A BEHAVIOURAL ANALYSIS OF THE CONCEPTS

USED IN HOUSING CHOICE

by

Elizabeth J. Harman, M.A.

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AUTHOR: Elizabeth J. Harman, B.A. (Auckland University, N.Z.)
M.A. (Auckland University, N.Z.)

SUPERVISOR: Professor J.F. Betak

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SCOPE AND CONTENTS:

Research on housing choice at the level of individual decision makers is handicapped by insufficient knowledge of the subjective concepts people use to think about housing. The thesis has one major objective; to clarify the nature of housing concepts, and two secondary objectives; to assess their relative importance and to examine group differences in their use. An inductive, exploratory and multi-operational approach is considered most appropriate and hence, conclusions are expressed as hypotheses. Concepts are defined at two levels of generality on the basis of personal construct elicitation procedures, a 200 item master code, and clustering techniques. Tradeoff analysis is used to consider concept importance, particularly those relating to accessibilities. Multidimensional Scaling is used for the analysis of first, the variables which define groups with different choice behaviours, and secondly, the manner in which groups display differences in choice behaviour.

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CHAPTER 1

INTRODUCTION

1.1 An Introduction to the Nature of Housing Concepts

The primary aim of this thesis is to use Kelly's personal construct theory (Kelly, 1955) and multidimensional scaling techniques (MDS) to elicit the nature of the subjective concepts[1] people use to evaluate, and hence choose between alternative urban dwellings. As such, the study is a contribution to the effort currently being given in geography and the social sciences to understanding housing choice behaviour, as a means ultimately, of describing and explaining urban population and residential patterns and processes.

Dating from the publication of Rossi's pioneering study in 1955, research on housing choice at the level of the individual decision-maker has been dominated by a single approach; empirical research based on the use of structured questionnaires which are designed to test the relative importance in choice of pre-selected attributes of the residential environments and characteristics of movers.

As will be seen in Chapter II, it is becoming increasingly evident that continued reliance on this one approach, no matter how comprehensive the surveys, will not lead to major new insights into choice behaviour, simply because there is still insufficient understanding of the nature or definition of the concepts people use to think about housing. This lack of understanding is demonstrated in the literature by the ambiguities of terms such as neighbourhood, and the confusion over what is a physical attribute of housing and what is a subjective or cognitive reference. The former describes the objective nature of housing and the latter, the terms in which housing is thought about. The continued use of structured questionnaires which assume a knowledge of the subjective concepts used by the respondents on the basis of the researchers own a priori definition, or on the basis of physical referents, simply perpetuates the confusion.

A brief flurry of excitement was caused in the 1960's and early 1970's by the development of a conceptual approach offered by Wolpert (1965, 1966), Brown and Moore (1970) and Demko and Briggs (1970). This, however, is not an alternative to empirical research and has since faltered as researchers face ignorance of the nature of most housing concepts and are unable to operationalize and further develop their models.

In recent years there has been growing recognition of the need for a retreat to inductive exploratory research as a means of identifying the nature of housing concepts more reliably; a movement most obviously initiated by the publication of Peterson's (1967) study of preferences in residential environments. Nonetheless, studies of the exploratory type which have been published to date, as yet offer only a piecemeal view of the whole picture, since they tend to concentrate on a particular aspect of the environment, employ an unusual sample, or a weak design. The study by Sanoff (1973) is a case in point, being based on a sample of school-children and the use of display photographs which prohibit examination of anything but the dwelling structure.

The need for a more comprehensive inductive and exploratory study into the nature of housing concepts used in individual choice behaviour inspired this thesis.[2] In it, various psychological procedures are utilized in a survey design to obtain and analyze data on the definition of the subjective attributes or concepts which people use in comparing and evaluating alternative residences. The questionnaires provide a simultaneous opportunity to gain insight into the relative importance of these concepts and group differences in their use. Since the intent of the research is exploratory and inductive, the major results are in the form of well-grounded hypotheses on the nature, importance and use of housing concepts.

