may make successful participation more or less difficult and desirable for various groups, such as the very poor, the elderly, or minorities.

The improvement in housing achieved under a housing allowance program is obviously central to judging its success. Housing improvement may be measured in terms of the change in the amount of housing purchased (essentially, the rent paid), achievement of certain specified quality levels in housing, or participant preferences and satisfaction with housing. Major issues include not only how these measures of housing change but what measures are most appropriate.

By providing poor households with a greater range of locational choice, a housing allowance may alter patterns of racial and socioeconomic segregation. In any case, the ability and interest of eligible households in searching for new housing can substantially affect their ultimate benefits from a housing allowance program. Examination of the degree of success with which households search for new housing may suggest the need for nonfinancial support, such as counseling, provision of vacancy lists, or equal opportunity support.

The fourth policy question concerns administrative issues. Although administrative issues are not a central concern of the Demand Experiment, analysis of the procedures used in the experiment may shed some light on selected issues, such as verification of participant income and household size, the need of providing housing information to participants, or appropriate coordination with other transfer programs.

The Demand Experiment studies a variety of potential housing allowance programs. It is designed to allow policymakers to make an informed choice among alternative forms of housing allowance programs. The fifth policy question asks how the effects of the allowance in terms of participation, housing change, locational choice, equity, and costs vary across different forms of housing allowance programs.

The last policy question asks how a housing allowance program compares with other housing programs or with income maintenance in terms of participation, housing quality achieved, locational choice, costs, and equity.

I.2 REPORTS

The first analytic reports from the Demand Experiment will be submitted in 1976 and early 1977. These reports will examine key analytic issues using data collected during the first year of participation. They are intended to test basic analytic models and concepts and to identify areas for further work. The topics for these reports are grouped around areas defined by the first three policy questions: participation, housing consumption, and location.

The final set of reports, to be submitted in 1977 and 1978, will be based on the full two years of experimental data and will represent the final analytic products of the experiment. These reports address each of the six policy questions in turn:

Report on Program Trade-offs (Policy Question 1)

Report on Housing Consumption (Policy Question 2)

Report on the Dynamics of Housing Choice (Policy Question 3)

Report on Administrative Issues and Costs (Policy Question 4)

Report on Payment Formulas (Policy Question 5)

Report on Comparison with Other Programs (Policy Question 6)

Final Report.

I.3 DATA COLLECTION

The Demand Experiment is conducted at two sites--Allegheny County, Pennsylvania (Pittsburgh), and Maricopa County, Arizona (Phoenix). Most of the information on participating households is collected from:

Baseline Interviews conducted by an independent survey operation before households are offered enrollment

Initial Household Report Forms and monthly Household Report Forms completed during and after enrollment to provide operating and analytic data on household size and income and on expenditures for housing

Supplements to the Household Report Forms completed after enrollment to provide data on assets, income from assets, actual taxes paid, income from self-employment, and extraordinary medical expenses

Housing Evaluation Forms completed by site office evaluators at least once each year for every dwelling unit occupied by participants, to provide information on the quality of participant housing

Periodic Interviews conducted approximately 6, 12, and 24 months after enrollment by an independent survey operation

Exit Interviews conducted by an independent survey operation for a sample of households that decline the enrollment offer or leave the program.

Surveys and housing evaluations are also administered to a sample of participants in existing housing programs.

The experimental programs in the Demand Experiment continue for three years after enrollment is completed. At the end of that time, eligible and interested allowance families will be aided in entering other housing programs, especially the Section 23 Leased Housing Program. Analysis will be based on data from only the first two years of participation. The experimental programs are continued for one additional year to avoid confusing participants' reactions to the ongoing experiment with their adjustments to the phaseout of the experiment.

I.4 ALLOWANCE PLANS USED IN THE DEMAND EXPERIMENT

The Demand Experiment directly tests three combinations of payment formulas and housing requirements and five to six variations within each of these combinations--a total of 17 variations. These 17 variations allow some possible program designs to be tested directly. More important, they allow estimation of key responses in terms of such basic program parameters as the level of allowances, the level and type of housing requirements, the minimum fraction of its own income which the family is expected to contribute toward housing, and the way in which allowances vary with family size, income, and rent. These response estimates can then be used to address the policy questions, not just for the program plans directly tested but for a much larger set of candidate program plans.[1]

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[1]The basic design and analysis approach, as approved by the HUD Office of the Policy Development and Research, is presented in Abt Associates Inc., Experimental Design and Analysis Plan of the Demand Experiment, Cambridge, Mass., March 1973, revised August 1973, and in Abt Associates Inc., (footnote continued on next page)

Two payment formulas are used in the Demand Experiment--Housing Gap and Percent of Rent.

Under the Housing Gap formula, payments to families constitute the difference between a basic payment level, C, and some reasonable fraction of family income. The payment formula is

$$P = C - bY$$

where P is the payment amount, C is the basic payment level, "b" is the rate at which the allowance is reduced as income increases, and Y is the net family income.[1] In the experiment, the basic payment level, C, varies with household size and is proportional to C*, the estimated cost of modest existing standard housing at each site, and varies by household size.[2] Thus, the payment in the Housing Gap formula can be interpreted as making up the difference between some fraction of the cost of decent housing and the fraction of its own income that a household should be expected to pay for housing.

Under the Percent of Rent formula, the payment is a percentage of the family's rent. Thus, the payment is determined by

$$P = aR$$

where R is rent and "a" is the fraction of rent paid by the allowance. The values of "a" remain constant once a family has been enrolled.[3]

(footnote continued from previous page)
Summary Evaluation Design, Cambridge, Mass., June 1973. Details of the operating rules of the Demand Experiment are contained in Abt Associates Inc., Site Operating Procedures Handbook, Cambridge, Mass., April 1973, updated periodically.

[1] In addition, whatever the payment calculated by the formula, the actual payment cannot exceed the rent paid.

[2] For more detailed discussion regarding the derivation of C*, refer to Abt Associates Inc., Working Paper on Early Findings, Cambridge, Mass., January 1975, Appendix II.

[3] Five values of "a" are used in the Demand Experiment. Once a family is assigned its "a" value, the value generally stays constant in order to aid experimental analysis. In a national Percent of Rent program, "a" would probably vary with income and/or rent. Even in the experiment, if a family's income rises beyond a certain point, the "a" drops rapidly to zero. Similarly, the payment under Percent of Rent cannot exceed C* (the maximum payment under the modal Housing Gap plan); this effectively limits the rent subsidized to rents less than C*/a.

The Percent of Rent payment formula is directly tied to rent: a household's allowance payment is proportional to the total rent. Under the Housing Gap formula, however, two additional housing requirements are needed to tie the allowance to housing: Minimum Standards and Minimum Rent.

Under the Minimum Standards requirement, participants must occupy dwellings meeting certain standards to receive the allowance payment. Participants occupying units that do not meet these standards must either move or arrange to improve their current units to meet the standards. Participants already living in housing that meets standards may use the payment to pay for better housing or to reduce their rent burden (the fraction of income spent on rent) in their existing units.

If housing quality were broadly defined to include all residential services, and if rent levels were highly correlated with the level of services, then a straightforward housing requirement (one relatively inexpensive to administer) would be that recipients spend some minimum amount on rent. Minimum Rent is considered as an alternative to Minimum Standards in the Demand Experiment, so that differences in response and cost may be observed and the relative merits of the two types of requirements assessed. Although the design of the experiment uses a fixed minimum rent for each household size, a program for direct cash assistance could employ more flexible versions. Such versions could, for example, combine features of the Percent of Rent formula with the Minimum Rent requirement.[1] Thus, the three combinations of payment formulas and housing requirements used in the Demand Experiment are Housing Gap Minimum Standards, Housing Gap Minimum Rent, and Percent of Rent.

The Housing Gap allowance plans are shown in Table I-1 below. The first nine plans all have "b" equal to 0.25, and include three variations in the level of C (1.2C*, C*, and 0.8C*) and three variations in housing requirements (Minimum Standards, Minimum Rent Low (0.7C*) and Minimum Rent High (0.9C*)). The next two plans have the same level of C (C*) and the Minimum Standards Housing Requirement, but different levels of "b"--the tenth plan

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[1] For example, instead of receiving nothing if their rent is less than the Minimum Rent, households might be paid a fraction of their allowance depending on the fraction of Minimum Rent paid.

Table I-1

HOUSING GAP ALLOWANCE PLANS

Housing Gap Formula: $P = C - bY$ where C is a multiple of C*

b VALUE	C LEVEL	HOUSING REQUIREMENTS			
		MINIMUM STANDARDS	MINIMUM RENT LOW = 0.7C*	MINIMUM RENT HIGH = 0.9C*	NO REQUIREMENT
b = .15	C*	Plan 10			
b = .25	1.2C*	Plan 1	Plan 4	Plan 7	
	C*	Plan 2	Plan 5	Plan 8	Plan 12
	0.8C*	Plan 3	Plan 6	Plan 9	
b = .35	C*	Plan 11			

Symbols:

b = Rate at which the allowance decreases as the income increases.

C* = Basic payment level (varied by family size and also by site).

has "b" equal to 0.15 while the eleventh plan has "b" equal to 0.35. The twelfth plan has no housing requirement.

Eligible households that do not meet the housing requirement can still enroll. They receive full payments whenever they meet the requirements and may do so anytime during the three years of the experiment. Even before they meet the housing requirements, such households receive a payment of $10 per month if they complete all reporting and interview requirements.

Within the Housing Gap design, the mean effects of changes in the allowance level and housing requirement can be estimated for all major responses. In addition, interactions between allowance level and housing requirement can be assessed. Responses to variations in the allowance/income schedule (changes in "b") can be estimated for the basic combination of the Minimum Standards housing requirement and C*.

The Percent of Rent allowance plans consist of five variations in "a", the proportion of rent paid to the household, as shown in Table I-2 below.[1]

Table I-2

PERCENT OF RENT ALLOWANCE PLANS

Percent of Rent Payment Formula: $P = aR$

Allowance Plan	13	14-16	17-19	20-22	23
Value of "a"	0.6	0.5	0.4	0.3	0.2

A demand function for housing will be estimated primarily from the Percent of Rent observations. This demand function should provide a powerful tool for analysis of alternative forms and parameter levels of housing allowance programs.

In addition to the various allowance plans, Control groups are necessary to establish a reference level for household responses, because a number of

[1]Designation of multiple plans for certain "a" values reflects an early assignment convention and does not indicate that the households in these plans are different.

uncontrolled factors may also induce changes in family behavior during the course of the experiment. Control households receive a monthly cooperation payment of $10. They report the same information required of households receiving allowance payments, including household composition and income; they permit housing evaluations; and they complete the Baseline Interview and the three Periodic Interviews. (Control households are paid an additional $25 fee for each Periodic Interview.)

Two Control groups are used in the Demand Experiment. Members of one group (Plan 24) were offered a Housing Information Program when they joined the experiment, and were paid $10 for each of five sessions attended. (This program was also offered to all households that were offered allowances, but these households were not paid for attending sessions.) The other Control group (Plan 25) was not offered the Housing Information Program.

All the households in the various allowance plans had to meet a basic modal income eligibility requirement. This was defined (approximately) by the income level at which the household would receive a zero payment under the Housing Gap formula.

$$P = C^* - 0.25Y.$$

In addition, households in plans with lower payment levels (Plans 3, 6, 9, and 11) had to have incomes low enough to receive payments under these plans. Finally, only households with incomes in the lower third of the eligible population were eligible for enrollment in Plan 13 and only those in the upper two thirds were eligible for Plan 23.

I.5 THE SAMPLE AFTER ONE YEAR

Much of the analysis of the impact of the housing allowance will be based on two years of experimental data. For this report and the other reports in this series the sample consists of only those households that were active in the experiment one year after enrollment. Table I-3 presents the sample sizes for households active at enrollment and after one year for each treatment plan.

Active households include both households receiving a full payment and those not receiving a full payment. Households receiving full payments meet all

Table I-3

SAMPLE SIZE AT ENROLLMENT AND ONE YEAR AFTER ENROLLMENT BY ALLOWANCE PLANS

ALLOWANCE PLAN[a]	ENROLLMENT SAMPLE		ONE YEAR SAMPLE	
	PITTSBURGH	PHOENIX	PITTSBURGH	PHOENIX
TOTAL HOUSING GAP	701	765	607	589
1	43[b]	48	37	36
2	59	74	51	49
3	62	66	53	50
4	43	42	36	34
5	62	70	58	54
6	61	63	49	48
7	45	43	37	40
8	67	78	59	59
9	67	70	53	54
10	57	64	51	53
11	60	77	50	53
12	75	70	73	59
TOTAL PERCENT OF RENT	510	490	467	407
13	34	32	33	28
14-16	121	114	116	106
17-19	145	120	129	93
20-22	118	140	111	112
23	92	84	78	68
TOTAL CONTROL[b]	434	525	393	394
24	210	262	187	194
25	224	263	206	200
TOTAL	1645	1780	1467	1390

SAMPLE: All enrolled households not above income eligibility limit.
DATA SOURCE: Payments file.

a. See Tables I-1 and I-2 for a description of the allowance plans.

b. Control households in plan 24 were offered the Housing Information Program, those in plan 25 were not.

requirements (including the housing requirements) and receive the full subsidy for which they are eligible given income, household size, and rent. Those not receiving a full payment receive only a monthly cooperation payment. Households fall in the latter group if they are homeowners, live in subsidized housing, have not met housing requirements, or have not turned in a rent receipt, but at the same time meet all other reporting and eligibility requirements. The numbers of households in each category after one year, together with reasons for not receiving a full payment, are presented in Table I-4.

Table I-4

NUMBER OF HOUSEHOLDS ONE YEAR AFTER ENROLLMENT

PAYMENT STATUS	PITTSBURGH	PHOENIX
Receiving a Full Payment	1,116	1,025
Not Receiving a Full Payment	351	365
Homeowners	29	100
Residing in Subsidized Housing	42	22
Missing a Rent Receipt	44	28
Not Meeting Housing Requirements	236	215

SAMPLE: Households active at one year.
DATA SOURCE: Payments file.

