Housing Allowance Demand Experiment

Subjective Assessment of Neighborhoods in the Housing Allowance Demand Experiment

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SUBJECTIVE ASSESSMENT OF NEIGHBORHOODS IN THE HOUSING ALLOWANCE DEMAND EXPERIMENT

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ABSTRACT

This report examines the relationship between participation in allowance programs and participants' subjective perceptions of the quality of their neighborhoods. Five different measures of perceived neighborhood quality are examined: overall level of expressed neighborhood satisfaction, public services, private services, neighborhood problems, and strength of social bonds. The report presents estimates of the direction, magnitude, and significance of the effects of the various housing allowance plans on recipients' evaluations of their neighborhoods. The major finding is that program participants that moved in the two-year interval after enrollment resided in neighborhoods where they had less frequent and less friendly interaction with their neighbors and had fewer relatives and other persons of similar background than would be expected to be the case in the absence of the program. This was especially the case for those that did not meet program housing standards at enrollment and subsequently moved.

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SUMMARY

This report is one of a series of technical reports on the 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 focus of the Demand Experiment is on how low-income renter households use allowances. The experiment was conducted in Allegheny County, Pennsylvania (Pittsburgh) and Maricopa County, Arizona (Phoenix). It tested a variety of allowance plans involving approximately 1,200 Experimental households and 500 Control households at each site. Each household enrolled in the experiment was offered allowance payments for three years. Analysis is based on data from the first two years.

This report examines the way in which participation in the housing allowance programs affected households' perceptions of the quality of their neighborhoods. A housing allowance, in contrast to most of the more traditional forms of housing assistance, allows participants substantial freedom in their choice of residential locations. Households offered allowances in the Demand Experiment could live anywhere in the program area (Allegheny County and Maricopa County), provided that their dwelling units met program requirements.[1] The freedom of locational choice inherent in the housing allowance concept might lead to households locating in neighborhoods that they considered to be more desirable. Accordingly, this report examines households' subjective neighborhood perceptions using five measures derived from baseline and periodic interview data:

[1] Several versions of a housing allowance program were tested. Some posed no requirement for the dwelling unit. Other versions required that participants occupy dwelling units that met minimum physical and occupancy standards (Minimum Standards). Still others required participants to spend at least a minimum amount for housing (Minimum Rent). No version directly imposed any locational requirements on participants (within the county). However, households that lived in subsidized housing or in units that they owned were not eligible to participate.

Overall expressed satisfaction

Perceived adequacy of public services

Perceived convenience of access to private services

Perceived seriousness of neighborhood decay and problems, and

Strength of social bonds.

1. Allowance recipients moved to neighborhoods where neighbors were less often perceived as friendly, where there were fewer relatives and people of similar backgrounds, and where they had less frequent interaction with neighbors than would have been expected in the absence of the program.

   Comparison of allowance households that moved with similar Control households that moved shows that the negative effect on neighborhood social ties occurred for all three types of allowance plans examined--Housing Gap, Percent of Rent, and Unconstrained--and was statistically significant in all cases except for Unconstrained households in Pittsburgh. In contrast, there was no effect for households that did not move. This suggests that allowance recipients moved to different neighborhoods than they would have in the absence of the allowance program.

2. Program effects on other measures of perceived neighborhood quality were generally small and inconsistent between sites and treatment types.

   The only other significant effect was for Unconstrained households in Pittsburgh and Housing Gap participants in Phoenix; in both cases there was a positive program effect on the perceived adequacy of public services. However, these effects do not show up among households that moved and may, given the number of measures and groups examined, reflect chance variations. If allowance recipients moved to different neighborhoods, as indicated by the negative effect on social ties discussed above, their new neighborhoods were not apparently perceived to be better.

3. In general, more positive perceptions of neighborhood quality are associated with higher rent levels, and lower low-income and minority concentrations in the Census tract. Nonminority households tend to rate their neighborhoods more positively than minority households.

> With the exception of the measure of neighborhood social bonds at both sites and the perceived convenience of access to private services in Pittsburgh, nonminority, higher income households paying relatively higher rents held more positive views of their neighborhoods. In addition, households living in tracts that had lower concentrations of low-income households and minority households tended to assess their neighborhoods more positively.[1]

[1] Again, measures of social ties at both sites and convenience to private services in Pittsburgh are an exception.

SOURCES OF STATEMENTS:

1. and 2. See Tables 3-1 and 3-3 for estimates of allowance program effects on the various measures of perceived neighborhood quality.

3. See Tables 2-2, 2-3, 2-4, 2-5, 2-6, and 2-7.

CHAPTER 1

INTRODUCTION

This is one of a series of technical reports on the Housing Allowance Demand Experiment. The Demand Experiment, authorized by Congress in the Housing Act of 1970, was designed to test the impact of direct cash assistance to low-income households on these households' ability to rent suitable housing. The experiment was conducted in Allegheny County (Pittsburgh), Pennsylvania and Maricopa County (Phoenix), Arizona. Allowance payments were offered to approximately 1,200 households selected at random in each area. Several different allowance plans were tested involving different payment formulas and housing requirements. In addition, a Control group of approximately 500 households was enrolled at each site. This report examines the relationship between participation in allowance programs and participants' perceptions of the quality of the neighborhoods in which they had established (or maintained) residence at the end of the two-year experiment.

Three types of allowance plans were tested in the Demand Experiment. Under the Housing Gap form of allowance, participants were offered cash payments designed to bridge the gap between the cost of modest existing standard rental units and the household's financial capacity to pay for such units. The allowance payment was directly linked to housing by housing requirements. Two sorts of requirements were tested. Minimum Standards requirements involved specific physical conditions of recipients' housing, including bath and kitchen facilities, and an adequate number of rooms for the size of the family. The alternative type of requirement, Minimum Rent, specified only that a household of a given size spend at least a minimum amount on housing. Households already living in housing that met the program's requirements were allowed to use the allowance payment to reduce the burden of housing costs. Those not in adequate housing had to improve their current housing or move to a qualifying unit in order to receive the allowance.

Yet another experimental plan offered a payment calculated in the same way as that of the Housing Gap plans but with no housing requirement. This plan, called Unconstrained, resembles an expanded welfare or other general income

support program, except that the payment was determined in terms of expected needs for housing expenditures rather than expected needs for all household expenses.

A third type of housing allowance plan, the Percent of Rent approach, offered a rent rebate. Under this plan allowance payments were a fixed fraction of monthly rent. This plan in effect reduced the cost of all housing in the area to eligible households by the amount of the rebate.

The final group of households enrolled in the experiment were Control households. These households received a $10 monthly payment for providing the same information as Experimental households, thus providing the opportunity to assess the housing outcomes for participants in housing allowance programs relative to the housing outcomes occurring in the absence of such programs.

One of the attractions of housing assistance strategies such as those implemented in the Demand Experiment is the presumption that such programs should allow participants greater freedom in choosing their dwelling unit and especially their neighborhood than more traditional forms of housing assistance, such as conventional public housing, where the major locational decisions are made by program administrators. In other words, allowance programs leave the determination of what constitutes "suitable living environment," in the terms of the Housing Act of 1949, up to the household members to a greater degree than most other forms of housing assistance.

Other reports from the Demand Experiment have analyzed changes in various objective measures of housing and neighborhood. This report is concerned solely with recipients' subjective perceptions of the quality of the neighborhoods in which they reside. Given the implicit respect granted by allowance programs to judgments regarding the "suitability" of a living environment that depend on the eye of the householder, the subjective nature of the measures renders them especially appropriate in the present application.

Measures of five different facets of perceived neighborhood quality are examined. One of these measures deals with the respondents' overall level of expressed satisfaction with the neighborhood in which they reside. This is based on responses to one interview question that directly asked for a global assessment of the respondent's neighborhood. The remaining four

measures deal with the perceived quality of more specific aspects of the neighborhood of residence and are composite indices derived from responses to four or more interview items. The four composite measures of perceived neighborhood quality are:

> Public Services. Perceived adequacy of public services such as police and fire department activities, garbage collection, and street lighting.
>
> Private Services. Perceived convenience of access to private services such as medical care, grocery stores, places of worship, and day care centers.
>
> Problems. Perceived seriousness of the degree of material, social, and cultural decay of the neighborhood as indicated by abandoned houses, crime, drug trafficking, poorly maintained streets and the like.
>
> Neighbors. Strength of social bonds as indicated by the respondents' perceived frequency of interaction with neighbors, friendliness of neighbors, and proximity to relatives and people of similar background.

Chapter 2 of this report provides conceptual and operational definitions of the five measures of perceived neighborhood quality and their cross-sectional relationship, under normal circumstances, to household rent and demographic characteristics. The relationship between scores on the measures and certain characteristics of the respondent's Census tract of residence is also examined. The overall intent of the chapter is to provide a context for interpretation of the substantive significance of the analyses of program effects.

Chapter 3 presents estimates of the direction, magnitude, and statistical significance of the effects of the various housing allowance plans in recipients' evaluations of their neighborhoods.

CHAPTER 2

THE MEASURES OF PERCEIVED NEIGHBORHOOD QUALITY

This chapter provides an operational definition of the measures of perceived neighborhood quality (PNQ) examined in this report and describes their relationship to several other variables of interest. The intent is to present rudimentary evidence regarding the psychometric validity of the measures, as well as to provide a quantitative context for the interpretation of estimates of program effects presented in the next chapter.

Section 2.1 briefly defines the measures. Section 2.2 assesses the cross-sectional relationship between the PNQ measures and various economic and demographic descriptors of housing and households, such as household rent and income and the general affluence and racial composition of the Census tracts in which households are located.

2.1 DEFINITION AND MEASUREMENT OF PERCEIVED NEIGHBORHOOD QUALITY

The term "perceived neighborhood quality" refers here both to households' general satisfaction with their neighborhood as a place to live and to their evaluations of their neighborhood with respect to a variety of specific features and services. Information about perceived neighborhood quality was obtained from responses to 26 Likert-type items in both the Baseline and Periodic Interviews. (See Table III-1 in Appendix III for the exact phrasing of these items.)[1]

In order to facilitate analysis, the 26 items were reduced to five summary measures, which are intended to capture in parsimonious fashion the essential

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[1] In an earlier report by Atkinson and Phipps (1977) several additional items concerned with the quality of public schools were examined. These items were excluded from the measures developed for the current analysis after they were found to have extremely poor qualities in terms of their test-retest reliability.

variation in the full set of items.[1] One of the five summary measures, general neighborhood SATISFACTION,[2] was based on the responses to a single four-point Likert-type question about respondents' satisfaction with neighborhood. The other four measures were derived from summative composites of responses to four mutually exclusive and exhaustive subsets of the remaining 25 items. These four measures and their constituent items are:

PUBLIC SERVICES

- Police protection
- Garbage collection
- Responsiveness of the fire department
- Public transportation
- Landscaping (trees, grass, and flowers)
- Parking availability
- Street lighting

PRIVATE SERVICES

- Medical care facilities
- Grocery shopping
- Places of worship
- Day care facilities

PROBLEMS

- Vacant lots filled with trash
- Litter in the streets
- Abandoned houses
- Streets in poor repair
- Crimes in the area

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[1] See Appendix III for a detailed discussion of the diverse exploratory analyses of the multidimensional structure of the PNQ data set conducted to this end, as well as for analyses of the test-retest reliability, internal consistency, and psychometric validity of the five summary measures.

[2] In this report the names of the measures are in capital letters to distinguish their use as analytical variables from their normal use as words.

Presence of drugs and drug users

Traffic congestion

Noise in the area

NEIGHBORS

How well respondent knows neighbors

Friendliness of neighbors

Importance of relatives in the neighborhoods

How many relatives live in the neighborhood

Importance of neighbors with same background as respondent

How many neighbors have same background as respondent

The composite measures have been constructed so that scores assume integer values from one to six with roughly equal relative frequency. A high relative to a low score on a measure reflects a more favorable evaluation by respondents of that aspect of their neighborhood. In this respect, it is important to note that since a relatively high score on PROBLEMS means a more favorable evaluation, it indicates a relatively low, rather than a relatively high, level of perceived problems such as crime and abandoned houses.

Table 2-1 presents the mean and standard deviation of scores on the perceived neighborhood quality measures at the time of the Baseline Interview. As indicated above, the SATISFACTION variable is based on a four-point scale running from one (very dissatisfied) to four (very satisfied). The mean score in this variable reflects the relative preponderance of satisfied households; only 21 percent of Baseline respondents said that they were either very dissatisfied or dissatisfied with their neighborhood at Baseline. The means and standard deviations of the four derived measures reflect the arbitrary metric in which the measures were constructed.[1]

A detailed discussion of the methods used in constructing the measures, together with an analysis of their psychometric reliability and validity is presented

[1]See Appendix III for a discussion of measure construction.

Table 2-1

MEANS AND STANDARD DEVIATIONS OF SCORES ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES AT BASELINE

	PITTSBURGH		PHOENIX	
MEASURE	MEAN	STANDARD DEVIATION	MEAN	STANDARD DEVIATION
SATISFACTION	3.13	0.99	3.19	0.95
PUBLIC SERVICES	3.57	1.71	3.55	1.74
PRIVATE SERVICES	3.43	1.60	3.58	1.83
PROBLEMS	3.31	1.72	3.66	1.69
NEIGHBORS	3.84	1.71	3.26	1.69
SAMPLE SIZE	(1240)		(1001)	

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

DATA SOURCES: Baseline Interviews.

NOTE: The SATISFACTION measure is based on a four-point scale from one (very dissatisfied) to four (very satisfied). The four composite measures range from one to six, with a high score reflecting a more favorable evaluation.

in Appendix III. This analysis suggests that the five measures represent a coherent and intuitively reasonable synthesis of the original set of 26 items. The structure of the measures in terms of their correlation with the full 26-item set is simple in form and highly stable over time and between sites. In addition, the measures exhibit acceptable levels of test-retest reliability and appear to be valid in the sense that they are significantly correlated in the expected direction with search and move behavior and various Census tract characteristics, such as relative concentration of low-income households in the Census tract in which a respondent resides, tract rent levels, and percentage of standard dwelling units in the tract.

2.2 VARIATIONS IN PERCEIVED NEIGHBORHOOD QUALITY ACCORDING TO RESPONDENTS' RENT, NEIGHBORHOOD, AND DEMOGRAPHIC CHARACTERISTICS

The units in which the PNQ scores are measured are essentially arbitrary. Thus, the estimated effects do not have an obvious interpretation. This section attempts to provide a practical yardstick for judging differences in PNQ scores by examining differences between the PNQ scores of households with different rent levels, neighborhood characteristics, or demographic characteristics.