The major objective of the thesis is to clarify the nature of concepts used to think about housing. As already mentioned, subjective concepts are only one of two ways to describe residential attributes; the other way being in physical or objective terms. The emphasis given to subjective concepts in the thesis reflects the choice of a behaviouralistic or cognitive approach to behaviour over a behaviouristic framework.[3]

Under the deterministic framework of a behaviouristic model, choice is a direct function of the physical environment, and hence housing is described in terms of physical referents which can be objectively defined. This is the approach taken in the normative models relating to housing choice which are reviewed briefly in Chapter II. Conversely, in the cognitive model used in the thesis, choice is a probablistic function of the physical environment since mental states such as beliefs and attitudes, and processes like cognition and evaluation are presumed to mediate between the environment and behaviour. Choice is then a function first, of housing attributes which are subjectively defined by the decision-maker according to his/her personal knowledge and interpretation of housing. It is believed that the identity and role of objective referents in choice will be comprehensible only after the major types of subjective concepts have been identified.

Given the ease with which data based on subjective information, can degenerate into ambiguous results, it is essential, if the objective of concept clarification is to be achieved, to define explicitly what is understood by the nature of housing concepts. In this thesis each concept is defined by, and measured in terms of:

1) the verbal labels used to describe the concept and the meanings commonly understood by these words (with care to recognize the problems of value transference this may involve);
2) together with any additional connotations denoted by a demonstrated relationship between the concept and other concepts.

This is important since the extent to which a given label, such as "lot size" implies something about other housing attributes has implications for determining the exact meaning of concepts, for aggregating them in lists of greater or lesser specificity, and for describing alternative housing choice sets. At least four factors suggest such cognitive associations exist. These are the large and complex set of housing attributes which can be identified intuitively, the recognized correlation of many variables in the housing market, the inability of people to comprehend more than a limited number of variables at one time (Miller, 1956), and the recognition of cognitive association in the psychological literature.

A rider is added to this definition of concepts in the thesis to make analysis easier. It is assumed throughout the thesis that, although concepts are strictly psychologcial variables unique to individuals, it is possible to identify types of concepts commonly used by many people. The generalizations allowed by this assumption are potentially useful in identifying concepts used by groups of people, and for defining housing choice sets. Obviously, however, the adoption of such an assumption sidesteps the crucial problems of aggregation which have never been adequately resolved in behavioural geography.[4]

1.2 Aims and Emphases of the Thesis

The study is focussed on three of the fundamental elements of housing choice behaviour, all of which must be clarified before the process can be understood, the conceptual models of behavioural geographers operationalized, or a strong behavioural theory developed. The three areas researched are:

1) the nature of concepts used in the cognition and evaluation of housing;
2) their relative importance; and
3) group and individual differences in cognition and evaluation.

The major emphasis in the thesis is given to the first problem; the definition of the nature of housing concepts. These are the criteria by which a choice of dwelling is made and, as such, a valid and reliable definition of the concepts is essential for the operationalization of the conceptual models of choice which are reviewed in Chapter II. Moreover, such a definition of concepts would provide a strong basis for future empirical work aimed at refining the definitions, assessing the relative importance of individual concepts in choice, or in assessing their relationship with objective descriptions of housing. The confused picture which presently exists in all these areas is aggravated by the widespread use of structured questionnaires which presume a rigorous definition of housing concepts. (More is said of this situation in the following Chapter).

Research on the nature of housing concepts provides a convenient opportunity for examining the relative importance of concepts in determining how specific vacancies are first understood (cognition) and then evaluated, and finally for identifying population subgroups homogeneous with respect to housing choice processes. These then, are secondary concerns.

In all Chapters, additional attention is paid to problematic areas in past research which are identified in the review in the following Chapter. Special consideration is given to the nature of location, to the importance of accessibility to work, and to the influence of lifecycle stage, socio-economic status and male-female differences.

1.3 Methodology

As the review in Chapter II demonstrates, our present knowledge of housing choice is only weakly developed and deductive approaches have not been fruitful for behavioural research in this area as yet. A major contention of this thesis, is that this situation is due, in part, to a lack of the type of exploratory inductive research needed to provide sufficient insight for the development of well-grounded hypotheses and deductive reasoning. Similar arguments are made for behavioural geography as a whole by Harrison and Sarre (1971) and for other social disciplines by Bass (1974) and Glaser and Strauss (1967).

In this thesis, an inductive, exploratory design is utilized with the intent, not of testing, but of generating, well-grounded hypotheses.

Information on the nature and importance of housing concepts is sought from the responses of two groups of forty persons who answered either of two main questionnaire formats. The results, as hypotheses, are listed at the conclusion of Chapters VI, VII, and VIII and are summarized in the final chapter.