APPENDIX II

MAJOR VARIABLES USED IN THE ANALYSIS AND SAMPLE DESCRIPTION

This appendix discusses the data sources (Section II.1) and analytical definitions (Section II.2) of the six different categories of variables. These major categories are: (1) the move variable; (2) household income, rent, and demographic characteristics; (3) program housing and occupancy standards; (4) satisfaction measures; (5) program status; and (6) location variables. The perceived neighborhood quality variable is discussed in Appendix IV. Section II.3 contains the definition of the samples used in this report.

II.1 DATA SOURCES

Table II-1 indicates the data sources used in the derivation of each variable. If a household's record was missing any of the data sources required for the derivation of a variable, that particular variable was assigned a missing value code and the household was excluded from any analysis involving that variable. Reasons for missing-value codes include nonresponses, "don't know" responses, and out of range responses.

II.2 ANALYTIC DEFINITIONS OF VARIABLES

Move Variable

Determination of a move was always based on the comparison of addresses rather than on the household's response to interview questions regarding moving. A household was classified as having moved during the first year of the experiment if the address on the Initial Household Report Form differed from the address on either the First or Second Periodic Interview.[1]

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[1]The First and Second Periodic Interviews were conducted after approximately six months and one year, respectively, of program participation. The Initial Household Report Form was completed as part of the enrollment process.

Table II-1

DATA SOURCES USED TO DERIVE KEY VARIABLES

VARIABLE	DATA SOURCES
First-Year Move Behavior	Initial Household Report Form, Baseline, First and Second Periodic Interviews
Household Characteristics	
Household Size	Initial Household Report Form
Household Type	
Sex of Head of Household	
Age of Head of Household	
Race/Ethnicity	Baseline Interview
Education of Head of Household	
Net Analytic Income	Initial Household Report Form
Housing Characteristics	
Rent	Initial Household Report Form, Housing Evaluation Form (at enrollment), Baseline Interview
Number of Rooms	
Satisfaction	
Housing Unit Satisfaction	Baseline Interview
Neighborhood Satisfaction	
Program and Occupancy Standards	
Minimum Standards	Housing Evaluation Form (at enrollment)
Occupancy	Initial Household Report Form, Housing Evaluation Form (at enrollment)
Program Status	
Current Status	Payments File
Income Eligibility Status	Initial Household Report Form, Household Events List
Low-Income Eligibility Status	Initial Household Report Form
Cost of Standard Housing, C*	Initial Household Report Form, Housing Evaluation Form
Location	
Census Tract	Initial Household Report Form, Baseline, First and Second Periodic Interviews, Housing Evaluation Form
Census Tract Characteristics	1970 Census of Population and Housing (Fourth Count Tapes)

Household Characteristics

In general, the household characteristics describe the household at the time of enrollment. Income, sex of head of household, household size, age of head of household, household type, and rent information were collected from the Initial Household Report Form (at enrollment), while race/ethnicity and education of household head came from the Baseline Interview.

Household size. The definition of household size includes all persons living with the household except roomers and boarders.

Household type. The household type variable describes households on the basis of the marital status of head of household, the presence of children, and the presence of relatives. A son or daughter 18 years of age or older is considered a relative rather than a child.

Sex of head of household. The census convention is used. To establish the census head of household, the sex and relationship of each household member to the respondent who is designated head is checked. Unless the household has a single female head, it is classified as having a male head of household.

Age of head of household. Age at the time of enrollment is derived from date of birth information for the person determined as census head of household.

Race/ethnicity. The following categories of racial or ethnic identification are used in this report:

Pittsburgh: white, black
Phoenix: white, black, Spanish American.

Race is based on interviewer observations of Baseline Interview respondents. There were relatively few American Indians, Orientals, and other nonwhites, and they are not included in analyses involving race/ethnicity. Households were designated as Spanish American in Phoenix based on their surname according to census conventions; only households not classified as Spanish American were classified according to race.

Education of head of household. The educational attainment of the census head of household is measured as the number of years of school completed.

Income

The only income variable used in this report is Net Income for Analysis, a measure of disposable household income. Net Income for Analysis is an estimate of the annual income received by all household members age 18 or over; it is the sum of earned and other income net of taxes and alimony paid. A complete list of all income components included in the definition of net income and its relation to the income definition used to determine eligibility for the experimental programs and to that used by the census are given in Table II-2.

Rent

Analytic rent is basically defined as the monthly payment for an unfurnished dwelling unit including basic utilities. The adjustment formula is

Adjusted Contract Rent = (Furnishing Adjustment Factor) x (Contract Rent + Utilities + Special Adjustments) - (Roomer Contribution Adjustment).

If reported contract rent includes furnishings, the adjusted gross rent is reduced by an amount equal to the estimated price of those furnishings.[1]

If the costs of utilities are not included in the household's contract rent, utilities adjustments are added to contract rent. Adjustments are made from site-specific tables for electricity, gas, heat, water, and garbage and trash collection if a household reports paying for a specific utility and if that payment is not included in contract rent. The amount of the adjustments depends on the number of rooms reported in the Housing Evaluation Form. No adjustment is made for any other utilities or services, such as parking.

Amounts by which contract rent is reduced by the landlord because a participant household works in lieu of rent or is related to the landlord are added to contract rent; these adjustments have not been added to income, although

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[1] See Abt Associates Inc. (1975, Appendix IV) for a more complete description of the furnishings adjustment.

Table II-2

COMPONENTS INCLUDED IN THE DEFINITION OF NET INCOME FOR ANALYSIS AND COMPARISON WITH CENSUS AND PROGRAM ELIGIBILITY DEFINITIONS

COMPONENTS	NET INCOME FOR ELIGIBILITY	NET INCOME FOR ANALYSIS	CENSUS (GROSS INCOME)
I. GROSS INCOME			
A. Earned Income			
1. Wages and Salaries	X	X	X
2. Net Business Income	X	X	X
B. Income-Conditioned Transfers			
1. Aid for Dependent Children	X	X	X
2. General Assistance	X	X	X
3. Other Welfare	X	X	X
4. Food Stamps Subsidy	-	X*	-
C. Other Transfers			
1. Supplemental Security Income (Old Age Assistance, Aid to the Blind, Aid to the Disabled)	X	X	X
2. Social Security	X	X	X
3. Unemployment Compensation	X	X	X
4. Workmen's Compensation	X	X	X
5. Government Pensions	X	X	X
6. Private Pensions	X	X	X
7. Veterans Pensions	X	X	X
D. Other Income			
1. Education Grants	X	X	X
2. Regular Cash Payments	X	X	X
3. Other Regular Income	X	X	X
4. Alimony Received	X	X	X
5. Asset Income	X*	X	X
6. Income from Roomers and Boarders	-	-	X
II. GROSS EXPENSES			
A. Taxes			
1. Federal Tax Withheld	X*	X*	-
2. State Tax Withheld	X*	X*	-
3. FICA Tax Withheld	X*	X*	-
B. Work-Conditioned Expenses			
1. Child Care Expenses	X	-	-
2. Care of Sick at Home	X	-	-
3. Work Related Expenses	X*	-	-
C. Other Expenses			
1. Alimony Paid Out	X	X	-
2. Major Medical Expenses	X	-	-

*The amounts of these income and expense items are derived using data reported by the household. All other amounts are included in the income variables exactly as reported by the household.

they should in theory be added. The household expenditures and payment definitions of rent exclude contributions made to rent by roomers (net of board).

Program Housing and Occupancy Standards

The housing and occupancy measures are based on the Minimum Standards housing requirements used in one part of the experiment. They were developed from elements of the American Public Health Association/Public Health Service, Recommended Housing Ordinance (1971).[1] Table II-3 lists the Minimum Standards housing requirements as they apply to the dwelling unit itself. The requirements are grouped into 15 components made up of related items.

Occupancy requirements are separate from the physical requirements listed in Table II-3. However, the requirements for light/ventilation, ceiling height, and electrical service are applied to bedrooms in determining the number of adequate bedrooms for the program occupancy requirements as explained below.

The occupancy requirement sets a maximum of two persons for every adequate bedroom, regardless of age. A studio or efficiency apartment is counted as a bedroom for occupancy standards. An adequate bedroom is a room that can be completely closed off from other rooms and that meets the program housing standards for ceiling height, light/ventilation, and electrical service. In addition, the room must meet the housing standards for the condition of room structure, room surface, floor structure, and floor surface. If the dwelling unit contains four or more adequate bedrooms, it is judged to meet occupancy standards.

Roomers and boarders are added to household size when determining whether a household meets occupancy standards, because all the rooms in the dwelling unit are taken into account.

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[1] See Abt Associates Inc. (1975) for more detail on the Minimum Standards.

Table II-3

COMPONENTS OF MINIMUM STANDARDS
(Program Definition)

1. COMPLETE PLUMBING

Private toilet facilities, a shower or tub with hot and cold running water, and a washbasin with hot and cold running water will be present and in working condition.

2. COMPLETE KITCHEN FACILITIES

A cooking stove or range, refrigerator, and kitchen sink with hot and cold running water will be present and in working condition.

3. LIVING ROOM, BATHROOM, KITCHEN PRESENCE

A living room, bathroom, and kitchen will be present. (This represents the dwelling unit "core," which corresponds to an efficiency unit.)

4. LIGHT FIXTURES

A ceiling or wall-type fixture will be present and working in the bathroom and kitchen.

5. ELECTRICAL

At least one electric outlet will be present and operable in both the living room and kitchen. A working wall switch, pull-chain light switch, or additional electrical outlet will be present in the living room.[a]

6. HEATING EQUIPMENT

Units with no heating equipment; with unvented room heaters which burn gas, oil, or kerosene; or which are heated mainly with portable electric room heaters will be unacceptable.

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a. This housing standard is applied to bedrooms in determining the number of adequate bedrooms for the program occupancy standard.

Table II-3 - continued

7. ADEQUATE EXITS

There will be at least two exits from the dwelling unit leading to safe and open space at ground level (for multifamily building only). Effective November, 1973 (retroactive to program inception) this requirement was modified to permit override on case-by-case basis where it appears that fire safety is met despite lack of a second exit.

8. ROOM STRUCTURE

Ceiling structure or wall structure for all rooms must not be in condition requiring replacement (such as severe buckling or leaning).

9. ROOM SURFACE

Ceiling surface or wall surface for all rooms must not be in condition requiring replacement (such as surface material that is loose, containing large holes, or severely damaged).

10. CEILING HEIGHT

Living room, bathroom, and kitchen ceilings must be 7 feet (or higher) in at least one-half of the room area.[a]

11. FLOOR STRUCTURE

Floor structure for all rooms must not be in condition requiring replacement (such as severe buckling or noticeable movement under walking stress).

12. FLOOR SURFACE

Floor surface for all rooms must not be in condition requiring replacement (such as large holes or missing parts).

13. ROOF STRUCTURE

The roof structure must be firm.

---

a. This housing standard is applied to bedrooms in determining the number of adequate bedrooms for the program occupancy standard.

Table II-3 - continued

14. EXTERIOR WALLS

The exterior wall structure or exterior wall surface must not need replacement. (For structure this would include such conditions as severe leaning, buckling or sagging and for surface conditions such as excessive cracks or holes.)

15. LIGHT/VENTILATION

The unit will have a 10 percent ratio of window area to floor area and at least one openable window in the living room, bathroom, and kitchen or the equivalent in the case of properly vented kitchens and/or bathrooms.[a]

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a. This housing standard is applied to bedrooms in determining the number of adequate bedrooms for the program occupancy standard.

Program Status Variables

Current status. Status of the household at the time of enrollment or at one year is defined as one of the following:

Active

Full Payments

Minimum Payments

Inactive, never reactivated in later cycles

Terminated.

Reasons for minimum payments are:

Household owns home

Household lives in subsidized housing

Rent receipt missing

Failure to meet housing requirement (Housing Gap Minimum Rent and Minimum Standards Groups only).

Reasons for inactive or terminated status are:

Move out of county

Ineligible household composition

Residing in institution

Cannot locate

Periodic Interview refused

Housing evaluation refused

Missing Household Report Forms

New household members refused to comply with requirements.

Additional reasons for termination are:

Household deceased

Ineligible split

Fraud

Received ineligible relocation benefits

Termination other (conflict of interest)

Reverification refused

Quit (voluntary termination).

Income eligibility status at enrollment. This variable represents income eligibility status of enrolled households based on income verification.

Data were collected in several ways. Experimental households that were verified as overincome were identified by the site offices. Control households with incomes above regular eligibility limits (termed "modal" in earlier reports) were identified from Household Events List data. Only a 20 percent sample of Control households went through income verification. Therefore the incomes for Control households reported on the Household Events List from which regular eligibility were determined were either the verified amount or that reported by the household on the Initial Household Report Form.

Low-income eligibility status based on eligibility limits for the low-income treatment cells at enrollment. This variable represents income eligibility status of all households, regardless of treatment, based on the limits for the Housing Gap Low C* cells (cells 3, 6, 9). This variable is useful in defining a sample where income biases related to differing cell eligibility limits should be removed.

Cost of standard housing, C*. This variable is used in calculating the housing allowance payment in Housing Gap plans (Appendix I). For a description of the derivation of C*, refer to Abt Associates Inc., Working Paper on Early Findings, Cambridge, Mass., January, 1975, Appendix II.

Allowance payments can be computed by applying the Housing Gap subsidy formula to data on household income, rental expenditures, and size.

$$\text{(1)} \qquad \text{Payment} = \min[\max(C - b\,\frac{NIE}{12},\ \$10.00),\ \text{program rent}].$$

NIE is Net Income for Eligibility. The components of NIE are shown in Table II-2. Program rent is derived in the same fashion as analytical adjusted contract rent except that no adjustments for work in lieu of rent or relationship with landlord are made. See Table I-1 for the relevant values of the marginal payment reduction rate "b" and the basic payment level C. Table II-4 presents the values of C used in evaluating Equation (1).

Table II-4

MONTHLY COST OF STANDARD HOUSING VALUE USED IN HOUSING GAP ALLOWANCE FORMULA

NUMBER OF MEMBERS IN HOUSEHOLD	1	2	3,4	5,6	7,8 or more
	PITTSBURGH				
C = 0.8C* (TG 3,6,9)	$ 84	$ 96	$112	$128	$152
C = 1.0C* (TG 2,5,8,10,11,12)	105	120	140	160	190
C = 1.2C* (TG 1,4,7)	126	144	168	192	228
	PHOENIX				
C = 0.8C* (TG 3,6,9)	$100	$124	$144	$176	$212
C = 1.0C* (TG 2,5,8,10,11,12)	125	155	180	220	265
C = 1.2C* (TG 1,4,7)	150	186	216	264	318

Location Variables

All the variables related to location are ultimately derived from a household's residential address, which was determined at the time of completion of every interview. The majority of Census tract assignments were obtained from local vendors who used standard geocoding programs. Further assignments were made by hand by site and Cambridge staff using census maps.