Perceived Neighborhood Quality and Rent

It seems reasonable to expect that households' rent levels and their scores on the five PNQ measures examined in this report should be positively correlated; that is, ceteris paribus, households paying higher rents should, on the average, obtain better neighborhoods than households paying relatively lower rents. Indeed, failure to observe such a relationship would undermine the credibility of the PNQ measures. Furthermore, if the expected relationship occurs, the magnitude of differences between the mean PNQ scores of groups with relatively high and relatively low rent levels should provide a useful yardstick for assessing the substantive significance of the estimated effects of housing allowances on PNQ scores.

Table 2-2 presents the mean PNQ scores of participants at the time of the Baseline Interview, where participants have been classified by four levels of rental expenditures. In order to take some account of household size, rental expenditures are classified in terms of their relationship to the estimated cost of modest existing standard housing for variously sized households in each site. Thus the "Low Rent" category comprises households spending less than 60 percent of the estimated rent necessary for a household of that size to obtain modest standard housing.[1] Given the arbitrariness of the metric underlying the PNQ measure, it seems helpful to use the sample standard deviations of the relevant PNQ measure as a point of reference for assessing the magnitude of the difference between means. For this reason, the size of the difference between the mean PNQ scores of respondents residing in the highest and lowest adjusted rent categories is presented as a proportion of the sample standard deviation of the PNQ scores in column (6).

As can be seen from Table 2-2, households with relatively high rent levels have, as anticipated, higher average scores for SATISFACTION, PUBLIC SERVICES, PROBLEMS, and PRIVATE SERVICES (Phoenix only) than households with rent levels that are relatively low. The largest difference observed, in terms of the sample standard deviation is 0.53 for SATISFACTION in Pittsburgh. With the exception of PRIVATE SERVICES in Pittsburgh and NEIGHBORS in both sites, the mean PNQ scores of the relatively high and relatively low rent groups are at least a fifth of the sample standard deviation apart in the expected direction.

The absence of a similar tendency for the NEIGHBORS measure is not surprising, in the light of previous research. A number of studies of social relation in low-income areas indicate that social affiliations with neighbors represent an important source of psychic compensation to the materially impoverished (Liebow, 1967; Gans, 1962). The slight tendency for the NEIGHBORS scores to be higher for households with relatively low rent levels than for

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[1] These estimates were based on local expert opinion in each site; for details see Abt Associates Inc. (1975), Appendix II.

Table 2-2

MEAN SCORES ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES BY RELATIVE RENT LEVEL

MEASURE	RELATIVE RENT LEVEL[a] LOW (1)	MODERATE LOW (2)	MODERATE HIGH (3)	HIGH (4)	SAMPLE STANDARD DEVIATION (5)	STANDARDIZED SPREAD (4) - (1) (5) (6)
			PITTSBURGH			
SATISFACTION	2.92	3.03	3.19	3.44	0.99	0.53
PUBLIC SERVICES	3.34	3.26	3.58	4.16	1.71	0.48
PRIVATE SERVICES	3.44	3.37	3.47	3.45	1.61	0.01
PROBLEMS	3.02	2.95	3.43	3.88	1.72	0.50
NEIGHBORS	3.98	3.75	3.88	3.82	1.71	-0.09
SAMPLE SIZE	(183)	(443)	(316)	(298)	(1240)	
			PHOENIX			
SATISFACTION	3.15	3.08	3.23	3.38	0.95	0.24
PUBLIC SERVICES	3.30	3.47	3.61	3.95	1.74	0.37
PRIVATE SERVICES	3.25	3.27	4.04	4.12	1.83	0.48
PROBLEMS	3.36	3.67	3.88	3.97	1.69	0.36
NEIGHBORS	3.41	3.17	3.21	3.16	1.69	-0.15
SAMPLE SIZE	(348)	(258)	(195)	(200)	(1001)	

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

DATA SOURCES: Baseline Interviews and Initial Household Report Forms.

a. Relative Rent Level = $R/C^* = \alpha$

Low: $\alpha > 0.6$

Moderate Low: $0.6 \leq \alpha < 0.8$

Moderate High: $0.8 \leq \alpha < 1.0$

High: $\alpha \geq 1.0$

households with relatively high rent levels is consistent with these findings.

The findings regarding PRIVATE SERVICES in Pittsburgh are not so readily explicable. It may be due to the fact that the pattern of geographic co-distribution of different types of housing stock and of private services such as those referenced by this measure (i.e., medical care, day care, grocery shopping, and places of worship) is substantially different in Pittsburgh and Phoenix. For example, in Pittsburgh PRIVATE SERVICES is positively related to residence in neighborhoods with relatively high proportions of substandard dwelling units located in older buildings (see Table III-7, Appendix III). In Phoenix, on the other hand, PRIVATE SERVICES is positively related to residence in neighborhoods with relatively high proportions of above-standard dwelling units located in relatively new buildings.

Perceived Neighborhood Quality and Neighborhood Characteristics[1]

Other analyses in the Demand Experiment and elsewhere have used the relative concentration of low-income households[2] in the Census tract in which the household resides as an objective proxy index of neighborhood quality (see Atkinson and Phipps, 1977, Chapter 2). The rationale for this is based in part on the relatively strong empirical correlation between low-income concentration and a wide variety of other objective measures of neighborhood housing conditions and socio-economic status.[3]

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[1] A more comprehensive review of the relationship of perceived neighborhood quality to characteristics of neighborhoods is presented in Appendix III.

[2] Low-income household concentration is defined as the proportion of households in a Census tract with incomes less than $5,000.

[3] See, for example, Birch et al. (1974).

Table 2-3 presents the mean PNQ scores of Baseline respondents classified by the relative (1970 Census) concentration of low-income households in their tract. The four classifications used are:

> Higher-Income. Tracts with low-income concentration less than 25 percent.
>
> Low-Poverty. Tracts with low-income concentration from 25 to 34.9 percent.
>
> Medium-Poverty. Tracts with low-income concentration from 35 to 49.9 percent.
>
> High-Poverty. Tracts with low-income concentration of 50 percent or more.

As expected, mean PNQ scores tend to be inversely related to the concentration of low-income households in the tract in which respondents reside. Once again, the major exceptions to this rule are the findings for the NEIGHBORS measure in both sites and the PRIVATE SERVICES measure in Pittsburgh. With the exception of NEIGHBORS and PRIVATE SERVICES in Pittsburgh, the mean PNQ scores of respondents living in higher-income Census tracts is at least one-fifth of a sample standard deviation higher than the mean scores of respondents living in high-poverty Census tracts. The largest difference occurs on PROBLEMS in Pittsburgh, where the respondents residing in higher-income neighborhoods had a mean score more than four-fifths of the sample standard deviation higher than the mean PROBLEMS score of respondents residing in high-poverty Census tracts.

As with household rent levels, the lack of a positive association between NEIGHBORS and the proportion of non-low-income households in the surrounding tract is not surprising. Indeed, given the relatively higher importance of social affiliations with neighbors found in the previous research cited earlier, a stronger negative relation might have been expected. Likewise, the different patterns for PRIVATE SERVICES in the two sites also mirrors the patterns found for rent level. As suggested above, this may reflect differences in the pattern of geographic codistribution in Pittsburgh and Phoenix of different types of housing stock and the types of services referred by this measure.

Table 2-3

MEAN SCORES ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES BY POVERTY LEVEL OF CENSUS TRACT

MEASURE	POVERTY LEVEL OF CENSUS TRACT				SAMPLE STANDARD DEVIATION	STANDARDIZED SPREAD (1) - (4) / (5)
	HIGHER-INCOME (1)	LOW-POVERTY (2)	MEDIUM-POVERTY (3)	HIGH-POVERTY (4)	(5)	(6)
			PITTSBURGH			
SATISFACTION	3.37	3.16	3.02	2.89	0.99	0.48
PUBLIC SERVICES	4.16	3.70	3.23	2.92	1.71	0.73
PRIVATE SERVICES	3.19	3.35	3.65	3.58	1.61	-0.24
PROBLEMS	4.09	3.37	3.02	2.68	1.72	0.82
NEIGHBORS	3.68	3.90	3.94	3.64	1.71	0.02
SAMPLE SIZE	(222)	(480)	(319)	(160)	(1181)	
			PHOENIX			
SATISFACTION	3.29	3.27	3.17	3.06	0.95	0.24
PUBLIC SERVICES	3.64	3.82	3.72	3.22	1.74	0.24
PRIVATE SERVICES	4.00	4.02	3.47	3.03	1.83	0.53
PROBLEMS	3.88	3.90	3.83	3.24	1.69	0.38
NEIGHBORS	3.15	3.33	3.29	3.32	1.69	-0.10
SAMPLE SIZE	(170)	(217)	(291)	(225)	(903)	

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

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

Most low-income neighborhoods in the Pittsburgh SMSA are in higher-density, central city areas. Households in these areas may reasonably be expected to rate the accessibility of the neighborhood to private services (medical care facilities, grocery facilities, churches, and day care services) more highly than those living in lower-density, non-central city locations where such services are more widely scattered. In Phoenix, where private services tend to be evenly dispersed throughout the SMSA, high-poverty neighborhoods are not so conveniently located relative to higher-income neighborhoods.

A second analysis that can shed some light on the relationship between respondents' PNQ scores and the nature of the neighborhoods in which they live involves the racial/ethnic characteristics of respondents' neighborhoods. The expectation here is that households living in minority areas of the city will tend to be less satisfied with their neighborhoods and to rate the various aspects of those neighborhoods less highly than those living elsewhere. As is well documented, minority neighborhoods have fewer (and lower quality) services and more problems than nonminority neighborhoods. (See, for example, King and Mieszkowski, 1975; Pettigrew, 1973). Table 2-4 supports this expectation quite strongly.

With the usual exception of NEIGHBORS and PRIVATE SERVICES in Pittsburgh, the mean PNQ scores of respondents residing in Census tracts with the lowest concentration of black households is at least one-quarter of a standard deviation higher than the cognate mean scores of respondents living in the Census tracts with the highest concentration of blacks. The largest difference in means occurs for PRIVATE SERVICES in Phoenix (0.85 of the sample standard deviation). Similar patterns obtained in comparing mean scores of respondents living in Census tracts with varying proportions of Spanish American residents in Phoenix, as shown in Table 2-5, though the difference in scores is smaller than in comparisons of tracts based on the proportion of black households.

Table 2-4

MEAN SCORES ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES BY PERCENTAGE BLACK IN CENSUS TRACT

MEASURE	PERCENTAGE BLACK IN CENSUS TRACT 0-15% (1)	16-49% (2)	50+% (3)	SAMPLE STANDARD DEVIATION (4)	STANDARDIZED SPREAD (1) - (3) / (4) (5)
		PITTSBURGH			
SATISFACTION	3.18	3.08	2.90	0.99	0.28
PUBLIC SERVICES	3.84	3.09	2.62	1.71	0.71
PRIVATE SERVICES	3.48	3.39	3.23	1.60	0.16
PROBLEMS	3.54	2.99	2.55	1.72	0.58
NEIGHBORS	3.84	3.95	3.72	1.71	0.07
SAMPLE SIZE	(837)	(168)	(176)	(1181)	
		PHOENIX			
SATISFACTION	3.23	2.98	2.94	0.95	0.31
PUBLIC SERVICES	3.70	3.14	2.82	1.74	0.51
PRIVATE SERVICES	3.73	3.03	2.18	1.83	0.85
PROBLEMS	3.81	3.35	2.61	1.69	0.71
NEIGHBORS	3.25	3.37	3.89	1.69	-0.38
SAMPLE SIZE	(757)	(118)	(28)	(903)	

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

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

Table 2-5

MEAN SCORES ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES
BY PERCENTAGE SPANISH AMERICAN IN CENSUS TRACT: PHOENIX

MEASURE	PERCENTAGE SPANISH AMERICAN IN CENSUS TRACT			SAMPLE STANDARD DEVIATION	STANDARDIZED SPREAD (1) - (3)
	0-14% (1)	15-49% (2)	50+% (3)	(4)	(4) (5)
SATISFACTION	3.31	3.07	3.15	0.95	0.17
PUBLIC SERVICES	3.79	3.56	3.13	1.74	0.38
PRIVATE SERVICES	3.99	3.23	3.31	1.83	0.37
PROBLEMS	3.92	3.60	3.35	1.69	0.34
NEIGHBORS	3.25	3.29	3.37	1.69	-0.07
SAMPLE SIZE	(417)	(343)	(143)	(903)	

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

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

Perceived Neighborhood Quality and Household Demographic Characteristics[1]

Table 2-6 compares the differences in mean PNQ scores at Baseline of respondents from different racial and ethnic groups. The pattern of responses across racial and ethnic groups is similar to the pattern found for varying levels of racial concentration in the surrounding Census tract. This is expected, since there is a strong correlation between the race of respondents and the racial composition of the tracts in which they reside.[2] Thus nonminorities generally gave higher evaluations of their neighborhoods than minorities. These differences are statistically significant for most of the measures, with the usual exception of NEIGHBORS in both sites and PRIVATE SERVICES in Pittsburgh. Of the three racial/ethnic groups in Phoenix, black respondents tended to have the lowest scores with Spanish American households having mean scores only slightly lower than whites.

The same pattern is apparent in comparisons of mean PNQ scores by three different levels of per-capita household income (under $1,000; $1,000 to $2,000; and over $2,000), as shown in Table 2-7. Households with higher per-capita income have higher PNQ scores on the average than those with lower per-capita income on all measures except for NEIGHBORS and PRIVATE SERVICES in Pittsburgh.

2.3 SUMMARY

The findings presented above support the psychometric and econometric credibility of the five PNQ summary measures. The measures of SATISFACTION, PROBLEMS, PUBLIC SERVICES, and PRIVATE SERVICES (in Phoenix only) all behave as predicted when related to a variety of objective neighborhood and household rent and demographic variables; that is, wealthier, nonminority households living in higher cost rental units located in wealthier, nonminority neighborhoods tend to have higher scores, on the average, on these

[1] A more comprehensive examination of the relationship between the perceived neighborhood quality measures and households demographic characteristics is presented in Appendix III.

[2] See, for example, Atkinson et al. (1979).