By taking an inductive approach, the thesis, like many behavioural studies, runs counter to the more popular philosphies and methodologies of geography. This is evident for example, in the fact that in an inductive design, the serendipitous result has as much credence as the expected; something which Merton (1948) saw as essential to the development of science, but which is not obviously accepted in much recent geography. A second example of the difference lies in the liberal use of psychological concepts and techniques, which in this thesis include Kelly's (1955) personal construct theory and three multidimensional scaling models.

The adoption of an inductive approach, however, should not be taken to mean that this is considered to be <u>more</u> valid, in any sense, than a deductive study. Following Feyerbrand (1968) it is seen only as an alternative and <u>equally</u> valid means of obtaining insight into a problem area and one which has been neglected in residential choice studies in the past.

Nor does the use of an inductive methodology preclude the use of theory. Kelly's personal construct theory and the MDS models contain explicit and implicit conceptualizations of behaviour. In Chapter III these are combined within a single conceptualization of housing choice behaviour. The adoption of an explicit conceptualization is considered crucial to behavioural research since its omission risks the type of methodological anarchy discussed by Burnett (1975), Downs (1970), and Harman and Betak (1975) which has plagued behavioural geography in the past and has led to difficulties in interpreting measurements and comparing results.

1.4 Chapter Outline

Background material for the study is presented in the following three Chapters. These discuss, in turn, evidence for the need for inductive research on the nature of housing concepts in a review of the literature (Chapter II); the conceptualization (Chapter III); and the design itself (Chapter IV).

The first of the chapters reporting results, Chapters V and VI, are wholly concerned with the nature of housing concepts. A classification of concept types is developed in Chapter V on the basis of commonly used verbal labels. The concept groups are tested for within - sample reliability in Chapter VI by means of observed regularities in concept associations. The same data provide information on the exactness of concept definitions and concept relations. The results are summarized as a series of hypotheses on the nature of concepts used in housing choice at the end of Chapter VI.

Chapters VII and VIII respectively, are devoted to the two secondary concerns; the importance of individual concepts in choice, and the nature of individual and group differences in residential cognition and evaluation. Consistent with the intention of looking closely at problem areas, the importance of accessibility is stressed in Chapter VII, while life cycle stage, socio-economic status and sex differences are discussed in Chapter VIII.

The thesis concludes with a summary chapter which lists the major findings and attempts to discuss their implications in terms of past empirical research and theoretical concepts.

FOOTNOTES

[1]Throughout the thesis the terms "concepts", "subjective or cognitive attributes" are used interchangeably, to refer to the ways in which individuals mentally organize information about housing. Concept is the term frequently used for this purpose in coding theory in psychology. In Chapter II with the introduction of personal construct theory, the term "personal construct" becomes a fourth alternative. These terms distinguish attributes which are subjectively defined from housing attributes defined by their objective or physical referents.

Since many of the terms used in this thesis are derived from psychology and are not commonly known to geographers, a glossary has been appended. Terms defined in the glossary are underlined the first time they appear in the text.

[2]The need for research on concepts is not peculiar to the problem of housing choice. The need in consumer behaviour research for example, is discussed by Downs (1969) and Hudson (1974).

[3]The two approaches are the behavioural, cognitive or organismic (O) and the behaviouristic or stimulus-response approach (SR). In psychology see for example, Chaplin and Krawiec (1968) and in geography, the discussion by Downs (1970). In behavioural geography the cognitive approach has been widely adopted. It clearly underlies the conceptualizations of Downs (1970), Golledge (1970), and others. Psychological sources quoted in geographic literature, and derived concepts are frequently more cognitive than behaviouristic; for example, the "life space" notions of Lewin (1936), influenced Wolpert (1965). Hudson (1970), reviews cognitive influences in learning in geography. Kelly's (1955), Personal Construct Theory is diffusing through the field (Hudson, 1970; Downs and Horsfall, 1971; Demko, 1971; Silzer, 1972; Lundeen, 1972). The proliferation of terms like "cognitive maps" and "awareness space" is symptomatic of the same trend. So is the use and definition of the term "perception" to cover cognitive elements as defined for instance by Gibson (1950) and Arnheim (1969). The cognitive stance in geography is explicitly recognized by Gale (1972b) and by those who use the term "cognitive behavioural geography" (Harvey, 1969).