Once the location by Census tract was known for enrollment and at the end of the first year, Fourth Count 1970 Census tract data were determined for each household.[1] All census variables used in this report except the Rent-Quality Index were derived directly from census tapes with a minimum of computation.

The variable Rent-Quality Index, based on the percentage of units in a Census tract with rents above C*, was derived to serve as a rough index of the quality of the housing stock at the Census tract level. The C* rent level used

[1] Documentation of Census data may be found in 1970 Census Users Guide, Parts I and II, U.S. Government Printing Office, Washington, D.C. (1970).

in the Housing Gap payment formula, as noted above, was the estimated cost of modest, existing, standard housing at each site. The level of C* varies by housing unit size. Inspection of the Census data indicated several anomalous tracts in which a substantial proportion of rental units with relatively high rents lacked complete plumbing facilities. Because for such tracts the direct percentage of units with rents above C* would not be a good indicator of the housing stock quality, the Rent-Quality Index was computed as the proportion of rental units with complete plumbing facilities and rent above the C* level. Thus, strictly speaking, the definition of the Rent-Quality Index confounds a direct quality measure (complete plumbing facilities) with a rough indicator of housing quality (rent in excess of the C* level). A direct measure, percentage of units lacking complete plumbing facilities, was also used, even though the percentage is generally low and has small tract-to-tract variation.

To obtain the Rent-Quality Index, the number of rental units with complete plumbing facilities by rent level by number of bedrooms was determined approximately from Fourth Count housing data by making the assumption that the percentage of units with complete plumbing facilities by rent level is independent of the number of bedrooms. That is, the number of units with a particular rent level with a given number of bedrooms was multiplied by the percentage of units in that rent level with complete plumbing facilities for the tract to get the desired estimate.

An adjustment for inflation was also made in computing the variable Rent-Quality Index. For the great majority of the enrollees, the actual first year of the experiment occurred during roughly the last half of 1973 through the end of 1974, a period in which prices had risen considerably since 1970, when the Census data were collected. A rough estimate, based on the Consumer Price Index, of the rise in prices occurring between 1970 and 1974 gives an inflation rate of 27 percent. If rents rose according to the general inflation rate, a unit renting for 0.8C* in 1970 would command roughly a rent of C* in 1974. Thus as a rough correction for inflation the 0.8C* level is used as the actual C* level for 1970.

The Census data provide rents in relatively broad dollar ranges, so that approximate values of 0.8C* must be used in the computation. These values along with the actual values of 0.8C* are shown in Table II-5. Units by

Table II-5

MONTHLY COST OF STANDARD HOUSING BY NUMBER OF BEDROOMS AND APPROXIMATE VALUES USED IN COMPUTATION OF RENT-QUALITY INDEX

NUMBER OF BEDROOMS	PITTSBURGH		PHOENIX	
	0.8C*	CENSUS RENT BREAK USED AS APPROXIMATION OF 0.8C*	0.8C*	CENSUS RENT BREAK USED AS APPROXIMATION OF 0.8C*
0	$ 84	$ 80	$100	$100
1	96	100	124	100
2	112	100	144	150
3	128	100	176	150
4 or more	152	150	212	200

DATA SOURCE: 1970 Census of Population and Housing (Fourth Count Tapes).

bedroom with rents greater than the values shown in Table II-5 are assumed to have had rents greater than C* during the first year of the experiment. Clearly the variable Rent-Quality Index is only a very rough indicator of the quality of the housing stock available in a Census tract.

II.3 SAMPLE DESCRIPTION

The basic analysis sample of households used throughout this report consists of households active at one year (the time of the Second Periodic Interview) that were not living in subsidized housing or their own homes and did not have an income above the income eligibility limit for the low-income treatment groups. (See program status variables in Section II.1.) This includes households that were enrolled in the experiment but not meeting their housing requirements at the end of the first year. This sample comprises 1,154 households in Pittsburgh and 1,186 households in Phoenix. The sample for analysis of perceived neighborhood quality excludes households that moved between the time of the Baseline Interview and enrollment. This insures that analysis of moving between enrollment and the time of the Second Periodic Interview is based on household responses pertaining to the enrollment residence. Households excluded because of moves between the time of the Baseline Interview and enrollment number 60 in Pittsburgh and 113 in Phoenix.

REFERENCES

Abt Associates Inc., Working Paper on Early Findings, Cambridge, Mass., January 1975.

APPENDIX III

REGRESSION ANALYSIS OF EXPERIMENTAL INFLUENCES

In this appendix, the steps taken to obtain the reduced-form regression equations used in Chapter 2 are discussed. The initial work on examining Experimental-Control differences in neighborhood choice proceeded using one regression equation of final low-income concentration with a dummy variable to distinguish Experimental from Control households. However, it turned out that some simple product interaction terms--for example, (Experimental/Control status) by (initial low-income concentration)--contributed significantly to the regression. It was decided because of heterogeneity of regression to run separate equations for Experimental and Control households and to look for experimental effects by means of comparison of regression coefficients. In order to make such comparisons meaningful, it is desirable to reduce the degree of multicollinearity in the equations as much as possible; this appendix discusses the procedure used to reduce multicollinearity.

The regression coefficients and the variables on which final low-income concentration was regressed for Pittsburgh movers are shown in Table III-1. This analysis is discussed in Chapter 2. What is of concern here is the possible multicollinearity present among the independent variables.

Multicollinearity might be expected, for example, because of program eligibility restrictions on age, income, and household size. For first-year Pittsburgh Experimental movers, the Pearson correlation coefficient between household size and income is 0.664, a value that indicates the two characteristics are nontrivially related. One measure of the degree of multicollinearity is, of course, the value of the determinant of the correlation matrix of the independent variables: if all the variables are orthogonal, which also implies linear independence, this determinant is equal to one. In the extreme case that one of the independent variables

Table III-1

REGRESSION COEFFICIENTS OF FINAL LOW-INCOME CONCENTRATION ON NEIGHBORHOOD, HOUSING AND DEMOGRAPHIC VARIABLES: PITTSBURGH
(Standard Error in Parenthesis)

VARIABLE[a]	EXPERIMENTAL HOUSEHOLDS	CONTROL HOUSEHOLDS	t-STATISTIC[b,c] (DEGREES OF FREEDOM)
Initial Low-Income Concentration	0.2543** (0.0778)	0.7887** (0.1783)	-2.774** (64)
Proportion of Black Population in Census Tract	-2.3982 (5.0241)	3.2964 (9.7593)	-0.524 (71)
Rent ($10s)	-0.2255 (0.2892)	0.1337 (0.4424)	-0.685 (89)
Passed Minimum Standards Requirements	-3.6187 (2.0457)	9.3755** (3.4143)	-3.293** (81)
Age of Head of Household	0.0976 (0.0597)	-0.0449 (0.1065)	1.178 (76)
Education (Years)	-0.3072 (0.3386)	-1.459 (0.7026)	1.085 (68)
Sex	0.8654 (1.7614)	-6.0906 (3.3353)	1.861 (73)
Income ($100s)	-0.1390 (0.0986)	0.1062 (0.1529)	-1.359 (88)
Household Size (Persons)	2.0121** (0.7036)	-0.7313 (1.2878)	1.886 (75)
Black Head of Household	7.4140* (2.9005)	4.8318 (4.7938)	0.465 (82)
Constant	25.1648	11.8270	
R^2	0.249	0.574	
Overall F-Statistic	6.480**	6.073**	
Standard Error	11.365	10.007	
Sample Size	(206)	(56)	

SAMPLE: Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interview, Initial Household Report Form, Housing Evaluation Form.

a. All variables measured at enrollment.

b. Because of unequal variances, the t-statistic is computed with separate variance estimates, and the degrees of freedom is determined approximately. See, for example, Blalock (1972), pp. 226-27.

c. Comparing Experimental and Control household regression coefficients.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

is in fact linearly dependent upon the others, the determinant is equal to zero; this would occur as the multiple R between one predictor and the other predictors in the set approached one. The smaller the value of the determinant, the higher the degree of multicollinearity among the variables. For the regressions shown in Table III-1, the determinant for the experimental variables is equal to 0.065; for Control variables it is 0.042. These small values indicate substantial multicollinearity.

The next step in the reduction of multicollinearity procedure was to examine the pattern of clustering of the independent variables looking for clues as to which variables might be dropped from the equation. This examination was accomplished by means of principal-components analysis, the details of which follow. The eigenvalues of the correlation matrix, shown in Table III-2 show rather graphically the departure from orthogonality in their broad range of values--if orthogonality prevailed, all eigenvalues would be equal to one.

To select variables, their loadings on the principal components shown in Table III-3 were considered. Where two or more variables loaded heavily on a component, one was selected and the rest excluded from the equation. Those excluded were the variables contributing least to the explanatory power of the regression. From the first column of the analysis of Experimental households,[1] then, SIZE was chosen and INC and SEX excluded. From the second column, BLACK was chosen and PB excluded. From the third, PASS was chosen and RENT and ED excluded.

The principal-components analysis was then rerun with the remaining variables: LIHC, PASS, AGE, SIZE, and BLACK. The eigenvalues are shown in Table III-4. Clearly a considerable reduction in multicollinearity has been accomplished.

Note that this reduction in the number of variables does not reduce the explanatory power of the equations. From Table 2-16 it is seen that the

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[1] Selection was guided by the components for Experimental households; the analysis for Control households showed generally similar patterns of loadings, but with somewhat more ambiguity.

Table III-2

EIGENVALUES OF CORRELATION MATRIX: PITTSBURGH[a]

EXPERIMENTAL MOVERS	CONTROL MOVERS
2.340	2.324
2.156	2.106
1.341	1.590
1.099	1.202
0.830	1.942
0.678	0.599
0.621	0.400
0.461	0.366
0.274	0.271
0.199	0.198

SAMPLE: Pittsburgh Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. Matrix computed for variables in regression equations used in Table III-1.

Table III-3

INDEPENDENT VARIABLE LOADINGS ON VARIMAX ROTATED PRINCIPAL COMPONENT

	EXPERIMENTAL HOUSEHOLDS			CONTROL HOUSEHOLDS		
	COMPONENT 1	COMPONENT 2	COMPONENT 3	COMPONENT 1	COMPONENT 2	COMPONENT 3
Initial Low-Income Concentration	0.006	0.246	-0.262	0.360	-0.062	-0.037
Proportion of Black Population in Census Tract	0.022	0.439	0.006	0.371	-0.020	0.125
Passed Minimum Standards Requirements	-0.149	0.016	0.425	-0.181	-0.069	0.165
Rent ($10s)	0.110	-0.036	0.285	-0.222	0.082	0.294
Income ($100s)	0.412	-0.022	0.008	-0.003	0.500	-0.113
Age of Head of Household	-0.176	-0.110	-0.213	-0.097	0.033	-0.386
Education (Years)	-0.023	0.046	0.393	-0.037	-0.026	0.416
Sex of Head of Household	0.356	-0.184	-0.303	-0.026	0.210	-0.245
Black Head of Household	-0.050	0.434	0.093	0.280	0.153	0.165
Household Size (Persons)	0.382	0.044	-0.036	0.031	0.454	0.027

SAMPLE: Pittsburgh Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Forms.

a. Matrix computed for variables in regression equations used in Table III-1.

Table III-4

EIGENVALUES OF CORRELATION MATRIX OF REDUCED MODEL: PITTSBURGH[a]

EXPERIMENTAL MOVERS	CONTROL MOVERS
1.446	1.546
1.302	1.249
0.956	0.898
0.721	0.805
0.575	0.502

SAMPLE: Pittsburgh Experimental and Control movers active at one year, not living in own or subsidized housing, and below the low-income eligibility limit.

DATA SOURCES: 1970 Census of Population and Housing (Fourth Count Tapes), Baseline, First and Second Periodic Interviews, Initial Household Report Form, Housing Evaluation Form.

a. See text for a description of the variables.

R^2 of the reduced-form equations for Experimental and Control groups are 0.229 and 0.510, respectively. The standard F-tests for the significant contribution of added variables for the variables dropped yielded non-significant F-statistics of 1.065 and 1.353 for Experimental and Control households, respectively.

The same basic procedure was used to eliminate variables in the equations used for Phoenix.

REFERENCES

Blalock, Hubert M. Jr., Social Statistics, New York, McGraw Hill, 1972.

APPENDIX IV

DERIVATION OF SUMMARY SCORES FOR PERCEIVED NEIGHBORHOOD QUALITY

The purpose of this appendix is to report in greater detail the procedures used in deriving the measures of perceived neighborhood quality discussed in Chapter 4. The reliability and validity of the measures are also examined.

Participant evaluations of neighborhood features were obtained from answers to 31 closed-end items in the Baseline and Periodic Interviews. In order to facilitate use of these data, it was decided to undertake a reduction of the data set. In particular, it was desired to create a set of summary measures that adequately reflected respondent evaluations of significant features of a neighborhood at each interview point in time. These measures were to be substantially fewer in number than the original set of 31 items. At the same time they were to capture the essential variation in the data, both between respondents and for the same respondent at different points in time.

To this end, it was felt that participant evaluations of their neighborhoods could be conveniently and realistically viewed as consisting of several distinct clusters of items, each of which measured a particular facet of perceived neighborhood quality. The derivation of perceived neighborhood quality measures was undertaken in four phases. After preliminary examination of the Baseline Interview neighborhood item ratings in Pittsburgh and Phoenix (phase 1), 28 of the original 31 items were placed into one of seven mutually exclusive subsets of items on the basis of a principal-components analysis of the Baseline Interview data (phase 2). Households were then scored on each of the seven clusters of items for each time period by additively combining their weighted and standardized responses to items within each cluster (phase 3). Finally, analyses assessing the reliability and validity of the derived measures were conducted (phase 4). A discussion of the procedures employed in each of these four phases follows.