Table 2-6

MEAN SCORES ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES BY RACE OF RESPONDENT

MEASURE	RACE OF RESPONDENT: WHITE	BLACK	SPANISH AMERICAN	SAMPLE STANDARD DEVIATION	STANDARDIZED SPREAD (White vs. Black)	STANDARDIZED SPREAD (White vs. Spanish American)
			PITTSBURGH			
SATISFACTION	3.15	3.03	NA	0.99	0.12	NA
PUBLIC SERVICES	3.82	2.62	NA	1.71	0.70	NA
PRIVATE SERVICES	3.51	3.16	NA	1.60	0.22	NA
PROBLEMS	3.45	2.84	NA	1.72	0.35	NA
NEIGHBORS	3.83	3.86	NA	1.71	-0.02	NA
SAMPLE SIZE	(919)	(262)		(1,181)		
			PHOENIX			
SATISFACTION	3.17	2.91	3.31	0.95	0.27	-0.15
PUBLIC SERVICES	3.77	3.07	3.34	1.74	0.40	0.25
PRIVATE SERVICES	3.77	2.83	3.39	1.83	0.51	0.21
PROBLEMS	3.78	3.45	3.60	1.69	0.20	0.11
NEIGHBORS	3.25	3.29	3.36	1.69	-0.02	-0.07
SAMPLE SIZE	(587)	(69)	(247)	(903)		

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

DATA SOURCES: Baseline Interviews.

Table 2-7

MEAN SCORES ON PERCEIVED NEIGHBORHOOD QUALITY MEASURES
BY PER CAPITA INCOME OF RESPONDENT

	PER CAPITA INCOME OF RESPONDENT				SAMPLE STANDARD	
	<$1,000	$1,000-1,499	$1,500-1,999	$2,000+	DEVIATION	STANDARDIZED SPREAD
			PITTSBURGH			
SATISFACTION	2.98	3.03	3.25	3.31	0.99	0.33
PUBLIC SERVICES	3.30	3.34	3.64	4.02	1.71	0.42
PRIVATE SERVICES	3.25	3.38	3.55	3.54	1.60	0.18
PROBLEMS	3.03	3.05	3.31	3.63	1.72	0.35
NEIGHBORS	3.76	3.83	3.76	3.95	1.71	0.11
SAMPLE SIZE	(250)	(427)	(221)	(304)	(1,202)	
			PHOENIX			
SATISFACTION	3.08	3.13	3.19	3.31	0.95	0.24
PUBLIC SERVICES	3.13	3.41	3.53	3.92	1.74	0.45
PRIVATE SERVICES	3.07	3.58	3.78	3.81	1.83	0.40
PROBLEMS	3.25	3.48	3.70	4.02	1.69	0.46
NEIGHBORS	3.01	3.33	3.46	3.27	1.69	0.15
SAMPLE SIZE	(235)	(201)	(209)	(345)	(990)	

four PNQ measures, than their more impoverished, minority counterparts living in less costly rental units in poorer, minority neighborhoods. In general, the difference between the mean score of the former group on one of these four PNQ measures is at least one-fifth of the sample standard deviation higher than the mean score of the latter group on that measure. In some instances, the difference is as large as four-fifths of the sample standard deviation; a third to half a standard deviation difference was a very typical value.

Furthermore, the failure of NEIGHBORS scores to show the same relationship is not unexpected. Previous research indicates that the relative deprivations of the poor are not nearly as serious in the social realm as in the physical aspects of their well-being.[1] The replication here of this previously observed pattern does, however, serve to emphasize the difference between NEIGHBORS and the other PNQ measures. To varying degrees, scores on all of the PNQ measures other than NEIGHBORS can be expected to be susceptible to improvement through receipt of a housing allowance, since relative lack of money seems to be empirically correlated with relative deprivation regarding the aspects of the neighborhood referenced by these measures. On the other hand, the evidence presented above and in other studies as well does not provide any indication of a systematic relationship between the relative cash wealth of a household and the relative strength of its social ties in the neighborhood of residence. This line of argument leads to the conclusion that housing allowance programs should not be expected to have a noticeable positive impact on NEIGHBORS, whereas positive impacts of allowances are generally expected on the other PNQ measures.

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[1] See, for example, Liebow (1967); Gans (1962).

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CHAPTER 3

PROGRAM EFFECTS

This chapter presents estimates of the extent to which the various types of housing allowance plans implemented in the Demand Experiment led participants to select neighborhoods of a higher or lower perceived quality than those in which they would have lived without the programs. Program effects are estimated with respect to the five measures of neighborhood quality discussed in Chapter 2:

Overall satisfaction with the neighborhood (SATISFACTION);

Perceived quality of public services in the neighborhood (PUBLIC SERVICES);

Perceived quality of private services in the neighborhood (PRIVATE SERVICES);

Perceived absence of neighborhood problems (PROBLEMS); and

Perceived degree of social attachments to neighborhoods (NEIGHBORS).

The discussion of Chapter 2 suggests that housing allowances should if anything lead to improvements in most of the PNQ measures by providing financial assistance in obtaining improved residential locations. The major exception to this hypothesis regards NEIGHBORS, for which there does not seem to be sufficient basis for predicting the expected direction of program impact. The remainder of this chapter is divided into two sections. Section 3.1 describes the statistical model used to estimate program effects. Section 3.2 presents findings regarding estimates of the effects of the three major types of allowance plans implemented in the Demand Experiment: Percent of Rent, Housing Gap, and Unconstrained.[1]

[1] An explanation of the differences among the various allowance plans is provided in Appendix I.

3.1 THE ESTIMATOR OF PROGRAM EFFECTS

This section offers a brief overview of the statistical model used to derive estimates of the effect of housing allowances on perceived neighborhood quality (PNQ) of recipients. A more thorough discussion is presented in Appendix IV. The effect of allowances (A) is defined as the difference between a participant's observed score, P, and the score that would have been observed in the absence of the program, P_N:

$$A = P - P_N.$$

Actual scores, P, are directly observed but P_N is not. Instead, P_N is predicted based on the experience of Control households. Specifically, P_N was specified to be a linear function of household characteristics, X, and pre-enrollment scores, P_o:

(1) $$P_N = X\beta + \rho P_o + \varepsilon$$

where

P_N = the vector of "normal" scores two years after enrollment

X = a matrix of household characteristics

P_o = the vector of pre-enrollment scores, taken from the Baseline Interview

β, ρ = unknown coefficients

ε = a stochastic term.

The specific household characteristics used included per capita household income, length of tenure, and dummy variables for minority households, elderly households, and single-parent (nonelderly) households.

The coefficients in Equation (1) were estimated using Control households.[1]

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[1]The estimator used was based on the Seemingly Unrelated Regressions Model suggested by Zellner (1962). In using this model it was assumed that

(i) $$P_N = X\psi + \theta_N$$

(ii) $$P_o = X\gamma + \theta_o$$

(iii) $$\theta_N = \rho\theta_o + \varepsilon$$

where

(footnote continued on following page)

Expected "normal" scores for Experimental households were then estimated as

$$(2) \qquad \hat{P}_N^E = X^E\hat{\beta}_C + \hat{\rho}P_o^E$$

where $\hat{\beta}_C$ and $\hat{\rho}$ are the estimated coefficients for Control households and X^E and P_o^E are the matrix of values of X and P_o for Experimental households. The mean estimated effect of the allowance program is then

$$(3) \qquad \hat{\bar{A}} = \bar{P}^E - \hat{\bar{P}}_N^E = \bar{P}^E - \bar{P}_C + (X^E - X^C)\hat{\beta}_C + (\bar{P}_o^E - \bar{P}_o^C)\hat{\rho}$$

where the superscripts E and C represent values for Experimental and Control households, respectively. Thus, the estimated mean effect is simply the difference between mean Experimental and Control scores ($\bar{P}^E - \bar{P}^C$), adjusted for mean differences in household characteristics ($\bar{X}^E - \bar{X}^C$) and initial position ($\bar{P}_o^E - \bar{P}_o^C$).

Since the metric underlying all of the perceived neighborhood quality measures examined in this report is, for the most part, arbitrary and not well understood, the substantive significance of the estimates of program impacts on PNQ is difficult to interpret. While all effect estimates that differ from

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(footnote continued from previous page)

P_N, P_o, X, ρ and ε are as defined above

ψ = unknown coefficients

γ = unknown coefficients

θ = stochastic term.

Since the X values in the Seemingly Unrelated Regressions in Equations (i) and (ii) are the same, the model reduces to a simple serial correlation model. From (ii) it follows that

$$(iv) \qquad \theta_o = P_o - X\gamma.$$

Substituting (iv) for θ_o in (iii) and then substituting the result for θ_N in Equation (i) yields

$$(v) \qquad P_N = X\psi + \rho(P_o - X\gamma) + \varepsilon$$

or

$$(vi) \qquad P_N = X(\psi - \rho\gamma) + \rho P_N + \varepsilon.$$

The presumption, borne out by empirical estimation, is that the covariates, X, in (i) and (ii) omit many determinants of PNQ scores, some of which tend to persist over time. The correlation of θ_N and θ_o, ρ, may be interpreted as reflecting the extent to which θ includes such omitted variables and the extent to which these variables persist over time. See Appendix IV for a more complete discussion of the estimator.

zero by a statistically significant margin (at the 0.05 level) are noted, these tests of statistical significance are generally more useful for establishing the relative level of uncertainty associated with the various effect estimates, rather than their relative magnitude. In instances such as this, it has been recommended that effect estimates be standardized, expressing them in terms of the population standard deviation, σ, of the dependent variable in question (or its sample estimate).[1] For reference in assessing the size of estimated effects, the values for 0.2 of a standard deviation are presented in such tables.[2]

3.2 OVERALL PROGRAM EFFECTS

This section presents estimates of the impact on perceived neighborhood quality (PNQ) of the three basic varieties of housing allowance plans offered in the Demand Experiment:

Percent of Rent subsidies,

Housing Gap subsidies, and

Unconstrained subsidies.

A brief description of each of these types of allowance plans and their expected impact on PNQ will be presented first[3], followed by a presentation of their estimated impact.

In the case of Percent of Rent subsidies, households were offered payments based upon a fixed proportion of their monthly rent. The actual rent rebate varied from 20 percent to 60 percent of rent as incurred. No program constraints on the quality of dwelling units or neighborhoods were applied. Thus, the Percent of Rent subsidies effectively reduced the price of any unit by the amount of the rebate. A household with a 50 percent rebate, for example, would pay only half of the market rent for any unit from its own

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[1] See Cohen (1977), Chapter 2.

[2] In general, effects larger than 0.2 of a standard deviation are also statistically significant; however, in some cases, when the size of the sample on which the estimate is based is small, effects somewhat larger than the 0.2 of a standard deviation benchmark will fail to achieve statistical significance. These estimates are nonetheless discussed as indicators of potential program impact on PNQ.

[3] See Appendix I for a detailed description of the varieties of housing allowance plans offered in the Demand Experiment.

pocket; the rest would be made up by the allowance payment. It was expected that this would encourage households to purchase more expensive units in correspondingly better neighborhoods.[1]

In the case of Housing Gap allowance plans, the monthly payment was intended to make up the gap between the estimated cost of modest standard housing and a reasonable fraction of the household's income, providing the household lived in housing that met certain requirements. Requirements were of two types. The Minimum Standards requirement required that the household live in a unit which passed various physical standards such as adequate plumbing, window condition and condition of interior and exterior surfaces, as well as an occupancy standard. The Minimum Rent allowance plan required that the household spend at least a specified amount for housing each month.

Expectations of positive impacts of Housing Gap plans on PNQ follow from the hypothesis that some households that failed to meet the housing requirements would be induced to move to dwelling units of higher quality and that these units were likely to be located in "better" neighborhoods.[2] However, this neighborhood effect might be offset for households subject to the Minimum Standards requirements, since the Minimum Standards relate solely to dwelling unit features and hence, might be expected to lead to a greater relative emphasis on dwelling unit features as opposed to neighborhood features.

For Unconstrained households, the payment formula was the same as that for Housing Gap households, but no housing requirements were imposed as a condition for receipt of the allowance. Thus, improvement in neighborhood quality would be expected to occur to the extent that households voluntarily used the allowance payment to purchase the benefits associated with living in a "better" neighborhood.

Table 3-1 presents the effect estimates for the Percent of Rent, Housing Gap, and Unconstrained allowance plans in Pittsburgh and Phoenix. The estimated magnitude of the effect and the estimated sampling variance of the

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[1]For an analysis of expenditure change under the Percent of Rent plans, see Friedman and Weinberg (1978).

[2]Even if they already met requirements, households might also simply choose to purchase better housing, given the extra income provided by the allowance. For analysis of expenditure change under the Housing Gap plans, see Friedman and Weinberg (1979).

Table 3-1

MEAN HOUSING ALLOWANCE EFFECTS ON PERCEIVED NEIGHBORHOOD QUALITY SCORES BY MAJOR TREATMENT GROUP

	SATIS-FACTION	PUBLIC SERVICES	PRIVATE SERVICES	PROBLEMS	NEIGHBORS	SAMPLE SIZE
			PITTSBURGH			
Standard Deviation of Control	0.81	1.57	1.53	1.54	1.54	(320)
One-fifth of Standard Deviation	0.16	0.31	0.31	0.31	0.31	
PERCENT OF RENT	0.03	0.03	-0.07	0.15	-0.12	(407)
HOUSING GAP	-0.01	0.04	-0.07	0.11	-0.04	(512)
UNCONSTRAINED	0.14	0.45 (2.10*)	0.02	0.29	0.13	(63)
			PHOENIX			
Standard Deviation of Control	0.76	1.63	1.78	1.44	1.55	(282)
One-fifth of Standard Deviation	0.15	0.33	0.36	0.29	0.31	
PERCENT OF RENT	-0.02	0.05	0.12	-0.03	-0.25 (-1.86†)	(298)
HOUSING GAP	-0.01	0.14	-0.08	0.01	-0.36 (-2.93**)	(421)
UNCONSTRAINED	-0.19	0.33 (1.16)	-0.34	-0.19	-0.64 (-2.30*)	(40)

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

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

NOTE: t-statistics in parentheses.

† t-statistic significant at the 0.10 level.

* t-statistic significant at the 0.05 level.

** t-statistic significant at the 0.01 level.

magnitude estimate are presented, along with an indication of the statistical significance of the effect estimate. Furthermore, estimates of 0.2 times the population standard deviation of the scores on each PNQ measure at year two based on Control group data are presented in order to facilitate interpretation of the substantive significance of the effect estimates according to conventions suggested in Section 3.1 above.