[4]For discussions of the problems of aggregation see Harvey (1968), and de Long (1973).

CHAPTER II

LITERATURE REVIEW

II.1 A Typology

This Chapter provides the major justification for the research undertaken in this thesis by reviewing what little is known on the nature of housing concepts and their relative importance in choice. The discussion is organized around five major approaches identified as relating to the analysis of residential site selection.[1] These are:

1. the conceptualizations of behavioural geographers like Brown and Moore (1970), Demko and Briggs (1970) and Gale (1972a,1973);
2. survey studies of people involved in housing choice such as those of Butler <u>et al</u>. (1969), Hempel (1970) and Rossi (1955);
3. the more recent studies of behaviour in residential environments characterized particularly by the work of Peterson (see for example, Peterson, 1967);
4. the models of urban ecologists and social area analysts, reviewed by Berry (1971), Murdie (1969), Senior (1973), and Shevky and Bell (1955); and

5. the normative models of land rent and population distribution of which Alonso's (1965) is a prototype.

In terms of their significance for understanding the behavioural bases of housing choice, studies in the fourth and fifth categories, need be discussed only briefly.

The urban ecologists made a major contribution culminating in the work of the factorial ecologists, by demonstrating the regularity with which households with similar socio-economic status, life cycle stage and ethnicity locate in the city. However, the studies have had limited success in getting beyond descriptions at an aggregate level.

Significant advances have also been made in the development of the normative population density, rent and planning models. Examples are models such as Alonso's (1965) which stipulates residential location to be a tradeoff between price, space and accessibility considerations, and models like those of Kain (1962) and Herbert and Stevens (1960) which disaggregate the population in terms of life cycle stage and/or socio-economic status. The main impact of the normative models on the research into housing behaviour has been their influence on the thinking of geographers, notably in regard to the importance of accessibility to work. The postulated importance of access to work at the level of individual behaviour in residential choice however, has been strongly challenged by Butler et al. (1969), Cantanese (1971), Lansing (1966), Rossi (1955), and Stegman (1969).[2]

In terms of providing insight into individual housing choice processes, the ecological and normative approaches are both limited by their definition of housing attributes as objective not cognitive referents, and by the use of aggregate not individualistic data. Harvey (1968) and de Long (1973) and Robinson (1950), all argue that processes operative at aggregate and individual levels are not necessarily comparable. Moreover, as shown in the example of accessibility, there are indications that the postulates of the normative models may contain a confusing mixture of fact and fiction in regard to individual choice behaviour which must be unravelled if the relationship between research at different levels is to be clarified.

The first three approaches to housing choice which are discussed in the following sections, are generally more sensitive to the individualistic nature of residential decision-making.

II.2 The Nature and Importance of Concepts in Housing Choice: A Review

The theoretical notions introduced in behavioural conceptualizations are discussed first, where it is shown that even in conceptual terms, the definition of housing concepts has not been well established. Empirical evidence on the nature and importance of concepts is considered in two subsections; one outlining the rather confused picture which has emerged from questionnaire surveys; while the second is a brief review of the results from recent studies of preferences and behaviour in residential environments.

II.2.1 Behavioural Conceptualizations

The paradigms of housing choice recently authored by a number of behavioural geographers are the most precise attempts at a theoretical level to define the nature and role of concepts in housing choice.

Choice is seen to be made on the basis of a relative subjective evaluation of each alternative dwelling. Wolpert (1965) uses the term "place utility" to express this notion. The place utility of each alternative is determined by the combination of its "scores" on each housing concept used in evaluation. In the Brown and Moore model (1970), the nature and importance of the concepts is represented by a complex notion - - the "aspiration region" - - although in a subsequent review, Moore (1972) prefers not to use the aspiration region, but simply to call the concepts "evaluation criteria". In the Demko and Briggs model (1970) the concepts and the dwelling's score on each concept defines the "vector of attribute values" which is the basis for a subsequent choice.