IV.1 VARIABLES IN THE ANALYSIS

As mentioned previously, the sources of data on perceived neighborhood quality were the Baseline, and First and Second Periodic Interviews, given prior to enrollment, and at six months and twelve months after enrollment, respectively. The sample of responses used in the data reduction process was that of households active at the time of the Second Periodic Interview that did not move between the Baseline Interview and enrollment (the time of completion of the Initial Household Report Form), and that were not enrolled over-income.[1]

The original 31 neighborhood items that households were asked to evaluate and the distribution of responses to these questions are presented in the order of their appearance on the questionnaire in Table IV-1. This initial list of 31 items was pared down to 28 by removing the "friendliness of neighbors" question from the list owing to problems with a skip pattern in the questionnaire and by multiplying the "importance of relatives" response and "the importance of neighbors with same background" response by their corresponding "how many relatives..." and "how many neighbors with same background" responses. The multiplied values ("importance" times "how many") gave greater definition to the question of the attachments households felt toward their neighborhoods. The corresponding values ranged from one ("not important" times "none") to nine ("very important" times "many").

It should be noted that the distribution of responses for most items tends to be negatively skewed. That is, a majority of respondents gave high (or positive) ratings to many of the questions. The effect of this skewness of the items on the distribution of perceived neighborhood quality summary measures is discussed below in greater detail.

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[1] For definition of "enrolled over-income," see Appendix II.

Table IV-1

PERCEIVED NEIGHBORHOOD QUALITY ITEMS AND DISTRIBUTION OF BASELINE RESPONSES (BOTH SITES COMBINED)

NEIGHBORHOOD ITEMS	DISTRIBUTION OF RESPONSES (SAMPLE SIZE = 3038)				
NEIGHBORS[a]					
How many neighbors do you know well enough to talk with?	None (1) 12.0	Some (2) 47.7	Most (3) 19.7	All (4) 20.7	Missing 9
In general, how friendly do you find most of the people in this neighborhood? (Skipped if answered "none" to above)	Unfriendly (1) 3.3	Neither Friendly Nor Unfriendly (2) 15.3	Friendly (3) 81.3	Missing 243	
How important is it to live in same neighborhood as relatives?	Not Important (1) 66.1	Somewhat Important (2) 15.4	Very Important (3) 18.5	Missing 2	
How many relatives live in neighborhood?	None (1) 60.1	Some (2) 33.3	Many (3) 6.6	Missing 3	
How important is it to live with neighbors with same background as yourself?	Not Important (1) 59.9	Somewhat Important (2) 24.0	Very Important (3) 16.1	Missing 3	
How many neighbors have same background as yourself?	None (1) 23.7	Some (2) 59.6	Many (3) 16.6	Missing 121	

FACILITIES AND SERVICES[b]	Not Available (1)	Poor (2)	Fair (3)	Good (4)	Missing
Parking	2.0	28.4	28.7	40.9	18
Street Lighting	1.5	10.4	19.0	69.1	6
Convenience to Grocery Shopping	1.6	12.2	17.3	68.9	7
Garbage Collection	0.2	4.7	12.1	83.0	10
Response of Fire Department	0.1	4.0	10.8	85.1	238
Police Protection	0.2	11.3	19.5	69.0	78
Public Transportation	8.5	13.6	16.1	61.8	93
Trees, Grass, Flowers	3.7	16.5	24.9	54.9	12
Convenience to Places of Worship	1.2	5.4	14.1	79.4	31
Medical Care	6.5	13.2	19.5	60.8	43
Recreation Facilities for Adults	26.8	26.6	18.0	28.6	176
Recreation Facilities for Teenagers	21.8	28.8	19.4	29.9	198
Play Areas for Children	16.8	25.5	20.6	37.1	123
Day Care Facilities	34.4	12.5	16.5	36.5	492
Elementary Schools	1.2	6.2	15.3	77.2	134
Junior High Schools	17.0	9.8	19.1	54.1	235
Senior High Schools	7.5	10.8	21.2	60.5	207

PROBLEMS IN NEIGHBORHOOD[c]	Big Problem (1)	Somewhat Of A Problem (2)	Not A Problem (3)	Missing
Streets in Poor Repair	14.9	19.8	65.3	17
Amount of Noise in Area	19.0	20.1	60.9	2
Litter and Trash in Streets	14.7	18.4	66.9	4
Heavy Traffic in Streets	27.2	22.3	50.5	6
Presence of Drugs and Drug Users	13.9	15.3	70.8	229
Crimes in the Area	12.8	23.1	64.0	78
Abandoned Houses	8.9	11.5	79.7	20
Vacant Lots filled with Trash and Junk	10.7	11.8	77.5	16

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

DATA SOURCE: Baseline Interview.

a. Response to Baseline Interview questions 70-73:

How many of your neighbors do you know well enough to stop and talk with--none, some, most, or all of them?

In general, how friendly do you find most of the people in this neighborhood--would you say they are friendly, neither friendly nor unfriendly, or are they unfriendly?

How important is it to you to live in the same neighborhood as your relatives--is it very important, fairly important, or not important?

How many of your relatives now live in this neighborhood--would you say none, some, or many?

How important is it to you to have neighbors of the same general background as yourself--is it very important, fairly important, or not important?

How many of your neighbors have the same general background as yourself--would you say none, some, or many?

b. Response to Baseline Interview question 74:

Now I'm going to ask you about some facilities and services that are available in some neighborhoods. Please tell me for each one whether you think it is good, fair, or poor in your neighborhood, or if it is not available at all.

c. Response to Periodic Interview question 76:

I'll read you some things that are problems for some people in their neighborhoods. Please tell me if they are a big problem, somewhat of a problem, or not a problem to you, in your neighborhood?

IV.2 PRINCIPAL-COMPONENTS ANALYSIS AND CLUSTERING OF ITEMS

The second step in the derivation of perceived neighborhood quality measures was to delineate mutually exclusive subsets of items that were:

> significantly fewer in number than the original 28 items,
> internally homogeneous with respect to the aspect of the neighborhood they referenced, and
>
> mutually exclusive in terms of their constituent items.

The analysis began with the intercorrelation of the 28 neighborhood evaluation items for all three time periods and both sites using Pearson correlations. The resulting correlation matrices were then submitted to principal-components analysis. The use of components analysis rather than some form of factor analysis implies that no assumption is being made about the items having common and unique parts, as is the case in common factor analysis. Thus, the analysis serves merely to define the basic dimensions of the data as given and to portray the relative positioning of items in the multidimensional space.

From a cluster-analytic point of view, principal-components analysis may be regarded as a means of placing the items of a multivariate data set into a multidimensional space in such a way that items that are similar to one another in terms of their pattern of covariation will tend to cluster along a straight line in the space, while unrelated items will tend to fall at right angles to one another (Harman, 1960, Chapter 4).

An important feature of a principal-components solution is that it is indeterminate in the sense that any rigid rotation of the reference axes (or components) to which the loadings pertain will offer a mathematically equivalent solution in terms of the relative positioning of the items in the space. This fact has led to the development of analytic procedures for determining a unique set of reference axes such that the loadings of the items on these axes can be easily used to interpret the structure of the items in the space.

In this instance the normal varimax rotation procedure has been used (Kaiser, 1958). This process facilitates the search for clusters in the configuration since groupings of items in the space become apparent, with the items in a given group having high loadings on one common reference.

axis and near zero loadings on all remaining axes.

In analyzing the neighborhood evaluation data, varimax-rotated principal-components solutions were generated with four through eight components. The following algorithm was then used to cluster items according to the outcome of each principal-components analysis. First, all items with loadings greater than 0.45 were denoted. Then, all items that had loadings above 0.45 on a given component and only on that component were said to form a cluster. Finally, clusters were labeled according to the substantive content of their constituent items.

Principal-components analysis and the item-clustering algorithm were applied to data obtained at each of the three interview cross sections for each site separately as well as for both sites combined. A seven-cluster configuration derived from Baseline Interview data for the combined-site sample was selected as the final working solution on the basis of adequacy of coverage, stability of the solution across sites, and stability of the solution over time. Evidence pertinent to these issues is presented in Section IV.4 below.

In the working solution (see Table IV-2), the first cluster contains six items that distinguish neighborhoods with regard to GENERAL DECAY. This cluster includes items of both physical deterioration (vacant lots filled with trash, litter in the streets, abandoned houses, streets in poor repair) and social problems (crimes in the area and presence of drugs and drug users).

In the second cluster are grouped those items referring to the quality of PUBLIC SERVICES, including the responsiveness of the fire department, garbage collection, and police protection. Cluster three includes four items describing the CONVENIENCE of neighborhoods to other services: public transportation, medical care facilities, grocery shopping, and places of worship.

Cluster four contains four items describing the RECREATIONAL FACILITIES available in the neighborhood for adults, teenagers, and children, together with the availability of day care. Cluster five describes neighborhoods with respect to the quality of three levels of public SCHOOLS--elementary and junior and senior high schools. Cluster six includes three items

Table IV-2

CLUSTER CONFIGURATION FOR PERCEIVED NEIGHBORHOOD QUALITY ITEMS

NEIGHBORHOOD ITEMS	COMPONENT 1 General Decay	COMPONENT 2 Public Services	COMPONENT 3 Convenience	COMPONENT 4 Recreational Facilities	COMPONENT 5 Schools	COMPONENT 6 Traffic	COMPONENT 7 Neighbors
Vacant lots with trash and junk	0.67						
Crimes in the area	0.66						
Litter and trash in streets	0.64						
Abandoned houses	0.64						
Presence of drugs and drug users	0.62						
Streets in poor repair	0.48						
Speed of Fire Dept. response		0.63					
Garbage collection		0.61					
Police protection		0.52					
Public transportation			0.64				
Medical care in neighborhood			0.60				
Convenience to grocery shopping			0.58				
Convenience to places of worship			0.56				
Recreational facilities for teens				0.85			
Play areas for children				0.76			
Recreational facilities for adults				0.73			
Day care facilities				0.49			
Senior high schools					0.80		
Junior high schools					0.79		
Elementary schools					0.63		
Heavy traffic in the streets						0.67	
Parking for people in neighborhood						0.60	
Amount of noise in area						0.54	
Neighbors of same background							0.70
Relatives in neighborhood							0.65
How well know neighbors							0.52

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment. (Sample size = 20008)

DATA SOURCE: Baseline Interview.

NOTE: Values in cell represent all item loadings greater than 0.45 from seven-dimensional varimax-rotated principal components analysis of response to twenty-eight perceived neighborhood quality items. Two items--street lighting (Baseline Interview Question 74b) and trees, grass, and flowers (Baseline Interview Question 74h)--had no loadings greater than 0.45; hence, they are not included in any summary measure and are not presented in this table.

having to do with TRAFFIC CONGESTION: heavy traffic, parking and noise. The final cluster contains the three items that refer to respondents' attachment to their NEIGHBORS: neighbors of the same background as themselves, relatives in the neighborhood, and how well respondents know their neighbors. Two items did not fall into any cluster: street lighting and trees, grass, and flowers.

In summary, the varimax-rotated principal-components analysis of the neighborhood evaluation items yields an intuitively appealing grouping of 26 of the 28 items into 7 distinct clusters. This particular cluster solution compares quite favorably with results that were obtained using similar items in the Administrative Agency Experiment (Temple and Warland, 1976). There, six clusters were extracted, four of which are practically identical to the CONVENIENCE, RECREATION, SCHOOLS, and NEIGHBORS clusters described here. The other two AAE clusters, RESIDENTIAL and SAFE AND CLEAN, tend to overlap the three Demand Experiment clusters of DECAY, PUBLIC SERVICES, and TRAFFIC CONGESTION.

Since the AAE drew observations from eight disparate sites, the similarity of its solution with the Demand Experiment solution suggests that the structural properties of the data are relatively consistent across sites and tends to justify the use of the combined-site solution in the Demand Experiment. A more detailed discussion of intersite consistency of the multi-dimensional structure of perceived neighborhood quality is taken up below.

IV.3 DERIVATION OF SUMMARY SCORES

Once the clusters of items had been identified, summary scores for each cluster for each respondent were developed. The major constraint in the construction of summary variables was the necessity of creating scores that would reflect intra-individual changes in the evaluation of a particular neighborhood facet over time. In other words, a one-year score on a particular measure that was higher than a Baseline Interview score of the same individual on the same measure should indicate a more positive evaluation by that individual of the neighborhood facet referenced by the constituent items of the measure.

The scoring process began with the conversion of raw item responses on the Baseline Interview to z-scores. This was accomplished by subtracting the item's mean from the observed response and dividing the difference by the item's standard deviation; or, in notational form

$$(1) \qquad Z_{ij0} = \frac{X_{ij0} - M_{j0}}{S_{j0}}$$

where

Z_{ij0} = the z-score for the i^{th} respondent on the j^{th} item at time period 0 (i.e., Baseline Interview)

X_{ij0} = the observed response of the i^{th} respondent to the j^{th} item at time 0

M_{j0} = the mean response to the j^{th} item at time 0 across all respondents

S_{j0} = the standard deviation of responses to the j^{th} item at time 0 across all respondents.

In performing these calculations, the values used were those indicated in Table IV-1.

The purpose of converting raw responses to z-scores was to standardize the unit of measurement across all items. As Table IV-1 indicates, the range of permissible values varies across items. Failure to standardize would have led to unequal contributions on the part of items to the variance of the summary score owing to artifactual differences in their means and standard deviations. With conversion to z-scores each item makes an equal contribution to the variance of the summary measure aside from the later weighting of items according to magnitude of component loadings, described below.

For the Baseline Interview data, cluster scores were computed by multiplying each z-score of items in the cluster by the appropriate component loading and summing these products together. In notational form

$$C_{ik0} = \sum_{j \in \text{cluster } k} b_{jk} z_{ij0} \quad (2)$$

where

b_{jk} = the loading of the j^{th} variable on component k

z_{ij0} = the z-score at baseline for the i^{th} respondent on the j^{th} variable

C_{ik0} = the summary score for the i^{th} respondent on the k^{th} measure at baseline.

The use of component loadings as weights is a convenient procedure for weighting items according to their importance to the measure under consideration. Generally, this weighting will have very little impact on the summary score when compared with a unit-weighted scoring procedure.