As can be seen from Table 3-1, the most outstanding finding is a consistent pattern of negative program effects on the strength of recipient families' social ties in their neighborhood of residence (NEIGHBORS) in Phoenix. This negative finding occurs for all three types of allowance plans examined. On the positive side, the Unconstrained plan in both Pittsburgh and Phoenix appears to have positive impact on PUBLIC SERVICES, although statistically significant only in Pittsburgh. Otherwise all estimated effects are both small (less than two-tenths of a standard deviation) and insignificant.

The samples used in Table 3-1 include all Experimental households actively enrolled at the end of two years. For Housing Gap households in particular, this may tend to understate the impact of the program on participants. Many Housing Gap households never met the housing requirements and hence never actually participated in the program and received allowance payments. Since such households would not be expected to have changed their housing in response to the program, their inclusion in the sample would dilute any effect on participants. On the other hand, estimates for participants may be biased by sample selection effects. In particular, to the extent that participants are disproportionately made up of households that would have improved their housing in the absence of the allowance program, estimated effects will be biased upward.

Table 3-2 presents estimated effects for Housing Gap participants (i.e., those receiving a full allowance payment). The only substantive difference from the figures in Table 3-1 is the significant positive effect for PUBLIC SERVICES in Phoenix. While this estimate may be biased by sample selection, it is not implausible given the estimates in Table 3-1 for all Housing Gap households. In particular, if the allowance offer in fact had no effect on nonparticipants, then the expected value of the estimate for all households

Table 3-2

ESTIMATED EFFECTS FOR
HOUSING GAP PARTICIPANTS

	SATIS-FACTION	PUBLIC SERVICES	PRIVATE SERVICES	PROBLEM	NEIGHBORS	SAMPLE SIZE
			PITTSBURGH			
0.2σ	0.16	0.31	0.31	0.31	0.31	(244)
Effect	0.03	0.12	-0.02	0.00†	-0.10	
t-statistic	(0.43)	(0.93)	(0.19)	(0.01)	(0.81)	
			PHOENIX			
0.2σ	0.15	0.33	0.36	0.29	0.31	(220)
Effect	0.09	0.31*	0.09	0.11	-0.34*	
t-statistic	(1.28)	(2.13)	(0.55)	(0.84)	(2.33)	

SAMPLE: Housing Gap households active and receiving full allowance payments two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

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

† t-statistic significant at the 0.10 level.

* t-statistic significant at the 0.05 level.

would be rA^P, where r is the fraction of households participating and A^P is the effect for participants.

Given the sample sizes in Tables 3-1 and 3-2, the effect on participants implied by the estimated effect in Table 3-1 for all households would be 0.27 (0.14 x 421/220), not too far below the estimated effect for participants of 0.31 in Table 3-2.[1] Thus there is some evidence, in Phoenix, of an effect for Housing Gap participants in the PUBLIC SERVICES measure similar to that found for Unconstrained households.

Since changes in neighborhood necessarily involve moving it is interesting to estimate effects for movers and stayers separately. This is done in Table 3-3.[2]

The predominant finding in Table 3-3 is a replication of the findings from Table 3-1. There is a strong negative impact on movers for all three allowance plans examined on NEIGHBORS in Phoenix. Furthermore, significant negative effects are also observed on the NEIGHBORS measure for the Percent of Rent and Housing Gap programs in Pittsburgh. As might be expected, similar program effects on NEIGHBORS are not observed for nonmovers in either site.

The effect of Housing Gap programs might be expected to vary substantially with the housing requirement used and by whether or not households already lived in housing that met the requirements when they enrolled.[3] Table 3-4 presents the effect estimates for NEIGHBORS among Housing Gap households that passed housing requirements at enrollment, failed housing requirements at enrollment, or failed housing requirements and moved.[4] Results are

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[1] On the other hand, the fact that estimated effects on the NEIGHBORS measure are so similar in Tables 3-1 and 3-2 does suggest some selection effect. The implied participant effect based on Table 3-1 would be -0.69 for this variable--much like the effect for Unconstrained households and well above the -0.36 estimate in Table 3-2.

[2] The estimates in Table 3-3 are based on comparisons of Experimental and Control movers and Experimental and Control stayers, respectively. Thus they do not include any effect that is produced by changes in the proportion of households moving, per se. These would be included in the estimates for all households.

[3] See, e.g., Friedman and Weinberg (1979) and MacMillan (1978).

[4] Results are not presented for that group of households that passed housing requirements initially and subsequently moved since the principal focus of the analysis is to determine the effects of earmarking on households that failed requirements initially.

Table 3-3

MEAN EFFECTS ON PERCEIVED NEIGHBORHOOD QUALITY AMONG MOVERS AND NONMOVERS BY MAJOR TREATMENT GROUP (PITTSBURGH)

	NEIGHBORHOOD SATISFACTION	PUBLIC SERVICES	PRIVATE SERVICES	PROBLEMS	NEIGHBORS	SAMPLE SIZE
			PITTSBURGH MOVERS			
Standard Deviation of Control Mean	0.84	1.83	1.55	1.69	1.59	(112)
One-fifth of Standard Deviation	0.17	0.37	0.31	0.34	0.32	
PERCENT OF RENT	-0.04	-0.13	0.02	0.05	-0.45 (-2.20*)	(153)
HOUSING GAP	-0.08	-0.08	-0.04	-0.04	-0.43 (-2.16*)	(192)
UNCONSTRAINED	-0.05	0.23	0.19	0.53	-0.05	(25)
			PITTSBURGH NONMOVERS			
Standard Deviation of Control Mean	0.77	1.37	1.46	1.40	1.48	(209)
One-fifth of Standard Deviation	0.15	0.27	0.29	0.28	0.30	
PERCENT OF RENT	-0.08	0.07	-0.14	0.16	0.04	(254)
HOUSING GAP	-0.01	0.01	-0.08	0.11	0.17	(320)
UNCONSTRAINED	0.18 (1.39)	0.48 (1.87†)	0.04	-0.01	0.23	(38)

(continued)

Table 3-3 (continued)

MEAN EFFECTS ON PERCEIVED NEIGHBORHOOD QUALITY AMONG MOVERS AND NONMOVERS BY MAJOR TREATMENT GROUP (PHOENIX)

	NEIGHBORHOOD SATISFACTION	PUBLIC SERVICES	PRIVATE SERVICES	PROBLEMS	NEIGHBORS	SAMPLE SIZE
			PHOENIX MOVERS			
Standard Deviation of Control Mean	0.79	1.71	1.74	1.54	1.57	(148)
One-fifth of Standard Deviation	0.16	0.34	0.35	0.31	0.31	
PERCENT OF RENT	-0.02	0.04	0.16	-0.13	-0.38 (-2.00*)	(182)
HOUSING GAP	-0.12	0.12	-0.04	-0.12	-0.40 (-1.83†)	(260)
UNCONSTRAINED	-0.26 (-1.38)	0.42 (1.10)	-0.28	-0.01	-1.13 (-2.96**)	(23)
			PHOENIX NONMOVERS			
Standard Deviation of Control Mean	0.69	1.50	1.72	1.27	1.42	(134)
One-fifth of Standard Deviation	.14	.30	.34	.25	.28	
PERCENT OF RENT	-0.13	-0.04	-0.04	0.01	0.11	(116)
HOUSING GAP	0.02	0.09	-0.09	0.01	-0.23	(161)
UNCONSTRAINED	-0.19	0.15	-0.40	-0.61 (-1.70†)	-0.10	(17)

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

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

NOTE: t-statistics in parentheses.

† t-statistic significant at the 0.10 level.

* t-statistic significant at the 0.05 level.

** t-statistic significant at the 0.01 level.

Table 3-4

EFFECT ESTIMATES FOR NEIGHBORS AMONG HOUSEHOLDS
THAT PASSED OR FAILED HOUSING REQUIRMENTS AT ENROLLMENT

INITIAL EARMARK STATUS BY TYPE OF EARMARK	MEAN EXPERIMENTAL EFFECTS	
	PITTSBURGH	PHOENIX
ALL HOUSING GAP		
Passed initially	0.08 (158)	-0.26 (104)
Failed initially	-0.14 (288)	-0.40** (274)
Failed and moved	-0.45* (115)	-0.38* (172)
HOUSING GAP MINIMUM STANDARDS		
Passed initially	0.03 (94)	-0.12 (34)
Failed initially	-0.23 (159)	-0.58** (138)
Failed and moved	-0.54* (70)	-0.65** (81)
HOUSING GAP MINIMUM RENT		
Passed initially	-0.05 (114)	-0.20 (70)
Failed initially	0.07 (129)	-0.28 (136)
Failed and moved	-0.19 (45)	-0.07 (91)

SAMPLE: Housing Gap households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

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

NOTE: t-statistics in parentheses.

* t-statistic significant at the 0.05 level.

** t-statistic significant at the 0.01 level.

presented for all Housing Gap recipients combined, and for households constrained to meet Minimum Standards and Minimum Rent requirements, separately. The results of these comparisons suggest that earmarking may indeed have had an impact on participants' neighborhood choices with respect to the NEIGHBORS measure. Estimates of program effects for households that pass earmark requirements initially are neither statistically significant nor substantively large; however, among households that failed housing requirements at enrollment--and particularly among Minimum Standards households that failed and moved--program effects are estimated to be statistically significant and negative at both sites.

It is apparent that most of these effects occur among those allowance recipients required to meet the Minimum Standards, as opposed to Minimum Rent, earmark. While the same pattern of negative effects is observed among the Minimum Rent group, the effect estimates are not statistically significant. It may be that it was more difficult for households with Minimum Standards subsidies to meet the earmark requirements in their original neighborhoods. This difficulty may therefore have encouraged more of these households to move to new neighborhoods where they were less likely to have friends and relatives in the area and where they were more likely to have neighbors with backgrounds different from their own.

The general conclusions to be drawn from the above analyses of program effects is that allowance recipients tend, at two years after enrollment, to reside in neighborhoods where they have less frequent and less friendly interaction with their neighbors and fewer relatives and other persons of similar background in close proximity than would be expected to be the case in the absence of their participation in the program. As might be expected, this finding applies almost exclusively to program participants that changed residence in the two-year interval after enrollment. This negative impact on the NEIGHBORS measure is not attributable to program-induced increases in the mobility rates of participants. On the contrary, the estimated magnitudes of the negative effects of the allowance programs on NEIGHBORS are substantially larger in the analysis based on comparisons with Control households that moved than they are in the full-sample analysis.

With respect to other aspects of perceived neighborhood quality, similar analyses were carried out. The results of these comparisons were inconclu-

sive with regard to the effect of housing requirements on the two-year scores. On balance no evidence was found indicating differences in the impact on perceived neighborhood quality of various plans offering earmarked subsidies that were related to initial earmark status and/or subsequent mobility of participants.

Effects of the housing allowance program on the NEIGHBORS measure differ according to whether households met program standards initially. More specifically, Minimum Standards households whose units did not meet standards initially and who subsequently moved were much more likely than their counterparts who passed standards initially to report lower than normal NEIGHBORS scores. While this pattern was consistent between the two sites, it was limited to those households in the Minimum Standards group.

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APPENDIX I

DESIGN OF THE DEMAND EXPERIMENT

This appendix presents a brief overview of the Demand Experiment's purpose, data collection procedures, 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 is given directly to individual low-income households to assist them in obtaining adequate housing. The allowance may be linked to housing either by making the amount of the allowance depend on the amount of rent paid or by requiring that households meet certain housing requirements in order to receive the allowance payment. The initiative in using the allowance and the burden of meeting housing requirements are therefore placed upon households rather than upon developers, landlords, or the government.

The housing allowance experiments are intended to assess the desirability, feasibility, and appropriate structure of a housing allowance program. Housing allowances could be less expensive than some other kinds of housing programs. Allowances permit fuller utilization of existing sound housing because they are not tied to new construction. Housing allowances may also be more equitable. The amount of the allowance can be adjusted to changes in income without forcing the household to change units. Households may also, if they desire, use their own resources (either by paying higher rent or by searching carefully) to obtain better housing than is required to qualify for the allowance. As long as program requirements are met, housing allowances offer households considerable choice in selecting housing most appropriate to their needs--for example, where they live (opportunity to locate near schools, near work, near friends

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

or relatives, or to break out of racial and socioeconomic segregation) or the type of unit they live in (single-family or multifamily). Finally, housing allowances may be less costly to administer. Program requirements need not involve every detail of participant housing. The burden of obtaining housing that meets essential requirements is shifted from program administrators to participants.

These potential advantages have not gone unquestioned. Critics of the housing allowance concept have suggested that low-income households may lack the expertise necessary to make effective use of allowances; that the increased supply of housing needed for special groups such as the elderly will not be provided without direct intervention; and that an increase in the demand for housing without direct support for the construction of new units could lead to a substantial inflation of housing costs.[1]

If housing allowances prove desirable, they could be implemented through a wide range of possible allowance formulas, housing requirements, nonfinancial support (such as counseling), and administrative practices. The choice of program structure could substantially affect both the program's costs and impact.

The Demand Experiment addresses issues of feasibility, desirability, and appropriate structure by measuring how individual households (as opposed to the housing market or administrative agencies) react to various allowance formulas and housing standards requirements. The analysis and reports are designed to answer six policy questions:

1. Participation

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

2. Housing Improvements

   Do households that receive housing allowances improve the quality of their housing? At what cost? How do households

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[1] The issue of inflation is being addressed directly as part of the Housing Allowance Supply Experiment.

that receive a housing allowance seek to improve their housing--by moving, by rehabilitation? With what success?

3. Locational Choice

For participants who move, how does their locational choice compare with existing residential patterns? Are there non-financial barriers to the effective use of a housing allowance?

4. Administrative Issues

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

5. Form of Allowance

How do the different forms of 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 other housing programs and with income maintenance in terms of participation, housing quality achieved, locational choice, costs (including administrative costs), and equity?

The Demand Experiment tests alternative housing allowance programs to provide information on these policy issues. While the experiment is focused on household behavior, it also offers data on program administration to supplement information gained through the Administrative Agency Experiment. Finally, the Demand Experiment gathers direct information on participants and housing conditions for a sample of households in conventional HUD-assisted housing programs at the two experimental sites for comparison with allowance recipients.