In all these models, the subjective attributes or concepts are apparently seen as being explicitly defined and mutually independent. A recent paper by Flowerdew (1973), tentatively explores some of the implications for a behavioural model of attribute <u>inter</u>dependence, an aspect which is explored in Chapter VI of this study. The models of Brown and Moore (1970), and Demko and Briggs (1970), also imply that housing concepts bear a one to one relationship with physical counterparts. The validity of this position is questioned in an argument by Gale (1972b) who postulates that many of the concepts relevant to behaviour represent overlapping, ambiguous or "fuzzy sets" which may be neither discretely nor explicitly defined. It is only one step from this to the conclusion that a single, apparently simple physical attribute of housing, such as lot size, may be mentally represented by a complex, multi-dimensional, even imprecise concept, or conversely, that what appear to be separate physical attributes may be combined in a single concept.

Gale's own model of housing choice is outlined in the K^N model of residential mobility, (Olsson and Gale, 1968). The model is, in effect, a multi-way contingency table which matches a number of population subgroups with urban housing submarkets or choice sets. The successful implementation of Gale's model and those previously outlined, and their ability to provide insight into the behavioural bases of relocation, depends on some means of classifying population subgroups and housing choice sets along lines which are meaningful in choice problems.[3]

II.2.2 Empirical Research

Extensive questionnaire surveys investigating housing preferences and/or satisfaction have been conducted by Butler et al. (1969), Hempel (1970), Lansing et al. (1964, 1966) and Rossi (1955), among others. While each of these studies has made important contributions to the definition of residential attributes, it has proved very difficult to derive from them a single verified and well defined description of the nature and meaning of housing. The difficulties are especially evident in reviews by Simmons (1968), and Schorr (1966). A major reason for the general paucity of concepts lies in the incomparability of most studies. This, in turn, is related to the fact that the surveys are not explicitly concerned with exploring cognitive meaning and, in fact, use techniques which militate against this.

In 1955, Rossi concluded that price and internal space requirements, notably the number of bedrooms, are of paramount concern to most house seekers. Studies since have generally concurred. The desire to own rather than rent ~~is~~ important when tenure is not controlled in the study. More precise definitions of these attributes in terms of either subjective or objective meanings is not yet well established. Does price for example mean an absolute value, downpayment or monthly rates? In terms of less important attributes of the lot and dwelling there is much less agreement on the nature or importance of concepts; Rossi (1955) cites dwelling design, various types of privacy are emphasized by a number of studies,[4] Leslie and Richardson (1961) list prestige and status factors, while lot and/or outdoor space considerations are recognized particularly by architects (see for example, Safdie, 1961 and 1966).

As a group, location attributes are particularly important since location is generally seen as a major explanatory variable in site selection. Moreover it would greatly simplify attempts to predict housing choice if the decision could be reduced primarily to a location choice. Three attributes are often cited; urban or suburban character, the neighbourhood and accessibility. Simmons (1968), reviews evidence that people distinguish between urban and suburban locations, concluding that there is a strong preference for the latter, which is often associated with a desire for quiet, for spaciousness and for a certain "suburban image". This is one of the few instances in which the components of meaning associated with a residential attribute are identified from the major surveys.

Both the definition and relative importance of neighbourhood concerns are controversial, having been the subject of many studies (for example; Keller, 1968; Lee, 1968; Peterson, 1967; and Tuite, 1973). Social, physical and functional definitions have been proposed, sometimes in combination. (Specific concepts are considered in a later section and in Chapter V). Also widely discussed, as for example by Schorr (1966), is the probability that the definition of neighbourhood varies between groups. Working class or lower income groups are known to perceive smaller, more regularly shaped neighbourhoods based on limited information fields (Tuite, 1973), and considerable social interaction in the local environs with "people like us," (Fried and Gleicher, 1961). In terms of importance, Rossi's data indicate that the social character of the location is important <u>after</u> cost, space, and dwelling design criteria have been considered. In contrast, the tradeoff exercises completed in the Butler survey indicate that the desire for better neighbourhood quality dominates the desire for a desirable housing unit. Also relevant is the finding that social access, (to friends and relatives), a concept often associated with neighbourhood preference, is more important than access to work, (Moriarty, 1970).

Accessibility, a third aspect of location, has no single accepted definition in residential studies even as an objective referent.

All definitions specify a distance relationship between origins and destinations, as points, in an urban area. However, the number and nature of the points may vary. Ingram (1971) distinguishes between relative accessibility between two points and total or integral accessibility between a point and all others in a finite area. In residential accessibility one of the points is the residence. Others may be downtown, place of employment, highways, public transport, location of shopping and service facilities, recreation and friends and relatives. The measurement of distance varies; it may be in terms of distance (objective or subjective), time, cost, comfort or convenience.