A scoring algorithm similar to that used for the Baseline Interview data was used for calculating summary scores for the neighborhood evaluation data from both the First and Second Periodic Interviews. The means and standard deviations used for calculating z-scores were those derived from the related Baseline Interview data. For this reason they are not truly z-scores and are given the notation z′. Thus, for the First Periodic Interview

$$z'_{ij1} = \frac{(X_{ij1} - M_{j0})}{S_{j0}} \quad (3)$$

where

X_{ij1} = the observed response of the i^{th} respondent to the j^{th} item in the First Periodic Interview

M_{j0} = the mean response to the j^{th} item from the Baseline Interview

S_{j0} = the standard deviation of responses to the j^{th} item from the Baseline Interview.

Use of Baseline Interview means and standard deviations in calculation of the First Periodic Interview z-scores was necessary in order to preserve intra-individual differences over time in response to the same item. The calculation of z′ scores for the Second Periodic Interview was directly analogous to the procedure used for the First Periodic Interview with the exception that the observed response to item

view, X_{ij2}, is substituted for X_{ij1} in Equation (3). Summary scores for the First and Second Periodic Interviews were developed in the same way as that used for the Baseline Interview data with the exception that the appropriate z' replaces the z in Equation (2).

The final step in the creation of the summary scores was a rescaling of the C_{ij0}, C_{ij1}, and C_{ij2} so that each of the seven baseline scores had a mean of 50 and a standard deviation of 10. This transformation was performed solely for the purpose of convenience in reporting and interpreting results and has no substantive implications. It should be noted, however, that First Periodic and Second Periodic Interview summary measures do not necessarily have means of 50 and standard deviations of 10, since they were transformed according to the baseline metric, and hence properly reflect changes in the level of response over time when compared with the arbitrarily established baseline level.

In using the summary measures, it is important to remember that all scores are constructed so that low values indicate relatively unfavorable perceptions of neighborhood quality and high scores indicate relatively favorable perceptions of neighborhood quality. A high score on SCHOOLS, for example, would indicate relatively favorable perceptions of schools. A high score on GENERAL DECAY would indicate that neighborhood deterioration was not perceived as a big problem.

Table IV-3 presents the mean, median, standard deviation, skewness, and maximum and minimum scores for each of the seven perceived neighborhood quality measures. Of particular interest is the relatively severe negative skewness of four of the seven measures: GENERAL DECAY, PUBLIC SERVICES, CONVENIENCE OF OTHER SERVICES, and SCHOOLS. Inspection of the frequency distribution of these four measures (not presented) reveals long tails for the low end of the scales and correspondingly high densities and lack of discrimination between individuals at the upper ends of the scales. Furthermore, the upward change possible for respondents at the upper end of the scale at the Baseline Interview is highly constricted on these measures. Indeed, a substantial proportion of households have the highest possible score on these measures at baseline; hence, improvement for them over time is impossible to observe. This ceiling effect on changes over time is virtually impossible to eliminate.

Table IV-3

DESCRIPTIVE STATISTICS FOR PERCEIVED NEIGHBORHOOD QUALITY SUMMARY MEASURES AT BASELINE (BOTH SITES)

CLUSTER	MINIMUM	MAXIMUM	MEAN	MEDIAN	STANDARD DEVIATION	SKEWNESS[a]
General Decay	15.03	59.05	50.0	52.85	10.0	-1.335
Public Services	- 2.63	56.63	50.0	54.66	10.0	-1.937
Convenience	7.00	59.58	50.0	51.30	10.0	-1.16
Recreation	30.65	66.85	50.0	49.99	10.0	-0.02
Schools	13.21	58.99	50.0	51.86	10.0	-1.06
Traffic	24.33	62.40	50.0	51.96	10.0	-0.467
Neighbors	34.03	90.359	50.0	48.21	10.0	1.004

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment. (Sample size = 2008)

DATA SOURCE: Baseline Interview.

a. Skewness = $\frac{\Sigma_i [(X_i - \bar{X})/S]^3}{N}$, where $\bar{X}$ = sample mean

S = sample standard deviation

N = sample size.

The source of the negative skewness of the summary scores lies in widespread occurrence of similar skewness in distribution of responses to the constituent items of the measures (see Table IV-1). It may be possible to ameliorate the skewness problem to some extent by rescaling the individual item scores or by transformation of summary measures or by some combination of both. These issues are currently being explored. Until they are resolved, analyses using these measures should be regarded with due caution. Correlational analyses are particularly sensitive to skewness and comparisons of group means and changes in means over time such as those presented in Chapter 4 can also be adversely affected by skewness of the measures.

IV.4 · RELIABILITY OF PERCEIVED NEIGHBORHOOD QUALITY MEASURES

The concept of the reliability of a measure refers to the dependability or stability with which a score represents the status of an individual on whatever aspect that person is being evaluated (Cronbach et al., 1972). In the present case, the issue of reliability is twofold, involving: (a) examination of whether the derived multidimensional structure of the data on perceived neighborhood quality is stable over time and across sites; and (b) determination of the extent to which the individual derived measures are stable over time and internally consistent.

Temporal Stability of Cluster Structure

The following table (IV-4) compares the cluster structure of perceived neighborhood quality items as determined from responses to the Baseline Interview with the item structure determined from responses to the Second Periodic Interview. The intent of this comparison is to determine whether the basic cluster structure of the items is stable over time. Temporal instability in the structure would seriously undermine the credibility of the derived measures.

The patterns of "significant" loadings for the Baseline and Second Periodic Interview data do not in fact differ markedly. Only two items exhibit critical differences in their clustering for the two data sets. "Parking for people in the neighborhood" loads above the 0.45 cutoff point on both PUBLIC SERVICES and TRAFFIC CONGESTION at the Second Periodic Interview whereas it falls solely into the TRAFFIC CONGESTION set of items at Baseline. Furthermore, "Convenience to Grocery Shopping" fails to pass the 0.45 cutoff point on any factor at the Second Periodic Interview, while belonging clearly to the CONVENIENCE TO OTHER SERVICES set of items at the Baseline Interview. Except for these differences, the basic structure of the items remains the same over time from the point of view of the clustering rules applied to them. Hence, temporal instability of the cluster structure of the perceived neighborhood quality data is not considered to be a serious threat to the reliability of the derived scores.

Table IV-4

COMPARISONS OF CLUSTER CONFIGURATIONS AT ENROLLMENT AND ONE YEAR AFTER ENROLLMENT FOR PERCEIVED NEIGHBORHOOD QUALITY ITEMS

NEIGHBORHOOD ITEMS	COMPONENT 1 General Decay		COMPONENT 2 Public Services		COMPONENT 3 Convenience		COMPONENT 4 Recreational Facilities		COMPONENT 5 Schools		COMPONENT 6 Traffic		COMPONENT 7 Neighbors	
	T_0	T_2	T_0	T_2	T_0	T_2	T_0	T_2	T_0	T_2	T_0	T_2	T_0	T_2
Vacant lots with trash and junk	0.67	0.76												
Crimes in the area	0.66	0.56												
Litter and trash in streets	0.64	0.65												
Abandoned houses	0.64	0.72												
Presence of drugs & drug users	0.62	0.55												
Streets in poor repair	0.48	0.50												
Speed of Fire Dept. response			0.63	.067										
Garbage collection			0.61	0.55										
Police protection			0.52	0.56										
Public transportation					0.64	0.71								
Medical care in neighborhood					0.60	0.49								
Convenience to grocery shopping					0.58	--								
Convenience to places of worship					0.56	0.60								
Recreational facilities for teens							0.85	0.83						
Play areas for children							0.76	0.79						
Recreational facilites for adults							0.73	0.78						
Day care facilities							0.49	0.53						
Senior high schools									0.80	0.81				
Junior high schools									0.79	0.80				
Elementary schools									0.63	0.58				
Heavy traffic in the streets											0.67	0.72		
Parking for people in neighborhood			--	0.48							0.60	0.47		
Amount of noise in area											0.54	0.67		
Neighbors of same background													0.70	0.71
Relatives in neighborhood													0.65	0.62
How well know neighbors													0.52	0.67

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment. (Sample size = 2008)

DATA SOURCES: Baseline and Second Periodic Interviews.

NOTE: Values represent all item loadings greater than 0.45 from seven-dimensional varimax-rotated principal-components analyses.

Comparison of item-cluster loadings over time is based upon observation pooled across both sites to facilitate direct comparison of cluster scores between sites and to enhance generalizability of findings. This approach was successfully used in analysis of neighborhood changes in the Administrative Agency Experiment (eight sites). See Temple and Warland (1976).

T_0 = enrollment.

T_2 = one year.

Stability of Cluster Structure Across Sites

A second issue concerning the reliability of the cluster structure of the perceived neighbor quality items is the appropriateness of a single solution for both Pittsburgh and Phoenix. Table IV-5 presents the results of applying principal-components analysis and the previously described item-clustering rules to Baseline Interview data from Pittsburgh and Phoenix separately.

Clearly, the stability of the solution across sites is problematic. SCHOOLS and NEIGHBORS are the only two measures that would remain exactly the same as in the combined-site solution if the sites were analyzed separately. the PUBLIC SERVICES, CONVENIENCE TO OTHER SERVICES, and RECREATIONAL FACILITIES item-clusters identified from the combined-site data, appear in only slightly modified form in the site-specific solutions. The most serious problems occur with the GENERAL DECAY and TRAFFIC CONGESTION measures. The items comprising both these measures do not cluster in similar ways for the two sites and neither site replicates the combined-site solution.

Although the between-site variability of the cluster structure of the perceived neighborhood quality items is viewed as large enough to be problematic, several considerations led to acceptance of the combined-site solution. First, the similarity between the combined-site solution and the solution obtained for a similar set of items by the Administrative Agency Experiment on data from eight disparate sites supports the general applicability of combined solution (Temple and Warland, 1976). Second, the combined-site solution seems more readily interpretable than either of the site-specific solutions. Third, the practical advantages of proceeding with a single solution, at least in the exploratory first-year analyses, were judged to outweigh the disadvantages of diminished validity and reliability of measures incurred by using combined rather than site-specific solutions.

Temporal Stability of Perceived Neighborhood Quality Measures

It is generally reasonable to assume that most measures, especially those involving subjective perceptions and attitudes, are fallible. The most

Table IV-5

COMPARISON OF CLUSTER CONFIGURATIONS AT ENROLLMENT FOR PITTSBURGH AND PHOENIX COMBINED

NEIGHBORHOOD ITEMS	COMPONENT 1 General Decay			COMPONENT 2 Public Services			COMPONENT 3 Convenience			COMPONENT 4 Recreational Facilities			COMPONENT 5 Schools			COMPONENT 6 Traffic			COMPONENT 7 Neighbors		
	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c	a	b	c
Vacant lots with trash and junk	67	56	78																		
Crimes in the area	66	--	--													--	71	71			
Litter and trash in streets	64	50	63													--	47	--			
Abandoned houses	64	45	80																		
Presence of drugs and drug users	62	--	--													--	78	--			
Streets in poor repair	48	54	--																		
Speed of Fire Dept. response				63	73	54															
Garbage collection				61	49	53															
Police protection				82	57	58															
Public transportation				--	--	49	64	61	--												
Medical care in neighborhood							60	66	53												
Convenience to grocery shopping							58	67	62												
Convenience to places of worship							56	58	--												
Recreational facilities for teens										85	84	77									
Play areas for children										76	76	79									
Recreational facilities for adults										73	71	74									
Day care facilities										49	48	--									
Senior high schools													80	87	70						
Junior high schools													79	88	74						
Elementary schools													63	66	63						
Heavy traffic in the streets																67	59	77			
Parking for people in neighborhood	1	--	58	--	--	--	45									60	--	--			
Amount of noise in area																54	60	77			
Neighbors of same background																			70	65	75
Relatives in neighborhood																			65	65	65
How well know neighbors																			52	62	56

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment. (Sample size = 2008)

NOTE: Values represent all item loadings greater than 0.45 from seven-dimensional varimax-rotated principal components analysis.

a = item loadings for both sites combined.
b = item loadings for Pittsburgh alone.
c = item loadings for Phoenix alone.

common way of formalizing this notion has been to separate the observed score, X_0, into two summative components, a true component, X_t, and error component, X_e. In notational form, this yields $X_0 = X_t + X_e$.

There are several ways of defining the true component or true score. One is to say that X_t is the score this individual would have obtained under ideal conditions with a perfect measuring instrument. A second way of looking at the situation is to view X_t, the true score, as the mean score that would be obtained from a very large number of administrations of the same question to a particular respondent. The error component then is a positive or negative increment to the observed score that may be viewed as a function of conditions prevailing at the time of questionnaire administration.

Given the above model, the notion of reliability has generally been formalized in terms of coefficients that indicate the amount of true-score variance relative to observed-score variance. This can be expressed as

$$r_{tt} = T_t^2/T_0^2$$

where

r_{tt} = the coefficient of reliability

T_t^2 = the true score variance

T_0^2 = the variance of the observed scores.

The theory of measurement error has traditionally been the province of psychometricians who have oriented much of their theory of reliability of measurement toward tests or instruments in which there are multiple items and for which a domain-sampling model can be viewed as appropriate (Lord and Novick, 1968). The resulting techniques of assessing reliability (internal consistency measures, cross-form correlations) are generally inappropriate or inoperable when key variables have been measured only by a single question or a small number of items, as is the case with the perceived neighborhood quality measures developed for the Demand Experiment. In cases like this, it is more appropriate to turn to test-retest correlations as the primary basis for assessing reliability.

Unfortunately, a simple test-retest correlation may not measure true reliability because it is affected by temporal changes or instability in true scores as well as by errors of measurement. The potential for changes in the true perceived neighborhood quality scores of respondents during the intervals between interviews is hardly negligible. First, during the intervals between reinterviewing many of the participants have moved. Hence, changes in their observed scores may be functions of changes in their neighborhood conditions and not due to unreliability in the measures. Second, even nonmoving participants may experience some real change in their neighborhood or may alter their perceptions of their neighborhood even in the absence of an objective change. Hence, temporal instability of true scores is a factor that needs to be taken into account when using test-retest correlations, even for participants who have not moved. Finally the very process of enrollment, involving housing evaluations and offers tied to housing, may itself alter perceptions about neighborhood conditions.