I.2 DATA COLLECTION

The Demand Experiment was conducted at two sites--Allegheny County, Pennsylvania (Pittsburgh), and Maricopa County, Arizona (Phoenix). HUD selected these two sites from among 31 Standard Metropolitan Statistical Areas (SMSAs) on the basis of their growth rates, rental

vacancy rates, degree of racial concentration and housing costs. Pittsburgh and Phoenix were chosen to provide contrasts between an older, more slowly growing Eastern metropolitan area and a newer, relatively rapidly growing Western metropolitan area. In addition, Pittsburgh has a substantial black minority and Phoenix a substantial Spanish American minority population.

Most of the information on participating households was collected from:

Baseline Interviews, conducted by an independent survey operation before households were offered enrollment;

Initial Household Report Forms and monthly Household Report Forms, completed by participating households during and after enrollment, which provided operating and analytic data on household size and income and on housing expenditures.

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

Payments and status data on each household maintained by the site offices;

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

Periodic Interviews, conducted approximately six, twelve, and twenty-four months after enrollment by an independent survey operation; and

Exit Interviews, conducted by an independent survey operation for a sample of households that declined the enrollment offer or dropped out of the program.

Surveys and housing evaluations were also administered to a sample of participants in other housing programs: Public Housing, Section 23/8 Leased Housing, and Section 236 Interest Subsidy Housing.

Since households were enrolled throughout the first ten months of operations, the operational phase of the experiment extended over nearly four years in total. Analysis will be based on data collected from households during their first two years after enrollment in the experiment. The experimental programs were continued for a third year

in order to avoid confusion between participants' reactions to the experimental offers and their adjustment to the phaseout of the experiment. During their last year in the experiment eligible and interested households were aided in entering other housing programs.

I.3 ALLOWANCE PLANS USED IN THE DEMAND EXPERIMENT

The Demand Experiment tested a number of combinations of payment formulas and housing requirements and several variations within each of these combinations. These variations allow some possible program designs to be tested directly. More importantly, they allow estimation of key responses such as participation rates and changes in participant housing in terms of basic program parameters such as the level of allowances; the level and type of housing requirements; the minimum fraction of its own income that a household can be expected to contribute toward housing; and the way in which allowances vary with household income and rent. These response estimates can be used to address the policy questions for a larger set of candidate program plans, beyond the plans directly tested.[1]

Payment Formulas

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

Under the Housing Gap formula, payments to households 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

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[1]The basic design and analysis approach, as approved by the HUD Office of Policy Development and Research, is presented in Abt Associates Inc. (June 1973), and in Abt Associates Inc.(August 1973). Details of the operating rules of the Demand Experiment are contained in Abt Associates Inc. (April 1973).

the net family income.[1] 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.[2] Thus, payment under the Housing Gap formula can be interpreted as making up the difference between the cost of decent housing and the amount of its own income that a household should be expected to pay for housing.[3]

Under the Percent of Rent formula, the payment is a percentage of the household's rent. The payment formula is:

$$P = aR$$

where R is rent and "a" is the fraction of rent paid by the allowance. In the Demand Experiment the value of "a" remained constant once a household had been enrolled.[4]

Housing Requirements

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

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

[2] The housing cost parameter, C*, was established from estimates given by a panel of qualified housing experts in Pittsburgh and Phoenix. For more detailed discussion regarding the derivation of C*, refer to Abt Associates Inc. (1975), Appendix II.

[3] As long as their housing met certain requirements (discussed below), Housing Gap households could spend more or less than C* for housing, as they desired, and hence contribute more or less than "b" of their own income. This is in contrast to other housing programs, such as Section 8 (Existing).

[4] Five values of "a" were used in the Demand Experiment. Once a family had been assigned its "a" value, the value generally stayed 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 rose beyond a certain point, the value of "a" dropped rapidly to zero. Similarly, the payment under Percent of Rent could not exceed C* (the maximum payment under the modal Housing Gap plan), which effectively limited the rents subsidized to less than C*/a.

Under the Minimum Standards requirement, participants received the allowance payment only if they occupied dwellings that met certain physical and occupancy standards. Participants occupying units that did not meet these standards either had to move or arrange to improve their current units to meet the standards. Participants already living in housing that met standards could use the allowance to pay for better housing or to reduce their rent burden (the fraction of income spent on rent) in their present units.

If housing quality is broadly defined to include all residential services, and if rent levels are highly correlated with the level of services, then a straightforward housing requirement (one that is relatively inexpensive to administer) would be that recipients spend some minimum amount on rent. Minimum Rent was considered as an alternative to Minimum Standards in the Demand Experiment, in order to observe differences in response and cost and to assess the relative merits of the two types of requirements. Although the design of the experiment used a fixed minimum rent for each household size, a direct cash assistance program could employ more flexible structures. For example, some features of the Percent of Rent formula could be combined with the Minimum Rent requirement. Instead of receiving a zero allowance 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.

Allowance Plans Tested

The three combinations of payment formulas and housing requirements used in the Demand Experiment were Housing Gap Minimum Standards, Housing Gap Minimum Rent, and Percent of Rent. A total of 17 allowance plans were tested.

The twelve Housing Gap allowance plans are shown in Table I-1. The first nine plans include three variations in the basic payment level, 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 value of "b"--the rate at which the allowance is reduced as income increases--is 0.25 for each of these plans. The next two

plans have the same level of C (C*) and use the Minimum Standards Housing Requirement, but use different values of "b". In the tenth plan the value of "b" is 0.15, and in the eleventh plan, 0.35. Finally, the twelfth plan is unconstrained, that is, it has no housing requirement. This unconstrained plan allows a direct comparison with a general income-transfer program.

Eligible households that did not meet the housing requirement were still able to enroll. They received full payments whenever they met the requirements during the three years of the experiment. Even before meeting the housing requirements, such households received a cooperation payment of $10 per month as long as they completed all reporting and interview requirements.

Within the Housing Gap design, the average effects of changes in the allowance level or housing requirements can be estimated for all the major responses. In addition, interactions between the allowance level and the 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 payments level of 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-1.[1] A demand function for housing is estimated primarily from the Percent of Rent observations. Demand functions describe the way in which the amount people will spend on housing is related to their income, the relative price of housing and other goods, and various demographic characteristics. Such functions may be used to simulate response to a variety of possible rent subsidy programs not directly tested within the Demand Experiment. Together with estimates of supply response, they may also be used to simulate the change in market prices and housing expenditures over time due to shifts in housing demand or costs.

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[1] Designation of multiple plans for the same "a" value reflects an early assignment convention and does not indicate that the households in these plans were treated differently for either payment purposes or analysis.

Table I-1
ALLOWANCE PLANS TESTED

HOUSING GAP: (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 = 0.15	C*	Plan 10			
b = 0.25	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 = 0.35	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).

PERCENT OF RENT (P = aR)

a = 0.6	a = 0.5	a = 0.4	a = 0.3	a = 0.2
Plan 13	Plans 14 - 16	Plans 17 - 19	Plans 20 - 22	Plan 23

CONTROL:

With Housing Information	Without Housing Information
Plan 24	Plan 25

Control Groups

In addition to the various allowance plans, control groups were necessary in order to establish a reference level for responses, since a number of uncontrolled factors could also induce changes in family behavior during the course of the experiment. Control households received a cooperation payment of $10 per month. They reported the same information as families that received allowance payments, including household composition and income; they permitted housing evaluations; and they completed the Baseline Interview and the three Periodic Interviews. (Control families were paid an additional $25 fee for each Periodic Interview.)

Two control groups were 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 households enrolled in the experimental allowance plans but they were not paid for their attendance.) 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 income eligibility requirement. This limit was approximately the income level at which the household would receive no payment under the Housing Gap formula:

$$\text{Income Eligibility Limit} = \frac{C^*}{0.25}$$

In addition, households in plans with lower payment levels (Plans 3, 6, 9 and 11) had to have incomes low enough at enrollment to receive payment 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.4 FINAL SAMPLE

Final analysis of the impact of the housing allowance will be based on the first two years of experimental data. Thus, the key sample size

Table I-2.

SAMPLE SIZE AFTER TWO YEARS

HOUSING GAP: (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 = 0.15	C*	Plan 10 PIT = 45 PHX = 36			
b = 0.25	1.2C*	Plan 1 PIT = 33 PHX = 30	Plan 4 PIT = 34 PHX = 24	Plan 7 PIT = 30 PHX = 30	
	C*	Plan 2 PIT = 42 PHX = 35	Plan 5 PIT = 50 PHX = 39	Plan 8 PIT = 44 PHX = 44	Plan 12 PIT = 63 PHX = 40
	0.8C*	Plan 3 PIT = 43 PHX = 39	Plan 6 PIT = 44 PHX = 35	Plan 9 PIT = 43 PHX = 35	
b = 0.35	C*	Plan 11 PIT = 41 PHX = 34			

Total Housing Gap: 512 households in Pittsburgh, 421 households in Phoenix

Symbols: b = Rate at which the allowance decreases as the income increases.
C* = Basic payment level (varied by family size and also by site).

PERCENT OF RENT (P = aR) :

a = 0.6	a = 0.5	a = 0.4	a = 0.3	a = 0.2
Plan 13 PIT = 28 PHX = 21	Plans 14 - 16 PIT = 109 PHX = 81	Plans 17 - 19 PIT = 113 PHX = 66	Plans 20 - 22 PIT = 92 PHX = 84	Plan 23 PIT = 65 PHX = 46

Total Percent of Rent 407 households in Pittsburgh, 298 households in Phoenix.

CONTROLS:

With Housing Information	Without Housing Information
Plan 24 PIT = 159 PHX = 137	Plan 25 PIT = 162 PHX = 145

Total Controls: 321 households in Pittsburgh, 282 households in Phoenix.

NOTE This sample includes households that were active, although not necessarily receiving payments, after two years of enrollment, households whose enrollment income was above the eligibility limits or that moved into subsidized housing or their own homes are excluded. While data on the excluded households may be useful for special analyses, particular analyses may also require the use of a still more restricted sample than the one shown here

for this report and the other reports in this series is the number of households in the experiment at the end of the first two years. The two-year sample size is shown in Table I-2, and comprises households that were still active, in the sense that they were continuing to fulfill reporting requirements. The sample size for a particular analysis may be smaller.

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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 five 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) program status; and (5) location variables. The perceived neighborhood quality variable is discussed in Appendix III. 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 and out of range responses.

II.2 ANALYTICAL DEFINITIONS OF VARIABLES

Move Behavior

Move. Determination of a move during the two years of the experiment was based on comparison of the addresses at which the Initial Household Report Form and the First, Second and Third Periodic Interviews were given. Households residing at a different address at any one of the interviews were counted as having moved (regardless of their response to interview questions on moving).

Search. To determine the search activity of a particular household over the whole two years, information from the First, Second and Third Periodic Interviews was combined. If a move (as defined above) took place during the two years of the experiment or if the household reported that it searched for alternative housing in either the First, Second or Third Periodic Interviews, then the household was classified as a searcher; if it did not move or report

Table II-1

DATA SOURCES USED TO DERIVE KEY VARIABLES

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

(continued)

Table II-1 (continued)

VARIABLE	DATA SOURCES
Origin Neighborhood	Census Tract of Address, Initial Household Report Form, Housing Evaluation Form (at Enrollment)
Destination Neighborhood	Census Tract of Address, First, Second and Third Periodic Interviews, Housing Evaluation Forms

that it searched, then the household was considered not to have searched.

Household Characteristics

Per capita income. The income variable used in this report is an analytic definition of household income, which measures disposable income. The definition of income, referrred to as "Net Income for Analysis," is an estimate of the annual income received by all household members 18 years of age or older. It is the sum of earned income and other income, net of taxes and alimony paid. Table II-2 shows how this definition of income compares with the definition used in determining eligibility in the experiment and the definition used by the census. Per capita income is computed as Net Income for Analysis divided by the size of the household (the household size definition used simulates that of the census).

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

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

Pittsburgh: white, black

Phoenix: white, black, Spanish American.

Race determination is based on interviewer observations of Baseline Interview respondents. There were relatively few American Indians, Orientals, and other nonwhites in the sample, 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.

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

$$\text{Adjusted Contract Rent} = (\text{Furnishing Adjustment Factor}) \times (\text{Contract Rent} + \text{Utilities} + \text{Special Adjustments}) - (\text{Roomer Contribution Adjustment}).$$

If reported contract rent includes furnishings, the adjusted gross rent is

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.

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 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

Minimum Standards requirement. The Minimum Standards requirement for Housing Gap households has two separate components--a series of physical requirements for the dwelling unit and an occupancy standard. Physical requirements were developed from elements of the American Public Health Association/Public Health Service, Recommended Housing Maintenance and Occupancy Ordinance (revised 1971). The requirements, listed below were grouped into 15 components made up of related items.

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 must 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 must be present and in working condition.

3. Living Room, Bathroom, Kitchen Presence. A living room, bathroom, and kitchen must be present. (This represents the dwelling unit "core," which corresponds to an efficiency unit.)

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

4. Light Fixtures. A ceiling or wall-type fixture must be present and working in the bathroom and kitchen.

5. Electrical. At least one electric outlet must be present and operable in both the living room and kitchen. A working wall switch, pull-chain light switch, or additional electrical outlet must be present in the living room.[1]

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.

7. Adequate Exits. There must 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.[1]

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.

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 must 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.[1]

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

The occupancy requirement sets a maximum of two persons for every adequate bedroom regardless of age. An adequate bedroom is a room that can be completely closed off from other rooms and meets the program housing standards of 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. A studio or efficiency apartment is counted as a bedroom. Roomers and boarders are added to household size when determining whether a household meets occupancy standards, as all the rooms in the dwelling unit are taken into account.

Program Status

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. (1975), Appendix II.

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).

Location Descriptors

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

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

Low-Income Household Concentration

Every Census tract in Allegheny and Maricopa counties was characterized in terms of the percentage of households in the tract with annual incomes under $5,000, in 1970 dollars, in order to describe the economic concentration of Demand Experiment households. Four categories were then used to describe the neighborhoods that households lived in:

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[1]Documentation of census data may be found in U.S. Department of Commerce, Bureau of the Census (1970), Parts I and II.

Higher-income neighborhoods. Census tracts with low-income concentration less than 25 percent.

Low-poverty neighborhoods. Those with low-income concentration from 25 to 34.9 percent.

II.3 SAMPLES USED IN ANALYSIS

The basic analysis sample of households used in this report consists of households active at two years (the time of the Third Periodic Interview) that were not living in subsidized housing or their own homes and did not have enrollment incomes above the eligibility limits for their treatment group. This sample comprises about 1,240 households in Pittsburgh and 1,001 in Phoenix. Of these 457 in Pittsburgh and 590 in Phoenix moved at some time during their two years in the program; some of the analyses in this report use only those households that moved as their base sample.