In many of the normative models and in the structured questionnaires used in many surveys, accessibility is frequently defined by access to the place of employment, generally the male's. The Butler et al. (1969) questionnaire is a case in point, while an ongoing study by Michelson (pers. comm.) who is looking at the relative importance of <u>her</u> place of work on housing choice, provides a topical exception to this tendency.

The predominant use of structured questionnaires in the major surveys is one reason why the results they produce are of little use in identifying concepts.[5] Since the respondent is forced to rate the importance of a set of housing attributes pre-selected and predefined by the author of the questionnaire, it is not clear what is being measured; physical attributes of housing concepts used by house searchers, or concepts meaningful to the researcher? The latter is most probable and may result in a study bias derived from value transference or the imposition of the researcher's values on respondents. Studies by Lansing and Marans (1969), and Leff and Deutsch (1973), demonstrate that this bias may not be insignificant since the reactions of lay and professional people to the residential environment differ significantly. The form the bias may take in the questionnaire may range from the use of ambiguous or meaningless descriptions of housing, the repetition of attributes and the exclusion of important ones. Stegman (1969) for example incidentally discovered that the definition of accessibility assumed by researchers in the Butler et al. (1969) survey did not correspond to the interpretation put on it by respondents.

Free response questions, popularly used to supplement the main format in many questionnaires have done little to remedy this situation. The recall task involved in free response is notoriously inefficient. Rossi (1955) admits he could elicit a mode of only two attributes by this method. A third problem undermining the value of much research has been the tendency to interview people _after_ they have moved to their new residence. Abu Lughod and Foley (1960) and Golant (1972), argue that this practice introduces a bias associated with post-decision rationalization, memory loss and confusion. Some contrary evidence is given by Butler _et al_. (1969).

The limitations of much past research for identifying the nature of housing concepts also applies when looking at the relative importance of concepts in choice, or at group differences. Most studies rely on a ranking of attributes in terms of importance;yet the task is unrealistic. It is likely that when making an actual choice,people tradeoff between individual attributes or bundles of attributes. Moreover some attributes act as constraints on choice - - called "limiting factors" by Michelson (pers. comm.) - - while others are objectives, preferences, "attitudinal" or "determining" factors. The salience of the two types may not be directly comparable.

In terms of group differences in choice, the results of urban ecological studies suggest that socio-economic and life cycle stage variables are significant and some of the normative models assume this to be so. Empirical research on individual choice behaviour has not been able to demonstrate the importance of either variable convincingly; although Rossi's (1955) results in particular, suggest life cycle stage does underlie differences in the reasons for making the move. Differences in housing preferences and constraints appear to be more related to the specific components of socio-economic status than to the index itself, although even here, the results are contradictory. Butler et al. (1969), identify income as a primary differentiating variable, and other studies cite education or occupation.[6] Yet Lansing, Clifton and Morgan (1969) demonstrate that the same house may be chosen by households with quite different incomes, education and occupational status. Bell (1958), suggests life style is a main predictor and is supported by Sabagh et al. (1969) and Michelson (1970), and yet results of the Butler survey show life style to be a poor predictor particularly by comparison with income and race.

Some researchers claim there are differences in the needs and preferences of the sexes, often basing their explanations on a traditional view of sex roles. Beshers (1967), for example, postulates a housing decision based on the male's consideration of price and access variables, and the female's evaluation of dwelling and neighbourhood. Klemesrud (1971) reports a study which postulates the first move to be a patriarchal decision, and all moves thereafter, to be matriarchal. There is little or no recognition of changes which may have been affected by the increasing numbers of women, especially married women, in the labour force, and by a trend towards more equalitarian family decision-making, although a study by Blood and Wolfe (1960) finds house buying to be a shared decision.

II.2.3 Recent Studies of Housing Choice

In recent years there has been a noticeable shift in the type of empirical research being conducted on housing choice, coincident with the development of behavioural geography and other disciplines involved in environmental behaviour. These studies have two principle characteristics; unlike earlier empirical studies they are expressly concerned with perceptual and cognitive processes, seeking to define the concepts used in the perception, cognition and/or evaluation of residential environments, their interdependence and relative importance. Secondly, in place of large surveys and structured questionnaires these studies generally involve small sample, experimental, inductive research designs based on psychological concepts and measurement procedures. The use of photographs is particularly popular; as for example, in the survey designs of Peterson (1967), Sanoff (1973) and Flachsbart and Peterson (1973).