Fortunately, Coleman (1968) and Heise (1969) have demonstrated that a procedure exists for analyzing test-retest correlations so that the effects of measurement error and true-score instability can be separated analytically, as long as one has gathered data at three points in time rather than two and the data meet certain assumptions. Since measurements of perceived neighborhood quality have been taken at three points in time, the Coleman procedure can be utilized, although the presentation will rely heavily on the reinterpretation by Heise (1969) of Coleman's basic insights in terms of traditional statistics used in measurement theory.

According to the Coleman-Heise model, reliability coefficients for perceived neighborhood quality measures can be calculated as follows

$$r_{tt} = \frac{r_{t_0-t_1}\, r_{t_1-t_2}}{r_{t_0-t_2}}$$

where r_{tt} = the coefficient of reliability

t_0, t_1, t_2 = the three points in time for the Demand Experiment interviews (Baseline, First Periodic and Second Periodic Interviews, respectively.

In addition to reliability coefficients, the model also produces what Heise terms true-score stability coefficients. These are estimates of the correlation between true scores at each end of a given time interval. Thus, in a sense, they are indices of the true amount of change occurring over a particular interval in the respondents' positions on the variable in question. Heise's formulae for true-score stability coefficients, s, given here without proof, are as follows

$$s_{t_0-t_1} = r_{t_0-t_2}/r_{t_1-t_2}$$

$$s_{t_1-t_2} = r_{t_0-t_2}/r_{t_0-t_1}$$

$$s_{t_0-t_2} = r^2_{t_0-t_1}/r_{t_1-t_2}.$$

Five basic assumptions underlie the model: the variable is measured on an interval scale, the relationship between the true score and the observed score is constant over time, errors are uncorrelated with true scores, measurement errors at different times are uncorrelated, and changes in the true score that occur over time are uncorrelated with the initial values of the true score. With regard to the validity of these five assumptions, the following observations are offered:

Assumption 1. Although attributing interval-level measurement properties to the perceived neighborhood quality measures is somewhat questionable, Labovitz (1967, 1970) has shown that, as long as a monotonic relationship is assumed between the measurement scale and the underlying psychological scale, the application of standard parametric procedures and related tests of significance yield results that are not seriously aberrant. Other authors have come to the same conclusion regarding the robustness of correlational techniques designed for interval-level data but applied to ordinal-level measures (see Baker et al., 1966; Burke, 1953; Senders, 1953; Borgatta, 1968, 1970; Jacobson, 1970; Boyle, 1970; and Bohrnstedt and Carter, 1971).

Assumption 2. Because of increased experience in filling out interviews and greater awareness of how they actually feel about their neighborhood owing to stimulation to think about it more, respondents' observed scores probably move closer to their true scores over time, in contradiction to

the second assumption. In support of this line of speculation is the fact that the values of t_1-t_2 correlations are uniformly higher than the t_0-t_1 correlations. Since the Coleman-Heise model assumes that the relationship between observed scores and true scores is constant over time, it follows that in comparison with a model that does not assume such constancy, it inflates the reliability estimate of the perceived neighborhood quality measures for the initial interview and deflates the reliability estimate for later interviews.

Assumption 3. The assumption that errors are uncorrelated with true scores may be problematic because of the apparent ceiling effect in the data collection instrument for most of the measures. Such ceiling effects frequently lead to negative correlation between error and true scores (Lord and Novick, 1968, p. 493). The failure of the Coleman-Heise model to take into account the likely negative correlation of the error and true scores leads to a slightly lower reliability estimate than would be obtained if the model did take such correlation into account.

Assumption 4. The assumptions that measurement errors at different times are uncorrelated may be violated when respondents recall earlier answers and try to be consistent in their responses. In such cases, errors in measurement will tend to be serially correlated. Violation of this assumption results in a higher estimate of reliability in comparison to the estimate that would be obtained from a model which compensated for the serial correlation.

Assumption 5. The assumption that changes in the true score that occur over time are uncorrelated with the initial values of the true score does not appear to pose any obvious problems, especially if reliability analyses are confined to nonmovers.

In summary, the perceived neighborhood quality measures are likely to violate most of the assumptions underlying the Coleman-Heise measurement model to some extent. The effect of these violations on the resulting estimates of reliability and stability coefficients is not known precisely, although the direction of the impact can generally be inferred. Since some of the likely biases are in opposite directions, some counterbalancing of errors of estimation may fortuitously occur. Nonetheless, any estimates of reliability

generated by the model must be regarded with some skepticism, since no firm conclusion as to the seriousness of the violations by the data can be made. The model should, however, provide better estimates of reliability than simple test-retest correlations, which are subject to even more serious problems in terms of the assumptions they must invoke, but do not meet, when used to estimate the reliability of such measures taken at points widely separated in time.

Table IV-6 presents estimates of the reliability and stability coefficients for the perceived neighborhood quality measures derived using the procedures described above. All calculations are based on the subsample of respondents who did not move at all between the Baseline and the Second Periodic Interviews, since it is only for this subsample that the Coleman-Heise model is even approximately appropriate. The computed reliability coefficients are in the 0.55 to 0.75 range, depending on the sample and the measure. The level of reliability is acceptable but not outstanding for all measures except for SCHOOLS. The apparent high proportion of measurement error in SCHOOLS relative to that of the other measures was puzzling enough to induce a more detailed analysis, which only served to confirm that inconsistency of scores on this measure over time does exist to a substantial degree. Little light was shed on why this measure should be so much more unreliable than the other six.

The stability coefficients in Table IV-6 are interesting in that they point to markedly greater stability of true scores in the interval between the First and Second Periodic Interviews than what is observed for the stability of the "true" scores in the earlier interval between the Baseline and First Periodic Interviews. This is not surprising because, as pointed out earlier, Baseline Interview responses were given prior to enrollment and the experience of participating in the experiment may have drawn enrollees' attention to their housing conditions and possibly altered their perceptions of their housing situation. Stabilization of the reassessment process over time is a reasonable expectation.

Table IV-6

RELIABILITY AND STABILITY COEFFICIENTS
FOR PERCEIVED NEIGHBORHOOD QUALITY SUMMARY MEASURES: NONMOVERS

CLUSTER	PEARSON'S r						
	t_0-t_1	t_1-t_2	t_0-t_2	r_{tt}	$s_{t_0-t_1}$	$s_{t_1-t_2}$	$s_{t_0-t_2}$
			PITTSBURGH (Sample size = 523)				
General Decay	0.67	0.71	0.63	0.76	0.89	0.94	0.83
Public Services	0.52	0.58	0.43	0.70	0.74	0.83	0.61
Convenience	0.52	0.54	0.51	0.55	0.94	0.98	0.93
Recreation	0.51	0.57	0.50	0.58	0.88	0.98	0.86
Schools	0.32	0.37	0.30	0.39	0.81	0.94	0.76
Traffic	0.50	0.61	0.51	0.60	0.84	1.00	0.85
Neighbors	0.51	0.63	0.53	0.61	0.84	1.00	0.87
			PHOENIX (Sample size = 384)				
General Decay	0.54	0.71	0.52	0.74	0.73	0.96	0.70
Public Services	0.55	0.56	0.49	0.63	0.87	0.89	0.75
Convenience	0.56	0.65	0.52	0.70	0.80	0.93	0.74
Recreation	0.44	0.62	0.47	0.58	0.76	1.00	0.81
Schools	0.16	0.44	0.23	0.31	0.52	1.00	0.75
Traffic	0.59	0.64	0.51	0.74	0.80	0.86	0.69
Neighbors	0.62	0.68	0.57	0.74	0.64	0.92	0.77

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

DATA SOURCES: Baseline, First and Second Periodic Interviews.

NOTE: t_0-t_1 indicates the interval between the Baseline and First Periodic Interviews. t_1-t_2 indicates the interval between the First and Second Periodic Interviews. t_0-t_2 indicates the interval between the Baseline and Second Periodic Interviews.

Internal Consistency of Perceived Neighborhood Quality Measures

In the case of single-item measures, reliability estimates based on analysis of the stability of repeated measurements similar to those just presented are virtually the only feasible analytic approach. However, if a measure consists of a composite of item scores such as is the case for all seven perceived neighborhood quality measures, test-retest reliability analyses can be usefully supplemented by analysis of the internal consistency of the component items.

When item responses are added together to form a composite score such as has been done for the perceived neighborhood quality measures, it is generally viewed as desirable that the component items both look and behave as if they had something in common. Most psychometric models of error in measures require some assumptions concerning the nature of the relationship between the items and the (unobserved) variable they share in common (Lord and Novick, 1968). These assumptions make it possible to estimate the reliability of a composite measure by examining the intercorrelations of its component items. Cronbach's alpha (Cronbach, 1951), for example, is a reliability coefficient frequently reported in psychometric studies of composite measures which is essentially a function of the average covariance among items. Alpha can be interpreted as lower bound on the proportion of true variance in the observed variance of a composite measure from the point of view of several different scaling models (Nunnally, 1967). Since none of these models is particularly well suited to the perceived neighborhood quality measures, alpha is probably best viewed, in this instance, as an index of internal consistency rather than a strict reliability coefficient. The Coleman-Heise coefficients are probably better estimates of the latter.

Although useful as a summary statistic for comparing internal consistency or different measures, alpha is not as informative as a more detailed correlational analysis for assessing internal consistency of component items. Such analysis frequently begins with the correlation of each item score with the total summative score. Since the latter includes the former as a component, it will be artificially inflated. This contamination may be eliminated by means of a correction formula developed by Peters and Van Voorhis (1940):

$$r_{i(T-i)} = \frac{r_{iT}\sigma_T - \sigma_i}{\sqrt{\sigma_T^2 + \sigma_i^2 - 2r_{iT}\sigma_i\sigma_T}}$$

where

r_{iT} = the correlation between item and uncorrected total

σ_T = the standard deviation of the summative measure

σ_i = the standard deviation of the (weighted and standardized) scores obtained on the item.

If all items show reasonably high corrected correlation with the total score, then there is some evidence that the items are homogeneous. Item-total correlations are particularly helpful in indicating items which may need to be dropped from a composite measure if a reasonable level of homogeneity is to be attained.

Although useful, examination of item-total correlations can often yield misleading conclusions about internal consistency of items composing a summative measure if not buttressed by examination of the interrelationships among items as well. In summative measures in particular, items should be positively related to one another as well as to the composite score if an acceptable level of reliability of measurement is to be attained.

A summary statistic useful in describing the average level of item intercorrelation (in addition to alpha) is the homogeneity ratio (Scott, 1960), defined as

$$HR = \frac{\sigma_T^2 - \Sigma\sigma_i^2}{(\Sigma\sigma_i)^2 - \Sigma\sigma_i^2}$$

where

σ_T^2 = the variance over subjects in total scale scores

σ_i^2 = the variance over subjects (weighted and standardized) scores for each item.

This formula is based on the observation that as the homogeneity of a scale increases, the variance among total scores increases. The homogeneity

ratio represents the degree to which the actual total-score variance exceeds the variance that would be obtained with uncorrelated items, in ratio to the maximum difference that would be found if all items were perfectly correlated. HR is also equal to a weighted average of item intercorrelations, in which the correlation between every pair of items is weighted by the geometric mean of their variances.

A negative homogeneity ratio would imply that the several manifestations of the attribute included in the scale tended to be mutually exclusive. Under such a circumstance, it would make a little sense to add item scores into a total score. A homogeneity ratio of zero would represent an average item intercorrelation of zero, which also suggests that a unidimensional score should not be established by addition of items. The maximum homogeneity ratio of unity can be reached only if all items are perfectly correlated. This would mean that the items were totally redundant and would obviate the necessity of computing a total score. Thus, some compromise is generally sought between a representative sample of items that assess an attitude in various ways and a homogeneous sample of items that assess it identically.

Tables IV-8 and IV-9 present a variety of indicators of the internal consistency of the perceived neighborhood quality measures.[1] Included are:

item-total correlations
corrected item-total correlations
item-item correlations
the mean and standard deviation of item-item correlations ($\bar{r}$ and $\sigma(r)$)
homogeneity ratios (HR)
Cronbach's alpha (α)

As can be seen from Tables IV-7 and IV-8 all corrected item-total correlations are significantly greater than zero. Most measures tend to be slightly less internally consistent for the Phoenix sample than for the

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[1] Internal consistency results are not available for the NEIGHBORS measure at this time.

Table IV-7

INTERNAL CONSISTENCY INDICATORS FOR
PERCEIVED NEIGHBORHOOD QUALITY MEASURES: PITTSBURGH

CLUSTER	ITEM	ITEM-TOTAL CORRELATION	CORRECTED ITEM-TOTAL CORRELATION	ITEM INTER-CORRELATIONS 1	2	3	4	5
General Decay	(1) Vacant lots	0.538	0.383	--				
	(2) Litter	0.702	0.528	0.351	--			
	(3) Abandoned houses	0.662	0.474	0.207	0.346	--		
	(4) Streets in poor repair	0.685	0.504	0.217	0.333	0.537	--	
	(5) Crimes in area	0.715	0.531	0.230	0.372	0.279	0.333	--
	(6) Drugs and drug users	0.738	0.571	0.319	0.450	0.299	0.340	0.530
	α = 0.737	HR = 0.323		$\bar{r}$ = 0.343		$\sigma(r)$ = 0.100		
Public Services	(1) Fire Department	0.716	0.462	--				
	(2) Garbage collection	0.775	0.723	0.302	--			
	(3) Police protection	0.722	0.684	0.263	0.380	--		
	α = 0.505	HR = 0.255		$\bar{r}$ = 0.315		$\sigma(r)$ = 0.060		
Convenience	(1) Public transportation	0.737	0.399	--				
	(2) Medical care	0.571	0.308	0.266	--			
	(3) Grocery shopping	0.640	0.357	0.282	0.247	--		
	(4) Places of worship	0.691	0.348	0.305	0.190	0.259	--	
	α = 0.545	HR = 0.241		$\bar{r}$ = 0.258		$\sigma(r)$ = 0.39		
Recreation	(1) Adult recreation	0.763	0.517	--				
	(2) Teen recreation	0.854	0.626	0.535	--			
	(3) Play areas for children	0.778	0.532	0.403	0.548	--		
	(4) Daycare	0.533	0.313	0.255	0.312	0.242	--	
	α = 0.612	HR = 0.300		$\bar{r}$ = 0.383		$\sigma(r)$ = 0.136		
Schools	(1) Elementary	0.751	0.462	--				
	(2) Junior high	0.882	0.723	0.472	--			
	(3) Senior high	0.889	0.684	0.446	0.777	--		
	α = 0.708	HR = 0.450		$\bar{r}$ = 0.565		$\sigma(r)$ = 0.184		
Traffic	(1) Heavy traffic	0.632	0.226	--				
	(2) Parking	0.715	0.381	0.176	--			
	(3) Noise	0.791	0.396	0.201	0.408	--		
	α = 0.504	HR = 0.256		$\bar{r}$ = 0.262		$\sigma(r)$ = 0.127		

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit. (Sample size = 1033)
DATA SOURCE: Baseline Interview.