REFERENCES

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

American Public Health Association/Public Health Service, Recommended Housing Maintenance and Occupancy Ordinance, Washington, D.C., revised 1971.

U.S. Department of Commerce, Bureau of the Census, 1970 Census Users Guide, Washington, D.C., U.S. Government Printing Office, 1970.

APPENDIX III

THE MEASUREMENT OF PERCEIVED NEIGHBORHOOD QUALITY

This appendix provides an operational definition of the five measures of perceived neighborhood quality examined in the main body of the report. The reliability, validity, and homogeneity of the measures are also assessed. Finally, the correlational relationships between the five measures of perceived neighborhood quality and a variety of demographic and household characteristics of respondents are presented.

III.1 OPERATIONAL DEFINITION OF MEASURES OF PERCEIVED NEIGHBORHOOD QUALITY

The perceptions of Demand Experiment participants regarding the quality of the neighborhoods in which they resided were elicited by 26 Likert-type items in the Baseline and Periodic Interviews. The phrasing of these items and the distribution of the responses to them at the time of the Baseline Interview is presented in Table III-1.

In order to facilitate analysis, information from the 26 items was reduced through creation of five summary measures that, while substantially fewer in number than the primary set of 26 items, at the same time captured the essential variation in the data.

An exploration of the multidimensional structure of the 26 perceived neighborhood quality items comprised the first phase of the data reduction process. The primary technique used for this purpose was principal components analysis of matrices of item intercorrelations complemented by orthogonal and oblique rotation of the principal components solutions to simple structure format.[1] In addition, nonmetric multidimensional scaling[2] of the matrices of item intercorrelations was used as a means of confirming structural configurations suggested by the exploratory components analyses.

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[1] Orthogonal rotations were performed using the varimax method (Kaiser, 1958). Oblique rotations were performed using the powered-vector method (Overall and Klett, 1972).

[2] Krushall (1964a, b).

Table III-1

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

NEIGHBORHOOD ITEMS	DISTRIBUTION OF RESPONSES (SAMPLE SIZE = 3425)				
NEIGHBORHOOD SATISFACTION					
In general, how satisfied or dissatisfied are you with this neighborhood as a place to live?	Very Dissatisfied (1)	Somewhat Dissatisfied (2)	Somewhat Satisfied (3)	Very Satisfied (4)	Missing
	9 4%	11 9%	31 1%	47 6%	4
FACILITIES AND SERVICES[a]					
	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 to 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
Day Care Facilities	34 4	12 5	16 5	36 5	492
PROBLEMS IN NEIGHBORHOOD[b]					
	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
NEIGHBORS[c]					
How many neighbors do you know well enough to talk with?	None (1)	Some (2)	Most (3)	All (4)	Missing
	12 0	47 7	19 7	20 7	0
In general, how friendly do you find most of the people in this neighborhood? (skipped if answered "none" to above)	Unfriendly (1)	Neither Friendly Nor Unfriendly (2)	Friendly (3)		Missing
	3 3	15 0	81 8		243
How important is it to live in same neighborhood as relatives?	Not Important (1)	Somewhat Important (2)	Very Important (3)		Missing
	66 1	15 4	18 5		2
How many relatives live in neighborhood?	None (1)	Some (2)	Many (3)		Missing
	60 1	33 3	6 6		3
How important is it to live with neighbors with same background as yourself?	Not Important (1)	Somewhat Important (2)	Very Important (3)		Missing Missing
	59 9	24 0	16 1		3
How many neighbors have same background as yourself?	None (1)	Some (2)	Many (3)		Missing
	21 7	59 6	15 6		121

SAMPLE All enrolled households, not living in own or subsidized housing, under the income eligibility income

DATA SOURCE Baseline Interview

a 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

b 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?

c 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--it is 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?

As a result of the diverse exploratory analyses conducted,[1] it was decided that five summary measures could be constructed that parsimoniously reflected the information contained in the full 26-item data set. The five summary measures derived are labeled as follows:

SATISFACTION--general satisfaction with the neighborhood;

PUBLIC SERVICES--perceived adequacy of public services such as police and fire department activities, garbage collection, and street lighting;

PRIVATE SERVICES--perceived convenience of access to private services, such as medical care, grocery stores, places of worship, and day care centers;

PROBLEMS--perceived seriousness of the degree of material, social, and cultural decay of the neighborhood as indicated by abandoned houses, crime, drug trafficking, poorly maintained streets and the like;

NEIGHBORS--strength of social bonds as indicated by the respondents' perceived frequency of interaction with neighbors, friendliness of neighbors, and proximity to relatives and people of similar background.

The SATISFACTION measures is based on responses to a single item regarding the overall satisfaction of the respondent with the neighborhood in which he resided at the time of the interview. Scores on this measure were assigned a value of

1 for the "very dissatisfied" response;

2 for the "somewhat dissatisfied" response;

3 for the "somewhat satisfied" response; and

4 for the "very satisfied" response.

The remaining four measures are composite summaries of responses to four or more items. For three of these four measures--PUBLIC SERVICES, PRIVATE SERVICES and PROBLEMS--scores were computed by summing the unit-weighted standardized responses to the constituent items (see Table III-2) where the raw values of the responses to items are as indicated in Table III-1 and the

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[1] A full description of the early exploratory analyses of the multidimensional structure of the perceived neighborhood quality items is presented in Appendix IV of Atkinson and Phipps (1977).

Table III-2

SUBSETS OF ITEMS INCLUDED IN PERCEIVED NEIGHBORHOOD QUALITY SUMMARY MEASURES

NEIGHBORHOOD SATISFACTION

General neighborhood satisfaction

PUBLIC SERVICES

Police protection
Garbage collection
Responsiveness of the fire department
Public transportation
Landscaping (trees, grass, and flowers)
Parking availability
Street lighting

PRIVATE SERVICES

Medical care facilities
Grocery shopping
Places of worship
Day care facilities

PROBLEMS

Crimes in the area
Presence of drugs and drug users
Vacant lots filled with trash
Litter in the streets
Abandoned houses
Streets in poor repair
Traffic congestion
Noise in the area

NEIGHBORS

How well respondent knows neighbors
Friendliness of neighbors
Importance of relatives in the neighborhood
How many relatives live in the neighborhood
Importance of neighbors with same background as respondent
How many neighbors have same background as respondent

sample mean and standard deviation of the raw item scores from the Baseline Interview were used for purposes of standardization. These summative scores were then placed in uniformly dense sextiles and assigned a value from 1 to 6.[1] For the final measure--NEIGHBORS--the initial step in the scoring algorithm involved creation of one composite item out of the third and fourth items in the battery and a second composite item out of the fifth and sixth items in the battery (see Table III-1). In both cases, one of the pair of elementary items deals with the perceived importance of proximity of either relatives or persons of similar background, while the second member of the pair is concerned with the perceived extent to which either relatives or persons of similar background reside in the respondent's neighborhood. Scores on the two composite items were derived by multiplying the unit-deviate, zero-mean transform of the raw score on the "magnitude" item in the pair by the untransformed raw score of the "importance" item. Responses to these two composite items and the remaining two elementary items in the battery were then assigned standardized values and summated. The Baseline mean and standard deviation of the raw scores on the two elementary and two composite items were used for purposes of standardization of responses at all interview occasions. As was the case with the other summative measures, the scores on the NEIGHBORS measured were placed into sextiles and assigned a value of 1 to 6.

In interpreting analyses involved these summary measures, it is important to remember that all scores are constructed so that low values indicated relatively unfavorable perceptions of neighborhood quality. A high score on PUBLIC SERVICES, for example, would indicate relatively favorable perceptions of community services such as police and fire protection. A high score on PROBLEMS, on the other hand, would indicate that neighborhood deterioration was not perceived as a big problem.

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[1]Most of the measures tended to have long tails on the low end of their frequency distribution in the original summative metric due to an apparently premature "ceiling" in the response categories provided to respondents for the individual items; hence, the sextile transformation.

III.2 INTERNAL CONSISTENCY OF PERCEIVED NEIGHBORHOOD QUALITY MEASURES

This section examines the internal consistency of the perceived neighborhood quality measures. When item responses are added together to form a composite score as has been done for four of the five PNQ measures, it is generally viewed as desirable that the component items look and behave as if they have something in common. The item-item correlations presented here are conventional empirical approaches to this issue.

Table III-3 presents a variety of indicators of the internal consistency of the perceived neighborhood quality measures. Included are:

Item-total correlations;

Corrected item-total correlations;

Item-item correlations;

The mean and standard deviation of item-item correlations ($\bar{r}$ and $\sigma(r)$); and

Homogeneity ratios (HR).

Item-total correlations are simply 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), which yields the correlation between a given item and the total score computed as usual with the exception that the item in question has been excluded from the total score. 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 internal consistency of the meausres is to be attained; hence Table III-3 contains the item-item correlations and the mean and standard deviation of these correlations for each of the four composite perceived neighborhood quality measures.

In addition, the table presents one other summary measure that is useful in describing the average level of inter-item correlation--the homogeneity ratio (Scott, 1960). The homogeneity ratio, HR, represents the degree to which the actual total-score variance exceeds the variance that would be

Table III-3

INTERNAL CONSISTENCY INDICATORS FOR
PERCEIVED NEIGHBORHOOD QUALITY MEASURES

MEASURE	ITEMS	ITEM-TOTAL CORRELATION	CORRECTED ITEM-TOTAL CORRELATION	ITEM INTER-CORRELATIONS						
				1	2	3	4	5	6	7
PUBLIC SERVICES	1 Parking for people in neighborhood	0 463	0 246	-						
	2 Street lighting	0 538	0 366	0 107	-					
	3 Garbage collection	0 584	0 476	0 148	0 202	-				
	4 Speed of Fire Department response	0 566	0 475	0 087	0 168	0 275	-			
	5 Police protection	0 594	0 457	0 177	0 174	0 240	0 309	-		
	6 Public transportation	0 360	0 087	-0 121	0 192	0 086	0.093	0 040	-	
	7 Trees, grass, and flowers	0 542	0 343	0 292	0 120	0 182	0 135	0 226	0 232	-
	HR = 0 417		$\bar{r}$ = 0 160			σ (r) = 0 097				
PRIVATE SERVICES	1 Convenience to grocery shopping	0 671	0 464	-						
	2 Convenience to places of worship	0 648	0 479	0 279	-					
	3 Medical care in neighborhood	0 692	0 428	0 302	0 264	-				
	4 Day care facilities	0 597	0 206	0 171	0 147	0 241	-			
	HR = 0 452		$\bar{r}$ = 0 298			σ (r) = 0 119				
PROBLEMS	1 Streets in poor repair	0 521	0 395	-						
	2 Amount of noise in area	0 595	0 475	0 198	-					
	3 Litter and trash in streets	0 679	0 586	0 316	0 343	-				
	4 Heavy traffic in streets	0 533	0 390	0 142	0 429	0 243	-			
	5 Presence of drugs and drug users	0 617	0 521	0 176	0 255	0 308	0 244	-		
	6 Crimes in the area	0 620	0 520	0 172	0 248	0 308	0 224	0 461	-	
	7 Abandoned houses	0 621	0 536	0 232	0 200	0 361	0 138	0 265	0 299	-
	8 Vacant lots with trash and junk	0 644	0 554	0 281	0 202	0 405	0 158	0 273	0 287	506
	HR = 0 684		$\bar{r}$ = 0 274			σ (r) = 0 094				
NEIGHBORS	1 How well know neighbors	0 631	0 653	-						
	2 How friendly are neighbors	0 576	0 280	0 182	-					
	3 Relatives in neighborhood	0 540	0 234	0 106	0 048	-				
	4 Neighbors of same background	0 620	0 338	0 209	0 134	0 126	-			
	HR = 0 397		$\bar{r}$ = 0 134			σ (r) = 0 057				

SAMPLE All enrolled households not living in own or subsidized housing, under the income eligibility limit (sample size = 3,425)
DATA SOURCE Baseline Interview
NOTES HR = homogeneity ratio (see text), $\bar{r}$ = average correlation coefficient σ (r) = standard deviation of correlation coefficient

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.

As can be seen from Table III-3, all corrected item-total correlations are substantially greater than zero, with the exception of the "public transportation" item in the PUBLIC SERVICES measures, for which a value of 0.087 is observed. The lowest value of the corrected item-total correlation for all other items is 0.206, for the "day care facilities" item in the PRIVATE SERVICES measure. All intra-measure item-item correlations are positive, with the single exception once again involving the "public transportation" item in the PUBLIC SERVICES measure. Although the "public transportation" item and the "day care facilities" item are somewhat problematic for the internal consistency of the PUBLIC SERVICES and PRIVATE SERVICES measures, respectively, it was not felt that the problems posed were serious enough to warrant their exclusion from the composite measures.

In general, PROBLEMS appears to be the most internally consistent of the measures, while NEIGHBORS is the least internally consistent. On the basis of the evidence presented in Table III-3, it is felt that the four composite measures of perceived neighborhood quality display an adequate degreee of internal consistency. Further evidence along these lines is presented in Table III-4 and Figure III-1.