Studies of the new genre have considered the concepts relevant to residential choice from a variety of perspectives and scales. Honikman (1972) has explored the cognitive meaning of a single room in the house, the living room; Flachsbart and Peterson (1973) and Sanoff (1973) have looked at the dimensions involved in the cognition and evaluation of housing structures; while preferences in terms of nieghbourhoods and accessibilities respectively, have been researched by Tuite (1973), Peterson (1967), Redding (1970), Peterson, Worrall and Redding (1969), and Peterson and Worrall (1970). At a city-wide scale are studies by Lamanna (1964) of the dimensions of an "ideal town" and the measurement of preferences for alternative inter-city migrant destinations by Demko and Briggs (1970) and Gould and White (1968).

The major concepts found to operate at the level of neighbourhood cognition are summarized by Tuite (1973) and those of neighbourhood evaluation, by Peterson (1967). Peterson derived nine variables from a review of the literature: greenery, open space, age, expensiveness, safety, privacy, beauty, closeness to nature and quality of the photograph. Although Peterson is expressly concerned with preferences in terms of the visual appearance of residential neighbourhoods, it is not immediately clear from his discussion the extent to which each of these concepts pertains to housing, lots, or general neighbourhood environs. A factor analysis collapsed the nine variables into four orthogonal factors explaining 99 per cent of the neighbourhood preferences of Peterson's respondents. These are described as:

1. harmony with nature (high loadings for greenery, open space and privacy);
2. age;
3. quality of the photography; and
4. "noise".

In this thesis, concepts and concept associations are found and described in Chapters V and VI, which appear to be remarkably similar to the factors of age and harmony with nature found by Peterson.

In a later study with Flachsbart (1973), which is concerned with housing as well as neighbourhood preferences, Peterson published a modified version of the 1967 list of concepts, including: vegetation (c.f. greenery), spaciousness (c.f. open space), newness (c.f. age) naturalness (c.f. closeness to nature) together with cleanliness, physical stability, visual variety, uniqueness and scale, where the latter is defined as the size or number of storeys in the dwelling structure. The last five concepts replace expensiveness, safety, privacy and beauty from the 1967 list. No explanation is given. Again, neither the exact meaning of each concept nor its major reference (house, lot, location, or some combination of these) is well defined.

Sanoff (1973) has conducted a similar study to those of Peterson, based on the responses of 150 school-children to a standard set of dwellings in a photographic display. Sanoff found "affective" components such as perceived socio-economic status to be important in explaining preferences, thus supporting previous studies. However, the seven major categories of concepts involved in the judgements of his respondents, unlike those in the Peterson studies, show almost no concern with lot or location. They are: house form, detail, quality, context, style, size and socio-economic status. The absence of lot or location concepts may be explained by Sanoff's survey design which allowed respondents no information except that provided in photographs, each dominated by a dwelling, and by using respondents who, as children, have little or no experience of house evaluation with an intent to purchase.

Overall, the behavioural studies of residential preferences have so far, produced lists of concepts which are vague, ambiguous, rarely comparable and incomplete. Location within the city as a whole, particularly urban-suburban and accessibility concepts are not explicitly represented, if at all. Suburban considerations may be manifest in the concern for open space and naturalness concepts, but this is pure speculation at this stage. The most significant findings on the cognitive meaning of accessibility have come from the studies specifically aimed at this concern which suggest that access is not a simple linear function of distance but is U-shaped since respondents show an aversion to proximity as well as to distance, (Redding, 1970).

In terms of the importance of concepts, the new approach is most obviously represented in the trade-off studies by Butler et al. (1969) and by Knight and Menchik (1975).

Results of the former work contradict earlier assumptions that access is more important than neighbourhood concerns. Knight and Menchik found that lot space may be traded in modest amounts for an improved view.

In work on group differences, the new approach is manifest in a suggestion by Briggs (1969), who argues that groups be identified on the basis of similar behaviour, as an alternative to the usual procedure of testing for differences between pre-defined groups. In this respect, the multi-dimensional scaling models used in this thesis, are seen as especially promising.