Table IV-6

INTERNAL CONSISTENCY INDICATORS FOR
PERCEIVED NEIGHBORHOOD QUALITY MEASURES: PHOENIX

CLUSTER	ITEM	ITEM-TOTAL CORRELATION	CORRECTED ITEM-TOTAL CORRELATION	ITEM INTER-CORRELATIONS				
				1	2	3	4	5
General Decay	(1) Vacant lots	0.505	0.318	--				
	(2) Litter	0.730	0.551	0.312	--			
	(3) Abandoned houses	0.619	0.427	0.153	0.316	--		
	(4) Streets in poor repair	0.661	0.441	0.186	0.355	0.432	--	--
	(5) Crimes in area	0.675	0.501	0.208	0.399	0.236	0.275	--
	(6) Drugs and drug users	0.705	0.502	0.233	0.410	0.247	0.245	0.508
	α = 0.697	HR = 0.367		$\bar{r}$ = 0.301		$\sigma(r)$ = 0.101		
Public Services	(1) Fire Department	0.751	0.326	--				
	(2) Garbage collection	0.770	0.337	0.310	--			
	(3) Police protection	0.647	0.311	0.254	0.287	--		
	α = 0.411	HR = 0.194		$\bar{r}$ = 0.284		$\sigma(r)$ = 0.028		
Convenience	(1) Public transportation	0.669	0.396	--				
	(2) Medical care	0.604	0.186	0.173	--			
	(3) Grocery shopping	0.646	0.313	0.313	0.100	--		
	(4) Places of worship	0.680	0.368	0.323	0.169	0.270	--	
	α = 0.491	HR = 0.196		$\bar{r}$ = 0.225		$\sigma(r)$ = 0.090		
Recreation	(1) Adult recreation	0.791	0.579	--				
	(2) Teen recreation	0.874	0.690	0.621	--			
	(3) Play areas for children	0.812	0.600	0.449	0.619	--		
	(4) Daycare	0.585	0.402	0.329	0.350	0.374	--	
	α = 0.612	HR = 0.296		$\bar{r}$ = 0.457		$\sigma(r)$ = 0.133		
Schools	(1) Elementary	0.652	0.357	--				
	(2) Junior high	0.781	0.342	0.276	--			
	(3) Senior high	0.795	0.413	0.359	0.372	--		
	α = 0.439	HR = 0.217		$\bar{r}$ = 0.336		$\sigma(r)$ = 0.052		
Traffic	(1) Heavy traffic	0.659	0.279	--				
	(2) Parking	0.733	0.419	0.199	--			
	(3) Noise	0.505	0.449	0.258	0.448	--		
	α = 0.560	HR = 0.301		$\bar{r}$ = 0.302		$\sigma(r)$ = 0.130		

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, and below the low-income eligibility limit. (Sample size = 975)
DATA SOURCE: Baseline Interview.

Pittsburgh sample, especially in the case of SCHOOLS. Cronbach's alpha is in the acceptable 0.5 to 0.7 range for all measures except for SCHOOLS and PUBLIC SERVICES in Phoenix. All item intercorrelations are greater than zero at a statistically significant level. GENERAL DECAY and RECREATION appear to be the most internally consistent measures.

IV.5 VALIDITY OF PERCEIVED NEIGHBORHOOD QUALITY MEASURES

In a very general sense, a measuring instrument is valid if it accurately measures what it intends to measure. In the social and behavioral sciences, validation of measuring instruments usually proceeds through empirical investigation of correlations between the variable in question and other variables that would be expected to display some relation to it on the basis of past empirical work, common sense, or theoretical grounds. In cases where the measure is subjective or abstract in nature, a strong form of validation is to replicate established relationships between that measure and other measures that are objective in form. Replication of predicted relationships with other subjective measures is less convincing, but still contributes to the general confidence that the derived variables measure what they claim. In this section, the validity of the perceived neighborhood quality measures is examined by relating them to several sets of variables for which reasonable relational hypotheses have been formulated.

Relationships Between Perceived Neighborhood Quality Measures and Search and Mobility Behavior

In the case of perceived neighborhood quality, one of the more generally accepted relational hypotheses is that low perceived neighborhood quality tends to lead to a change in residence or at least an attempt to change residence (Stegman, 1969 ; Morrison, 1972; Greenberg and Boswell, 1972; Boyce, 1969; Moore, 1972). In this vein, Table IV-9 compares the first-year search behavior of households above and below the mean for each of the seven perceived neighborhood quality measures. As can be seen, the expected relationship occurs for four out of the seven measures in both Pittsburgh and Phoenix.

To explore further the relationship of perceived neighborhood quality and search behavior, a discriminant-function analysis was performed in which the ability of the seven perceived neighborhood quality measures to discriminate between households that looked for a new unit and households that did not was examined. Table IV-10 presents the findings from this analysis.

Table IV-9

COMPARISON OF PERCENTAGE OF HOUSEHOLDS ABOVE AND BELOW MEAN ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES AT BASELINE THAT SEARCHED

(Sample Size in Parentheses)

CLUSTER	PITTSBURGH		PHOENIX	
	BELOW MEAN	ABOVE MEAN	BELOW MEAN	ABOVE MEAN
General Decay	58.3% (422)	42.3%** (601)	56.0% (323)	45.6%** (620)
Public Services	62.1 (338)	42.3** (685)	58.2 (273)	45.4** (680)
Convenience	53.1 (318)	47.0* (705)	52.0 (477)	46.2 (476)
Recreation	51.5 (534)	46.0* (489)	53.5 (475)	44.8** (478)
Schools	51.6 (450)	46.8 (473)	46.4 (506)	52.1 (447)
Traffic	53.8 (495)	46.2** (528)	50.8 (313)	48.3 (640)
Neighbors	54.6 (533)	42.7 (490)	54.2 (609)	40.1** (344)

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

DATA SOURCES: Baseline, First and Second Periodic Interviews.

* Difference between proportions significant at less than the 0.05 level (one-tailed test).

** Difference between proportion significant at less than the 0.01 level (one-tailed test).

Table IV-10

DISCRIMINANT ANALYSIS OF SEARCH

CLUSTER	PITTSBURGH		PHOENIX	
	STANDARD DISCRIMINANT FUNCTION COEFFICIENT	UNIVARIATE F-STATISTIC	STANDARD DISCRIMINANT FUNCTION COEFFICIENT	UNIVARIATE F-STATISTIC
General Decay	-0.56	38.7**	-0.41	14.31**
Public Services	-0.53	40.03**	-0.21	7.98*
Convenience	-0.01	4.31*	+0.04	0.76
Recreation	-0.05	4.62*	-0.33	8.19*
Schools	-0.01	5.32*	+0.20	0.00
Traffic	-0.05	10.01**	-0.06	3.79
Neighbors	-0.37	11.53**	-0.71	28.30**
R^2	.068		.074	
Chi-square	71.67**		48.29**	
(degrees of freedom)	(7)		(7)	
Sample size	(1023)		(953)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

DATA SOURCES: Baseline, First and Second Periodic Interviews.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

The standardized discriminant function coefficients indicate that of the seven scores, those of DECAY, PUBLIC SERVICES, NEIGHBORS, and (in Phoenix) RECREATION are most important in distinguishing between households that searched and those that did not. The high chi-squares in both Pittsburgh and Phoenix indicate that the equations as a whole are significant. However, the multiple R^2s (0.068 and 0.074) indicate that the seven measures as a set are only marginally effective in distinguishing between searchers and non-searchers.

For households that did search for a new unit during the first year of the experiment, Table IV-11 compares the percentage that actually moved for households above and below the mean on each of the seven perceived neighborhood quality scores. The mobility of searchers does not seem to be significantly related to any of the seven measures on the basis of this analysis. Discriminant analysis produces similar findings (Table IV-12).

One interpretation of these findings might be that while households' lowered evaluations of neighborhood influences the probability of searching, these lower ratings do not by themselves provide sufficient conditions for moving. Indeed, as is pointed out in the analysis of search and mobility, many searching households were unable to find a suitable place to move to (Weinberg, et al., 1977). Since there are probably many factors other than perceived neighborhood quality that determine whether households that search will actually move, the absence of a relationship does not seriously diminish the credibility of the perceived neighborhood quality measures.

Relationships Between Mobility and Change in Perceived Neighborhood Quality

It has also been hypothesized that "the major function of mobility [is] the process by which families adjust their housing to the housing needs that are generated by the shifts in family composition that accompany life cycle changes" (Rossi, 1955, p. 9). This line of reasoning leads to the hypothesis that there should be a significant average increase in perceived neighborhood quality after a move.

Table IV-13 presents the differences between mean neighborhood scores at the Baseline and the Second Periodic Interviews for households that moved,

Table IV-11

COMPARISON OF PERCENTAGE OF SEARCHERS ABOVE AND BELOW MEAN ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES THAT MOVED

(Sample Size in Parentheses)

CLUSTER	PITTSBURGH		PHOENIX	
	BELOW MEAN	ABOVE MEAN	BELOW MEAN	ABOVE MEAN
General Decay	49.6% (246)	51.6% (254)	74.2% (221)	76.0 (358)
Public Services	45.2 (210)	54.5* (290)	71.4 (189)	77.2 (390)
Convenience	48.5 (169)	51.7 (331)	74.1 (301)	76.6 (228)
Recreation	48.0 (275)	53.8 (225)	73.6 (314)	77.4 (265)
Schools	47.4 (232)	53.4 (268)	73.1 (301)	77.7 (278)
Traffic	48.7 (269)	52.8 (231)	73.9 (203)	76.1 (376)
Neighbors	51.9 (291)	48.8 (209)	76.0 (396)	73.8 (183)

SAMPLE: Experimental and Control searchers active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

DATA SOURCES: Baseline, First and Second Periodic Interviews.

* Difference between proportion significant at less than the 0.05 level (two-tailed test).

Table IV-12

DISCRIMINANT ANALYSIS OF MOVING BEHAVIOR OF SEARCHERS

	PITTSBURGH		PHOENIX	
CLUSTER	STANDARD DISCRIMINANT FUNCTION COEFFICIENT	UNIVARIATE F-STATISTIC	STANDARD DISCRIMINANT FUNCTION COEFFICIENT	UNIVARIATE F-STATISTIC
General Decay	0.187	0.40	-0.118	0.28
Public Services	-0.535	3.92	0.662	2.85
Convenience	-0.170	1.42	-0.056	0.43
Recreation	-0.237	1.48	0.060	0.59
Schools	-0.382	3.17	0.448	1.89
Traffic	-0.377	1.86	0.202	0.32
Neighbors	-0.369	0.54	0.538	1.57
R^2	0.17		0.11	
Chi-square	8.348		6.072	
(degrees of freedom)	(7)		(7)	
Sample size	(500)		(579)	

SAMPLE: Experimental and Control searchers active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between the Baseline Interview and enrollment.

DATA SOURCES: Baseline, First and Second Periodic Interview.

Table IV-13

DIFFERENCE BETWEEN MEANS OF PERCEIVED NEIGHBORHOOD QUALITY MEASURES AT ENROLLMENT AND ONE YEAR FOR MOVERS, SEARCHERS AND STAYERS

	MOVERS (Sample size = 253)				SEARCHERS THAT DID NOT MOVE (Sample size = 247)				STAYERS (Sample size = 523)			
CLUSTER	Mean at Enrollment	Mean at One Year	Difference	t-statistic	Mean at Enrollment	Mean at One Year	Difference	t-statistic	Mean at Enrollment	Mean at One Year	Difference	t-statistic
					PITTSBURGH							
General Decay		51.76	4.22	5.47**	46.11	44.76	-1.35	-1.75*	51.02	51.57	0.55	1.54
Public Services	47.86	49.29	1.42	1.88	47.30	45.16	-2.15	-2.83**	51.22	51.31	0.09	0.21
Convenience	51.93	52.19	0.25	0.36	51.46	52.20	0.74	1.52	52.83	53.90	1.07	3.10**
Recreation	49.65	51.64	1.99	2.63**	48.29	49.54	1.25	2.06*	50.32	52.22	1.90	4.55**
Schools	50.84	50.92	0.08	0.11	49.60	49.98	0.38	0.52	51.31	51.29	-0.02	0.05
Traffic	47.62	52.27	4.63	6.20**	46.20	46.56	0.35	0.57	49.14	51.25	2.11	5.25**
Neighbors	49.92	49.35	-0.57	0.83	49.99	50.23	0.25	0.44	52.19	52.54	0.35	0.84
	(Sample size = 436)				PHOENIX (Sample size = 143)				(Sample size = 384)			
General Decay	50.44	52.69	2.25	4.59**	49.97	47.72	-2.25	-2.67**	52.26	52.49	0.23	1.50
Public Services	49.89	50.45	0.56	1.06	49.14	49.21	0.07	0.08	51.76	52.00	0.24	0.37
Convenience	47.49	48.56	1.07	1.71	47.75	48.58	0.83	1.04	47.77	49.29	1.52	3.24**
Recreation	49.93	52.34	2.41	4.02**	49.13	48.95	-0.18	0.20	51.26	52.99	1.73	3.79**
Schools	49.44	49.05	-0.39	-0.63	48.22	46.10	-2.12	-2.06*	49.18	48.20	-0.98	2.91**
Traffic	51.53	54.92	3.39	6.18**	51.30	50.68	-0.62	-0.77	52.58	53.85	0.97	3.75**
Neighbors	46.89	47.65	0.76	1.65	48.51	48.10	-0.41	-0.55	51.19	51.60	0.41	0.53

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between the Baseline Interview and enrollment.