Table III-4 presents an overview of the correlation of the items with the composite measures. For the sake of clarity, all correlation coefficients

Table III-4

CORRELATION OF PERCEIVED NEIGHBORHOOD QUALITY ITEMS
WITH COMPOSITE MEASURES AT BASELINE (SAMPLE = 3,425)

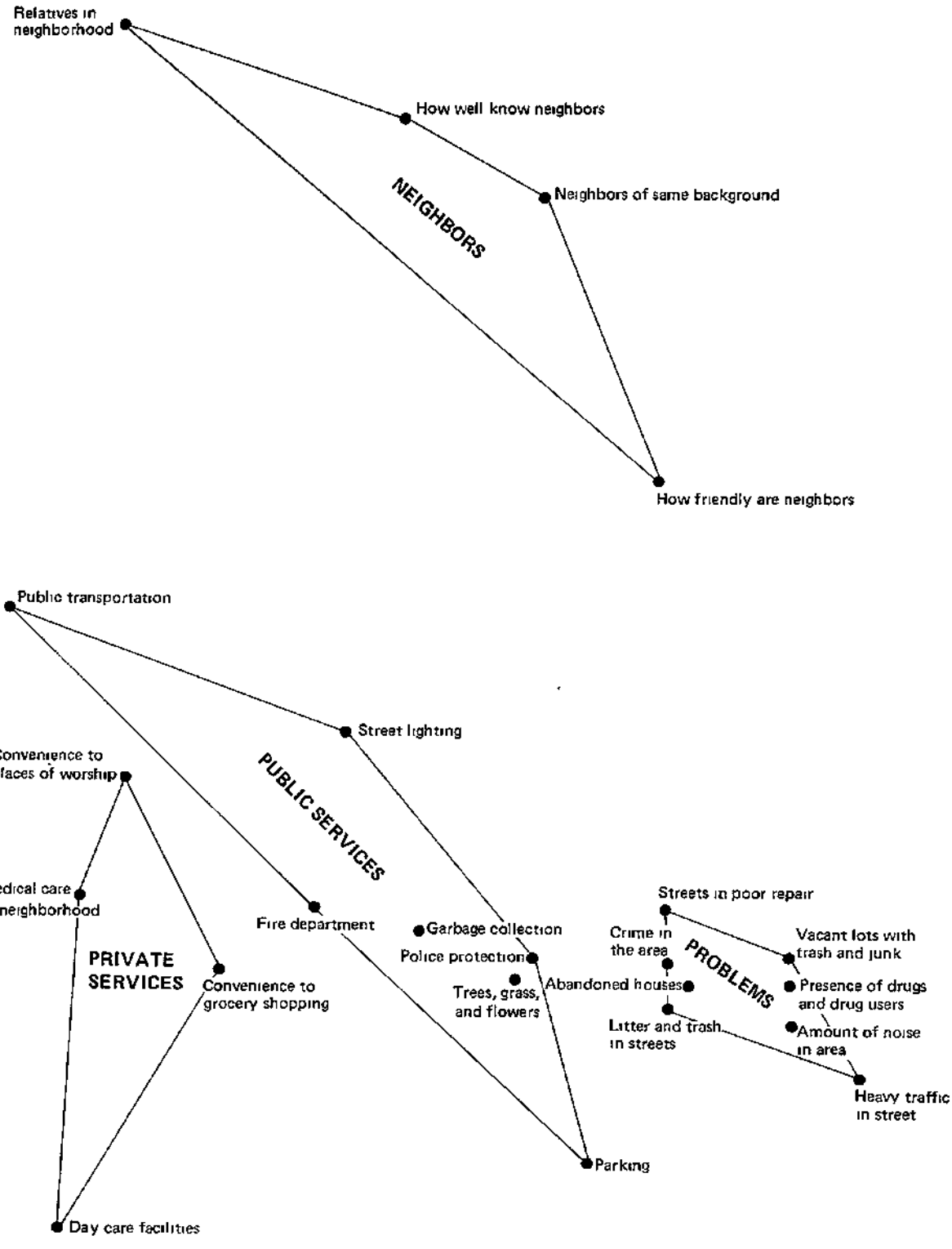
ITEM	PUBLIC SERVICES	PRIVATE SERVICES	PROBLEMS	NEIGHBORS
Parking for people in neighborhood	.46	.16	.27	.02
Street lighting	.53	.17	.16	.11
Garbage collection	.58	.20	.24	.06
Speed of Fire Department response	.56	.19	.16	.03
Police protection	.59	.20	33	.05
Public transportation	.36	.15	-.02	.07
Trees, grass, and flowers	.54	18	.31	.04
Convenience to grocery shopping	.31	.67	.15	.04
Convenience to places of worship	.25	.64	.08	.12
Medical care in neighborhood	.21	.69	.09	.08
Day care facilities	.13	.59	.06	.02
Streets in poor repair	.28	.11	.52	.03
Amount of noise in area	.18	.08	.59	.03
Litter and trash in streets	.30	.12	.67	03
Heavy traffic in streets	15	.05	.53	.02
Presence of drugs and drug users	.23	.05	.61	.00
Crimes in the area	.23	.07	.62	.07
Abandoned houses	.25	.10	.62	.00
Vacant lots with trash and junk	.29	.10	64	.02
How well know neighbors	.05	.07	.00	.63
How friendly are neighbors	.15	09	.14	.57
Relatives in neighborhood	- 03 -	02	-.06	54
Neighbors of same background	.09	.05	.03	.62

SAMPLE. All enrolled households not living in own or subsidized housing, under the income eligibility limit.

DATA SOURCE: Baseline Interview.

Figure III-1

TWO DIMENSIONAL CONFIGURATION OF PERCEIVED NEIGHBORHOOD QUALITY ITEMS RESULTING FROM NONMETRIC MULTIDIMENSIONAL SCALING OF ITEM INTERCORRELATIONS WITH CLOSED CONVEX HULLS INSERTED



greater than 0.35 have been enclosed in boxes. The findings affirm the basic internal coherence of the chosen partitioning of the PNQ item set in that items not included in the computation of a given measure never correlate greater than 0.45 with that measure, while all items that are included in a given measure do correlate greater than 0.45 with that measure (with the exception of the "public transportation" item in the PUBLIC SERVICES measure). Furthermore, using the trace criterion,[1] 54 percent of the variance in the primary data set is reflected in the five summary measures. Four principal components could have captured the same proportion of variance, but only at the expense of the substantive clarity and generality of the measures chosen.

Figure III-1 presents a two-dimensional configuration of the primary item set derived from a nonmetric multidimensional scaling of the intercorrelations (Kruskal, 1964, a, b). The items are configured in such a way that the relative Euclidean distances between pairs of items in the figure inversely approximate as closely as possible in two dimensions the cognate correlations between pairs of items.[2] Convex hulls indicating the chosen partitioning of the PNQ items have also been imbedded in Figure III-1. Figure III-1 lends additional credence to the partitioning of the PNQ item set underlying the five PNQ measures in that all items constituting a given measure are contained within a convex hull that does not intersect hulls constructed around items comprising any other of the five measures.

Finally, in closing this section, it is observed that when analyses identical to those underlying Tables III-3 and III-4 and Figure III-1 were applied to Second and Third Periodic Interview data, the pattern of findings was virtually identical to those described for the Baseline data above. This stability in the internal structural properties of the composite measures also held true when the analyses were conducted on a site-specific basis.

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[1] This criterion is equivalent to the average multiple R^2 resulting from multiple linear regression of each of the items onto all four of the summary measures (Overall and Klett, 1972).

[2] For a discussion of the use of nonmetric multidimensional scaling in applications such as this, see Napior (1971).

III.3 VALIDITY OF PERCEIVED NEIGHBORHOOD QUALITY MEASURES

The analyses presented in this section offer empirical evidence regarding the validity of the five measures of perceived neighborhood quality. In a very general sense, a measure is considered to be valid if variation in the observed scores it generates corresponds in a reasonably direct way to true variation on the (unobservable) construct to which it refers.

In cases such as the present, where the construct tapped by a measure is subjective or intangible in nature, validation frequently proceeds through empirical investigation of correlations between observed scores on the measure in question and scores on other variables that are expected to display some relation to it on the basis of past empirical research, common sense, or theoretical grounds. Replication of predicted relationships contribute to the general confidence that the derived variables measure what they claim. All of the analyses offered here are based on this correlation approach to the validation problem.

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 hypothesis 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 III-5 compares the two-year search behavior of households above and below the mean for each of the five perceived neighborhood quality measures at Baseline. As can be seen, the expected relationship occurred for four out of the five measures in both Pittsburgh and Phoenix. The exception to the rule is the PRIVATE SERVICES measure.

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

Table III-5

COMPARISON OF PERCENTAGE OF HOUSEHOLDS ABOVE AND BELOW MEAN ON PERCEIVED NEIGHBORHOOD QUALITY SCORES THAT SEARCHED
(Sample Size in Parenthesis)

MEASURE	PITTSBURGH			PHOENIX		
	BELOW MEAN	ABOVE MEAN	SIGNI-FICANCE	BELOW MEAN	ABOVE MEAN	SIGNI-FICANCE
Neighborhood Satisfaction	67.3 (422)	48.0 (262)	**	76.3 (354)	59.0 (261)	**
Public Services	65.1 (382)	51.6 (304)	**	74.3 (321)	61.9 (294)	**
Private Services	58.2 (365)	58.5 (321)	NS	68.7 (298)	67.0 (317)	NS
Problems	64.8 (414)	50.7 (272)	**	72.7 (303)	63.7 (312)	**
Neighbors	67.3 (321)	52.2 (365)	**	74.5 (382)	59.1 (233)	**

SAMPLE: Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

DATA SOURCES: Baseline and Periodic Interviews.

** Significant at the 0.01 level.

neighborhood quality after a move.

Table III-6 compares changes in mean PNQ scores over a period between the Baseline and the Third Periodic Interviews for households that moved and households that did not move. As can be seen, all five measures showed significant upward change in mean scores for movers in Phoenix and four of the five measures did likewise in Pittsburgh.

It should be noted that some of the Third Periodic means for nonmovers also show significant differences when compared with Baseline 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 or sampling fluctuations.

Relationships to Census Tract Characteristics

Although many of the aspects of neighborhood to which the summary PNQ measures refer are not directly comparable to data from the 1970 Census of Population and Housing, 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.

Table III-7 provides evidence that tends to confirm these expectations. For each of the five measures (columns) the simple correlations (r), standardized multiple regression coefficients (β), and significance levels of 12 Census tract characteristics (rows) are presented. The 12 Census tract characteristics are:

Percentage of tract population black;

Percentage of tract population Spanish American (Phoenix only);

Table III-6

MEAN TWO-YEAR CHANGES IN PERCEIVED NEIGHBORHOOD QUALITY SCORES AMONG MOVERS AND STAYERS
(t Values in Parenthesis)

	PITTSBURGH						PHOENIX					
	MOVERS			NONMOVERS			MOVERS			NONMOVERS		
	BASELINE	TWO-YEARS	CHANGE	BASELINE	TWO-YEARS	CHANGE	BASELINE	TWO-YEARS	CHANGE	BASELINE	TWO-YEARS	CHANGE
Neighborhood satisfaction	2.97	3.35	0 38 (6 30)**	3 21	3.40	0.19 (5.77)**	3.10	3.36	0 26 (5 44)**	3.31	3.39	0.08 (1 77)
Public Services	3.37	3.72	0 38 (3 63)**	3.68	3.74	0 05 (0.85)	3.42	3.96	0.54 (6.28)**	3 73	3 89	0.16 (1 86)
Private Services	3.42	3 49	0.06 (0.68)	3.43	3.62	0.19 (3 07)**	3.65	3 79	0 24 (2.73)**	3.64	3 75	0.11 (1 13)
Problems	3.10	3.74	0.64 (6.25)*	3.43	3 61	0.18 (2 98)**	3 57	4.12	0.56 (7 61)**	3.80	3.98	0 18 (2.29)*
Neighbors	3.51	3.78	0.27 (2.79)**	4 02	4.25	0.22 (3.58)**	3.02	3 41	0.39 (4.63)**	3 60	3.92	0 32 (3.47)**

SAMPLE Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing.

DATA SOURCES: Baseline Interviews, Initial Household Report Forms, and 1970 Census of Population and Housing (Fourth Count Tapes)

** Significant at the 0.01 level.

* Significant at the 0.05 level

Table III-7

REGRESSION OF BASELINE PERCEIVED NEIGHBORHOOD QUALITY SCORES ON CENSUS TRACT CHARACTERISTICS

	PITTSBURGH										PHOENIX									
	SATISFACTION		PUBLIC SERVICES		PRIVATE SERVICES		PROBLEMS		NEIGHBORS		SATISFACTION		PUBLIC SERVICES		PRIVATE SERVICES		PROBLEMS		NEIGHBORS	
	r	β	r	β	r	β	r	β	r	β	r	β	r	β	r	β	r	β	r	β
Percentage black	-.11*	-.02	-.24**	-.15**	-.07*	-.10**	-.19**	-.08**	-.02	-.02	-.09**	-.03	-.14**	-.11**	-.23**	-.11**	-.15**	-.10**	.06†	.09**
Percentage Spanish	-	-	-	-	-	-	-	-	-	-	-.05†	.13*	-.12**	-.03	-.17**	.06	-.12**	.02	.02	.04
Socioeconomic status	.21**	.24**	.21**	.14**	.004	.02	.25**	.22**	-.02	0 1	.14**	.06	.17**	-.02	.26**	.10*	.15**	.12**	-.02	.03
Percentage dwelling units standard	.10**	-.01	.13**	-.003	-.11**	-.04	.15**	-.02	.003	.004	.09**	.18**	.16**	.14*	.21**	.16**	.14**	.05	-.04†	.04
Percentage dwelling units in multifamily buildings	-.001	-.09**	.005	-.01	.11**	.01	.01	-.04	-.01	-.01	.07*	.11**	.10**	.09*	.10**	.05	.04†	.02	-.02	-.07
Location in suburbs	.06*	.07**	.13**	.04	-.02	-.03	.15**	.07*	.01	-.001	.03†	-.01	-.10**	-.01	.12**	-.04	.01	-.09*	.08*	-.04
Percentage dwelling units single family	.04†	-.08	.11**	-.02	-.15**	-.13**	.11**	-.04	-.02	-.11**	-.02	-.07	-.06†	-.03	-.09**	-.16**	-.03	-.01	-.01	-.19**
Percentage households in same house since 1965	-.02	.003	.07*	.08**	-.08**	.01	.02	.03	.04†	.05	.07**	.21**	-.01	.16**	-.01	.24**	-.04†	.05	.06†	.15**
Mean age of dwelling unit	-.06*	.001	-.09**	-.02	.10**	.07**	-.12**	-.04	.04†	.02	-.08**	-.005	-.04	-.01	-.18**	.04	-.04†	.14**	.002	.10**
Distance from Central Business District	.005	-.05	.06*	-.005	.005	.12**	.09**	.005	.02	.05*	.05†	.06	-.09**	-.16**	.19**	.20**	.06†	.13**	.10**	.21**
Reported property crimes per 1,000 population	-.05†	-.07	-.07*	.06	.11**	.08†	-.09**	-.02	-.06*	-.08*	-.03†	-.01	-.06†	-.02	-.09**	.02	-.11**	-.13**	.01	-.003
Reported violent crimes per 1,000 population	-.07**	.06	-.17**	-.04	.06*	-.03	-.16**	.0009	-.04†	.02	-.06*	.003	-.10**	-.06	-.15**	-.03	-.11**	.05	.02	-.01
R^2	.052**		.078		.048		.080		.011		.047**		.070		.122		.046		.033	
F-test	5.093		7.77**		4.62**		8.007**		0.985		3.512		5.410**		10.014**		3.433**		2.442**	
Sample Size	(1,025)		(1,028)		(1,028)		(1,028)		(1,028)		(873)		(874)		(874)		(874)		(874)	

SAMPLE Experimental and Control households active at two years after enrollment, excluding those with enrollment incomes over the eligibility limits, and those living in their own homes and in subsidized housing

DATA SOURCES Baseline and Periodic Interviews, Initial and Monthly Household Report Forms, and 1970 Census of Population and Housing (Fourth Count Tapes)

NOTES r = simple correlation, β = standardized regression coefficient

** Significant at the 0.01 level

* Significant at the 0.05 level

† Significant at the 0.10 level

Socioeconomic status of tracts[1];

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

Percentage of dwelling units in multifamily buildings;

Location of tract in central city or suburb;

Percentage of single-family dwelling units;

Percentage of households living in same house since 1965;

Median age of dwelling units;

Distance from Central Business District;

Reported property crimes per 1,000 population;

Reported violent crimes per 1,000 population.

At the bottom of each column, the appropriate R^2 statistic, F-ratio, and significance level are given for each of the 11 regressions. The basic approach is to estimate the contribution of the 12 Census tract characteristics as a group to variation in each of the 5 neighborhood quality measures.

The simple correlation coefficients (r) in Table III-7 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 proportion of minority populations in the Census tract.

Perceived neighborhood quality tends to improve with increasing socioeconomic status of tracts, and percentage of dwelling units standard.

Perceived neighborhood quality tends to be higher in single-family locations and in area where turnover is not so great, as indicated by the percentage of households living in the same house since 1965. This is particularly true with regard to NEIGHBORS and overall SATISFACTION in Phoenix.

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[1]Due to problems of collinearity, tract income, education, and occupational levels were entered into the equations in the form of a single measure of socioeconomic status. This was computed as the joint ratio of the tract means of each variable to the means of these variables for the SMSA as a whole. See Post (1976), p. 11.

Perceived neighborhood quality tends to be lower in older parts of the ubran area (as indicated by dwelling unit age).

Perceived neighborhood quality tends to be higher in the suburbs than in the capital city (the exception is PUBLIC SERVICES in Phoenix) and increase with distance from the Central Business District.

When Census tract characteristics are taken into account as a group, the proportion of variance in the PNQ scores explained by these characteristics is highest in the case of PROBLEMS and PRIVATE SERVICES (Phoenix only). Generally, the standardized multiple regression coefficients indicate that the proportion of minorities in the tract, the socioeconomic status of the tract (income, education, and occupation), and the location of the tract in the central city or suburbs (Pittsburgh only) 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 status suburban neighborhoods.

Although 9 of the 10 regressions as a whole are significant at the 0.01 level, the low R^2s (0.11 to 0.122) indicate a rather weak relationship overall between neighborhood quality scores and these Census tract charcteristics. This is not particularly disappointing since, as indicated previously, the measures refer to aspects of neighborhood quite different from those of the Census.

III.4 RELIABILITY OF MEASURES OF PERCEIVED NEIGHBORHOOD QUALITY

Perceptions of neighborhood quality by a given respondent are likely to be artifactually labile (i.e., unreliable) in the sense that they are susceptible to the influence of extraneous factors, such as mood swings and familial harmony, that are temporarily operative at the time of the interview but in the long run would have no net impact. The intent of this section is to estimate the extent to which the interrespondent variance of observed scores generated by the PNQ measures consists in part of variance attributable to artifactual intrarespondent lability.

To begin, let is be assumed that

$$P_O = P_T + \varepsilon \quad (1)$$

where

P_O represents an observed score on a given PNQ measure

P_T represents the "true" score on the measure; that is, the score expected, on the average, from the respondent from a very large number of administrations of the same PNQ instrument over a suitably local time span in which a representative range of fluctuations in the respondent's status on relevant exogenous variates, such as general mood and familial harmony, would have taken place, and

ε represents the error component in the observed score or the deviation of the observed score from the value expected on the average in a representative range of exogenous situations.

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

$$\rho = \sigma_T^2 / \sigma_O^2$$

where

ρ = the coefficient of reliability

σ_T^2 = the true score variance

σ_O^2 = the variance of observed scores

In order to estimate the reliability, ρ, of the PNQ measures examined in this report, a model suggested first by Coleman (1968) and pursued by Heise (1969) has been applied. Five basic assumptions underlie the model: the variable is measured in 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. The Coleman-Heise estimator of the reliability coefficient, ρ, can be viewed as a refinement of the classical "test-retest" approach to the problem (Guttman, 1955) in that it relaxes the assumption implicit in the simple "test-retest" model that true scores on the measure in question have not changed between observational occasions. Since the repeated observations of PNQ in the Demand Experiment occurred over a two-year span, application of an estimator of the reliability coefficient ρ, that does not assume constancy of true scores across observational occasions is considered to be desirable.

The Coleman-Heise model for estimation of ρ is able to forego the assumption regarding constancy of true scores by requiring thrice-repeated observation of scores on the measure in question rather than the twice-repeated observations required in the simple test-retest model. This requirement is reflected in the form of the estimator of ρ offered by the model, which is

$$\hat{\rho} = \frac{r_{12}r_{23}}{r_{13}}$$

where r_{12}, r_{23}, and r_{13} represent the sample correlation of observed scores on the measure in question obtained from the first and second, second and third, and first and third observational occasions, respectively.

Table III-8 presents estimates of the reliability of the five PNQ measures according to the Coleman-Heise model. All estimates are based on the subsample of respondents who did not change residence in the two-year interval after the Baseline interview. Households that moved in the two-year interval were excluded from the analysis since their PNQ scores are not plausibly interpretable as repeated observations in the sense required by the Coleman-Heise model.

As can be seen from Table III-8, the estimated reliability coefficients range from a low of .608 for PRIVATE SERVICES to a high of .666 for NEIGHBORHOOD SATISFACTION. These findings can be interpreted as an indication that approximately 35 to 40 percent of the variance of observed PNQ scores is attributable to artifactual intrarespondent lability.

III.5 SUMMARY

Participant evaluations of neighborhood features were obtained from answers to 26 closed-end items. In order to facilitate use of these data, a set of five summary measures were constructed that adequately captured the essential variation in the primary data set in a parsimonious fashion.

On the basis of analyses presented in this Appendix, it is felt that the five measures represent a coherent and intuitively reasonable synthesis of the original 26 items. The measures exhibit acceptable levels of internal consistency and test-retest reliability. In addition, the multidimensional structure of the items is highly consistent between sites and stable over

Table III-8

RELIABILITY COEFFICIENTS FOR PERCEIVED NEIGHBORHOOD QUALITY SUMMARY MEASURES: NONMOVERS (SAMPLE SIZE = 1194)

MEASURE	PEARSON'S r			
	t_0-t_1	t_1-t_2	t_0-t_2	r_{tt}
Neighborhood Satisfaction	0.519	0.624	0.486	0.666
Public Services	0.525	0.586	0.489	0.629
Private Services	0.515	0.504	0.427	0.608
Problems	0.541	0.639	0.539	0.641
Neighbors	0.502	0.537	0.423	0.637

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

DATA SOURCES: Baseline and Periodic Interviews.

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

over time. Finally, the five measures appear to be valid in the sense that they are significantly correlated in the expected direction with search and move behavior and various Census tract characteristics.

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APPENDIX IV

THE ESTIMATOR OF TREATMENT EFFECTS

This appendix describes the estimator used to compute the effect estimates presented in Chapter 3 of this report. The basic assumption underlying the estimator is that the score, P_E, indicating a respondent's perception of the quality of a particular aspect of the neighborhood in which he lives at two years after enrollment in an experimental housing allowance plan, A, can be decomposed into two additive components:

> The score, P_N, that would have been observed under normal circumstances (i.e., in the absence of the allowance program), and
>
> A score, α_A, representing the incremental effect of an allowance program of type A.

Thus,

$$P_E = P_N + \alpha_A. \tag{1}$$

The actual score, P_E, is observed for experimental households. Normal values, P_N, must be estimated for these households, so that the estimated experimental effect is

$$\hat{\alpha}_A = P_E - \hat{P}_N . \tag{2}$$

The normal values for experimental households are estimated in this report by specifying that

$$P_N = X\beta + \delta \tag{3}$$

where

X = a matrix of household characteristics

β = a set of unknown coefficients

δ = a stochastic term.

The coefficients, β, are estimated using Control households, so that

$$\hat{\beta}_C = (X_C'X_C)^{-1} X_C'P_C \tag{4}$$

where subscripts indicate values for Controls, and

$$\bar{\alpha}_A = \bar{P}_A - \bar{X}_A'\hat{\beta}_C . \tag{5}$$

If the additive model of Equation (1) is correct, this procedure is inefficient, since it throws away information on β offered by experimental observations. Instead, $\bar{\alpha}_A$ may be regarded as estimating the mean effect under the fully crossed model[1]

$$(6) \quad \begin{cases} \begin{pmatrix} P_C \\ P_A \end{pmatrix} = \begin{pmatrix} X_C & 0 \\ 0 & X_A \end{pmatrix} \begin{pmatrix} \beta_C \\ \beta_A \end{pmatrix} + \varepsilon \\ \hat{\alpha}_A = \bar{X}_A' (\hat{\beta}_A - \hat{\beta}_C) \\ \quad = \bar{P}_A - \bar{X}_A' (X_C'X_C)^{-1} X_C'P_C \ . \end{cases}$$

The rest of this section first describes the actual equations used to estimate $\hat{\beta}_C$ and then discusses the statistical tests used to assess the significance of estimates of $\hat{\alpha}_A$.

IV.1 ESTIMATES OF $\hat{\beta}_C$

The covariates (X) used to estimate β_C consisted of

Monthly rent of the household

Per capita household income

A dummy variable for race/ethnicity of head of household

A dummy variable for elderly vs. head of the household

A dummy variable for single parent, nonelderly heads of the household

The length of tenure of residence at time of the Baseline interview

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[1] When effects were estimated for subpopulations, estimates of normal values based on Control households were adjusted to allow for a dummy variable for the subpopulation in the Control estimates. Specifically, the estimate of normal values, $\bar{X}_A'\hat{\beta}_C$ was replaced by

$$\hat{P}_N = \bar{X}_A'\hat{\beta}_C + \hat{\gamma}_P$$

where

$$\hat{\gamma} = \bar{P}_{CP} - \bar{X}_{CP}'\hat{\beta}_C$$

(i.e., the difference between the actual mean value for the Control subpopulation and the predicted mean value based on regression coefficients for the total Control sample).

The value of P at enrollment.

The first six covariates were selected from a more extensive list of plausible exogenous variables. The final covariate--the households' pre-enrollment rating of its neighborhood--reflects the hypothesis that household ratings and neighborhoods are determined by a variety of factors in addition to the first six covariates, whose effects tend to persist over time. Specifically, if

$$(7) \qquad \begin{cases} P_N^t = X_t\beta + \delta_t \\ \delta_t = \rho\delta_{t-1} + \theta_t \end{cases}$$

then

$$P_N^t = X_t\beta + \rho\delta_{t-1} + \theta_t$$

$$= X_t\beta + \rho(P_N^{t-1} - X_{t-1}\beta) + \theta_t$$

$$(8) \qquad = (X_t - \rho X_{t-1})\beta + \rho P_N^{t-1} + \theta_t .$$

In particular, under the specification used in this report, in which values of X are fixed over time (only pre-enrollment values are entered in the regression), Equation (8) reduces to

$$(9) \qquad P_N^t = X(1-\rho)\beta + \rho P_N^{t-1} + \theta_t,$$

which was the form used.[1]

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[1]The actual procedure used was a Seemingly Unrelated Regression routine under the specification

$$P_N^t = X_t\beta + \varepsilon_t \qquad t=1,2$$

$$\varepsilon_t = \rho\varepsilon_{t-1} + \theta_t .$$

Under the procedure, β is estimated first and then ρ is estimated using the estimated residuals ($\hat{\varepsilon}_t$).

IV.2 STATISTICAL TESTS OF $\hat{\alpha}_A$

Given the estimate of P_N provided by the Control estimates--viz.,

$$\hat{P}_A^N = X_A \hat{\beta}_C \tag{9}$$

the mean effect of the allowance was estimated by

$$\bar{\alpha}_A = \bar{P}_A - \bar{P}_A^N \,. \tag{10}$$

The actual statistic used to test significance in this report was

$$t = \frac{\hat{\bar{\alpha}}_A}{\hat{\sigma}\sqrt{\frac{1}{N_A} + \frac{1}{N_C}}} \tag{11}$$

where

$\hat{\bar{\alpha}}_A$ = estimated effect

$\hat{\sigma}$ = sample standard error for the sample of allowance recipients

N_A = the sample size for allowance recipients

N_C = the sample size for Controls used in estimating $\hat{\beta}_C$.

This statistic is only approximately correct. To see this, consider the underlying fully crossed model specified by Equation (6). The estimator

$$\hat{\bar{\alpha}}_A = \bar{X}_A' \, (\hat{\beta}_A - \hat{\beta}_C) \tag{12}$$

is distributed (under the usual assumptions for θ),

$$\text{Mean } (\hat{\bar{\alpha}}_A) = \bar{X}_A' \, (\beta_A - \beta_C) \tag{13}$$

$$\begin{aligned} \text{Var } (\hat{\bar{\alpha}}_A) &= \left[\bar{X}_A' \, (X_A'X_A)^{-1}\bar{X}_A + \bar{X}_A' \, (X_C'X_C)^{-1}X_A\right] \sigma_\theta^2 \\ &= \left[\frac{1}{N_A} + \bar{X}_A' \, (X_C'X_C)^{-1}\bar{X}_A\right] \sigma_\theta^2 \\ &\geq \left[\frac{1}{N_A} + \frac{1}{N_C}\right] \sigma_\theta^2 \,. \end{aligned}$$

Thus the use of $[\frac{1}{N_A} + \frac{1}{N_C}]^{\frac{1}{2}}$ in Equation (11) tends to overstate the value of

the t-statistic (unless $X_C'X_C = X_A'X_A$). On the other hand, the standard error for allowance households, will be inflated, relative to the model of Equation (6) by the failure to account for variations in $(\beta_A - \beta_C)$. Which of these two offsetting effects will predominate is unclear.