DATA SOURCES: Baseline and Second Periodic Interviews.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

searched but did not move, and neither searched nor moved in the first year of the experiment. Measures showing significant positive changes among movers during the first year were (in order of the magnitude of the difference):

Pittsburgh	Phoenix
GENERAL DECAY	GENERAL DECAY
RECREATION	CONVENIENCE
TRAFFIC CONGESTION	RECREATION
	TRAFFIC CONGESTION

While the changes in mean scores for movers is not very large (about one-fifth of a standard deviation), the differences in the above scores are all significant at the 0.05 level or better, since the standard errors of the scores are all in the 0.20 to 0.30 range.

It should be noted that some of the Second Periodic means for nonmovers (either with or without searching) also show significant differences when compared with initial mean scores. The drift in some of the means may be due either to cognitive restructuring (i.e., "I have seen better neighborhoods but haven't been able to move there, so I don't like mine as well now" or "I haven't moved, so I must like things better") or to measurement error. In future analyses it might be appropriate to take such drift into account by adjusting perceived neighborhood quality scores so that the mean of nonmoving Control households is constant over time. Until further analyses are completed, the present findings must be regarded as somewhat ambiguous.

Relationship of Perceived Neighborhood Quality Measures to Satisfaction With Neighborhood

Another hypothesis whose confirmation would lend support to the validity of the perceived neighborhood quality measures is that expressed global neighborhood satisfaction should be positively related to perceived neighborhood quality scores. Table IV-14 presents the zero-order correlations (r) and standardized multiple regression coefficients (β) of the seven perceived neighborhood quality measures as they relate to overall satisfaction with neighborhood. On this table a number of observations are worth making. First, in both Pittsburgh and Phoenix the scores show significant zero-order correlations with neighborhood satisfaction in the expected direction. The higher the score, the greater the satisfaction with neighborhood.

Second, as a group the seven scores account for about 22 percent and 17 percent of the variance in neighborhood satisfaction in Pittsburgh and Phoenix, respectively. These R^2 s are not as high as might be desired, but they compare quite favorably with the 0.20 obtained in the regression of neighborhood satisfaction on the individual perceived neighborhood quality items (Weinberg, et al., 1977, p. A-40). The creation of seven summary measures from the individual items does not appear to result in a loss of explanatory power vis-a-vis neighborhood satisfaction. Third, when the same regressions are run on First and Second Periodic Interview data, the corresponding R^2s are 0.29 and 0.30 for Pittsburgh and 0.27 and 0.30 for Phoenix. There are two possibilities for explaining these higher R^2 s. First, the higher R^2s may indicate a "position bias" in the order of questions in the questionnaire. On the Baseline Interview instrument, neighborhood satisfaction was the very first question, while the neighborhood quality items were encountered much later on. In the First and Second Periodic Interviews the neighborhood satisfaction question directly precedes the neighborhood quality items. Hence, one might anticipate a greater correspondence between neighborhood satisfaction and the item ratings. Second, the higher R^2s may indicate the increasing familiarity of respondents with the questionnaire generally and, hence, less error in their responses and less attenuation of correlations due to such error.

Table IV-14

REGRESSION OF NEIGHBORHOOD SATISFACTION ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES AT BASELINE

CLUSTER	PEARSON'S r	β
	PITTSBURGH	
General Decay	0.41**	0.32**
Public Services	0.20**	0.03
Convenience	0.08**	-0.02
Recreation	0.22**	0.13**
Schools	0.11**	-0.003
Traffic Congestion	0.32**	0.15**
Neighbors	0.09**	0.10**
Sample Size	(1029)	R^2=0.22**
	PHOENIX	
General Decay	0.34**	0.23**
Public Services	0.24**	0.11**
Convenience	0.15**	0.04
Recreation	0.15**	0.07**
Schools	0.04*	-0.06*
Traffic Congestion	0.29**	0.16**
Neighbors	0.11**	0.10**
Sample Size	(973)	R^2=0.17**

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and not moving between Baseline Interview and enrollment.

DATA SOURCE: Baseline Interview.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

Relationships to Census Tract Characteristics

Many of the aspects of neighborhood to which the summary measures refer are not directly comparable to data from the 1970 Census of Population and Housing. However, one might anticipate that household ratings of perceived neighborhood quality would tend to increase in Census tracts with higher socioeconomic status, higher rent levels, and lower minority representation. Of course, subjective assessments might not be highly correlated with Census tract attributes, since individual perceptions may differ widely about the same objective circumstances. Further, there may be considerable variation in objective conditions within a Census tract.

Tables IV-15 and IV-16 provide evidence that tends to confirm these expectations. For each of the seven measures (columns) the simple correlations (r), standardized multiple regression coefficients (β), and significance levels of nine Census tract characteristics (rows) are presented. The nine Census tract characteristics are:

Percentage of tract population black

Percentage of tract population Spanish American

Median years of education

Median Income

Percentage of dwelling units in tract with complete plumbing, direct access, and complete kitchen (percentage standard)

Median gross rent of rental units in tract

Median age of dwelling units

Percentage of dwelling units in structures with more than four dwellings

Location of tract in central city or suburb.

At the bottom of each column, the appropriate R^2 statistic, F-ratio, and significance level are given for each of the seven regressions. The basic approach is to estimate the contribution of the nine Census tract characteristics as a group to variation in each of the seven neighborhood quality scores.

Table IV-15

REGRESSION OF BASELINE PERCEIVED NEIGHBORHOOD QUALITY MEASURES ON CENSUS TRACT CHARACTERISTICS: PITTSBURGH

CENSUS TRACT CHARACTERISTICS	PERCEIVED NEIGHBORHOOD QUALITY MEASURES													
	GENERAL DECAY		PUBLIC SERVICES		CONVENIENCE		RECREATION		SCHOOLS		TRAFFIC		NEIGHBORS	
	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β
Percentage Black	-.29**	-.19**	-.30**	-.26**	-.12**	-.17**	-.07*	-.05	-.12**	-.12**	-.07*	.06	.02	.05
Percentage Spanish American	-.06*	.04	-.04	-.02	.02	.02	-.05	-.03	-.02	-.03	-.02	.003	-.02	-.06**
Median School Years	.20**	-.003	.12**	.02	-.04	-.02	.07*	.02	.11**	.09**	.16**	.02	-.05	-.11**
Median Income	.29**	.13**	.19**	.03	-.02	-.07	.08**	.08	.10**	-.08	.20**	.23**	-.03	.06
Percentage of Standard Dwelling Units	.17**	-.03	.07**	-.07**	-.07*	-.00	-.02	-.08**	.05	.06	.11**	-.08**	-.01	.01
Median Gross Rent	.16**	.08*	.07*	.03	-.04	.09**	.08**	.09*	.08**	.08*	.14**	-.04	-.03	.02
Age of Dwelling Unit	-.08**	.04	-.05	.00	.13**	.19**	.01	.09**	-.05	.04	-.15**	-.10**	.04	.06**
Percentage of Dwelling Units in Building with 4 or more Dwelling Units	-.05	-.03	-.003	.00	.10**	.13**	.05	.03	.03	.002	-.04	-.05	-.01	.03
Location in Central City or Suburbs	.16**	.08**	.13**	.06**	.002	.003	.05	.03	.14**	.13**	.10**	.13	.02	.06**
R^2	.11		.10		.06		.03		.04		.05		.01	
F-statistic	14.36**		12.44**		7.23**		3.16**		4.48**		6.23**		.99	
Sample Size	(1033)		(1033)		(1033)		(1033)		(1033)		(1033)		(1033)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and did not move between the Baseline Interview and enrollment.

DATA SOURCES: 1970 Census of Population and Housing, Baseline Interview.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

Table IV-16

REGRESSION OF BASELINE PERCEIVED NEIGHBORHOOD QUALITY MEASURES ON CENSUS TRACT CHARACTERISTICS: PHOENIX

CENSUS TRACT CHARACTERISTICS	PERCEIVED NEIGHBORHOOD QUALITY MEASURES													
	GENERAL DECAY		PUBLIC SERVICES		CONVENIENCE		RECREATION		SCHOOLS		TRAFFIC		NEIGHBORS	
	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β	Pearson's r	β
Percentage Black	-.20**	-.05	-.17**	-.06	-.13**	-.04	-.05	.10**	-.19**	.01	-.10**	-.11**	.09**	.05
Percentage Spanish American	-.16**	.08	-.13**	.10	-.09**	.17**	-.07*	.14*	-.15**	.20**	-.06*	-.07	.09**	-.07
Median School Years	.22**	-.007	.19**	.10	.14**	.12	.11**	.18	.22**	.28**	.07*	-.08	-.11**	-.21*
Median Income	.21**	.19**	.16**	.18**	.12**	-.006	.08**	-.005	.22**	.06	.10**	-.06	-.11**	.09
Percentage of Standard Dwelling Units	.21**	.22**	.17**	.17**	.13**	.09	.09**	.07	.22**	.11	.10**	.01	-.11**	.10
Median Gross Rent	.21**	-.03	.14**	-.14**	.13**	.12	.12**	.20**	.22**	.03	.10**	.10	-.11**	-.13*
Age of Dwelling Unit	-.08**	.14**	-.02**	.12**	.002	.07*	-.01	.20**	-.15**	.07*	-.11**	-.05	.05	.03
Percentage of Dwelling Units in Building with 4 or more Dwelling Units	.08**	.06	.10**	.06*	.12**	.06*	.01	-.05	-.01	-.06*	-.06*	-.08**	-.04	.05
Location in Central City or Suburbs	.04	.07**	-.03	-.007	-.09**	-.11**	.10**	.13**	.15**	.12**	.02	-.03	.07*	.13**
R^2	.07*		.06*		.05		.04		.08**		.02		.03	
F-statistic	8.50**		6.60**		5.81**		4.80**		9.82**		2.64**		2.95**	
Sample Size	(975)		(975)		(975)		(975)		(975)		(975)		(975)	

SAMPLE: Experimental and Control households active at one year, not living in own or subsidized housing, below the low-income eligibility limit, and did not move between the Baseline Interview and enrollment.

DATA SOURCES: 1970 Census of Population and Housing, Baseline Interview.

* Significant at the 0.05 level.

** Significant at the 0.01 level.

The R^2 statistic ranges from 0.01 to 0.11. Although 13 of the 14 regressions as a whole are significant at the 0.01 level, the low R^2s indicate a rather weak relationship overall between neighborhood quality scores and these particular Census tract characteristics. This is not particularly disappointing since, as indicated previously, the measures refer to aspects of neighborhood quite different from those of the census. It should be noted that a similar set of Census tract characteristics accounted for only 3 percent of the variance in overall neighborhood satisfaction (see Weinberg, et al., 1977, Appendix III). The comparison suggests that these seven measures of perceived neighborhood quality may contain important information about neighborhood not accounted for in overall neighborhood satisfaction.

The simple correlation coefficients (r) in Tables IV-15 and IV-16 show a pattern of relationships directly in line with what one might expect. Specifically:

> All measures of perceived neighborhood quality (except NEIGHBORS) decline with increasing proportions of minority populations in the Census tract.
>
> Perceived neighborhood quality tends to improve with increasing income, education, rent levels, and percentage of dwelling units standard.
>
> Perceived neighborhood quality (with the exception of CONVENIENCE) tends to be lower in older parts of the urban area as indicated by dwelling unit age.
>
> Perceived neighborhood quality tends to be higher in the suburbs than in the central city (the exceptions are SERVICES and CONVENIENCE in Phoenix).

When Census tract characteristics are taken into account as a group, the proportion of variance in the scores explained by these characteristics is highest in the case of GENERAL NEIGHBORHOOD DECAY, PUBLIC SERVICES and SCHOOLS (Phoenix only). Generally, the standardized multiple regression coefficients indicate that the proportion of minorities in the tract, the socioeconomic status of the tract (income and education), and the location of the tract in the central city or suburbs make the greatest relative contribution to these measures of perceived neighborhood quality. Households living in low-income, central city ghettos tend to rate their neighborhoods less highly than those living in higher-income suburban neighborhoods.

IV.6 SUMMARY

Participant evaluations of neighborhood features were obtained from answers to 31 closed-end items. In order to facilitate use of these data, principal components analysis was used to define seven distinct, internally homogeneous clusters of items. Households are then scored on each of the seven clusters of items for each of three interview occasions by additively combining their weighted and standardized responses to items within each cluster. The resulting summary measures and their constituent items are:

GENERAL NEIGHBORHOOD DECAY

- vacant lots filled with trash
- litter in the streets
- abandoned houses
- streets in poor repair
- crimes in the area
- presence of drugs and drug users

PUBLIC SERVICES

- responsiveness of the fire department
- garbage collection
- police protection

CONVENIENCE TO OTHER SERVICES

- access to public transportation
- medical care facilities
- grocery shopping
- places of worship

RECREATIONAL FACILITIES

- recreational facilities for adults
- recreational facilities for teenagers
- play areas for children under 12
- day care services

SCHOOLS

- elementary schools
- junior high schools
- senior high schools

TRAFFIC CONGESTION

heavy traffic in the streets

availability of parking

noise in the area

NEIGHBORS

presence of neighbors with same background as respondent

presence of relatives in the neighborhood

how well respondents know their neighbors

A major problem with the seven summary measures, as they now stand, is the tendency for some of them to have frequency distributions with long tails for the low end of the scale and correspondingly high densities and lack of discrimination between households at the upper end of the scale. Amelioration of these problems is the focus of current efforts. Until they are resolved, analyses using these measures should be regarded with some caution.

It is felt that the seven summary measures represent a coherent and intuitively reasonable synthesis of the original 31 perceived neighborhood quality items. The multidimensional structure of the items is reasonably consistent between sites and highly stable over time. In addition, the individual measures exhibit acceptable levels of internal consistency and temporal stability. (An exception to the latter is the SCHOOLS measure.) Finally, the seven measures appear to be valid in the sense that they are significantly correlated in the expected direction with search behavior, overall neighborhood satisfaction, and various Census tract characteristics, especially the concentration of low-income households, proportion of minority populations in the tract, tract income, education, and rent levels, percentage of dwelling units standard and location of the tract in the central city or suburbs.

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