II.3 Summary

Five major approaches relating to residential choice are identified. Two of these, the work of urban ecologists and social area analysts, and the landrent and population density models, have both influenced current thinking in well defined ways, but the value of these approaches for providing insight at the level of individual choice behaviour is suspect. The remaining three approaches have produced a prolific number of studies, but a rather confused picture of the nature of housing concepts and their importance in the process of choice. Many of the problems can be traced to ambiguous and incomparable methodologies, some of which the recent behavioural studies are attempting to overcome.

This thesis is in the tradition of these recent experimental, inductive, behavioural studies. Chapters III and IV which follow, outline the conceptual framework and the research design which are used in the thesis to explore the nature of housing concepts.

FOOTNOTES

[1]Other classifications are available. Moriarty (1970), for example, recognizes only two main approaches; the "structuralistic" corresponding to the normative and factorial approaches here, and the "socio-psychological" corresponding to the survey and behavioural studies.

[2]Much of the criticism of accessibility is based on a contradiction between the importance it is ascribed in the normative models and findings from survey research. This contradiction has been rationalized by Moore (1972), Rossi (1955) and Whitelaw (1972).

[3]The problem of operationalizing many of the concepts discussed in the mobility and housing choice literature has been commented on frequently. For just two of these, see Adams (1969), and Brown and Moore (1969).

[4]See Fried and Gliecher (1961), Harman and Betak (1974), Hedley (1966), and Schorr (1966).

[5]Simmons (1968), summarizes the current situation very well when he says; 'relatively little is known about the complex selection process, some data are available, but the survey methods - the form of the questionnaire, the location of the sample, the timing - vary so much that the data are almost useless'.

[6]The existing evidence comes largely from aggregate studies. See for example Duncan and Duncan (1957), and Wheeler (1968).

CHAPTER III

THE CONCEPTUAL FRAMEWORKS

Two conceptualizations are adopted in the study and provide a rationale for the concepts and the methodology used: a philosophy of the mind and behaviour in general and a conceptualization of housing choice in particular.

III.1. A Philosophy of the Mind

A cognitive approach to behaviour is assumed, meaning that psychological variables such as percepts, concepts, attitudes and values are seen as major determinants of behaviour and are worth measuring as a means of explaining behaviour.[1] Of the many psychological variables which can be defined, concepts are particularly important since they are the main vehicle for the coding, storage and processing of information in the mind.

Information may be represented initially in the form of percepts and subsequently as concepts, corresponding to the outcome of the processes of perception and cognition recognized by behavioural geographers. This study is primarily concerned with cognition not perception, and in particular with the nature of the concepts used in the processes of cognition and evaluation of housing which precede the choice of a home.

Recall that the nature of a concept is considered to be defined by the verbal labels used to describe the concept, and the meanings commonly understood by these words. Also relevant are any additional connotations denoted by a demonstrated relationship between the concept and other concepts. A one to one relationship between a concept and a physical attribute of housing is not assumed or expected. The precision, bounding or exactness of the concept definition is important. So too is the specification of cognitive structures comprised of related concepts. It is further assumed that at any one time an individual uses only a finite set of concepts. Finally, although concepts are strictly unique to individuals, it is assumed possible to identify concept types commonly used by many people, and hence to produce conclusions potentially useful in theory construction.

While this definition of the nature of housing concepts differs somewhat from that implicit in the work of Demko and Briggs (1970), it is sympathetic to many other statements reviewed in Chapter II. Simmons (1968), for example, discusses the interrelated connotations of a suburban location, lot size and quietness. Gale's (1972b) notion of "fuzzy sets" recognizes the possible imprecision of concepts, and in an attempt to operationalize their model, Demko and Briggs (1970) adopt an assumption that respondents use the same basic and finite set of concepts.

However, the definition of housing concepts used in the thesis is primarily derived from psychology, specifically from coding theory, which has developed largely since 1963 (Melton and Martin, 1972), and from the older less known theory of personal constructs published in 1955 by George Kelly.

Both these theories accept that mentally coded information may occur in a variety of forms, but give greatest attention to semantic, verbal, or lexical codes.[2] Both also postulate that although there is an infinite number of ways in which events might be coded, it is likely that a selective process limits the codes used by an individual. An infinite coding capacity is implied in the multi-attribute memory models of Bower (1967) and Wickens (1970) for example, but is challenged by Posner and Warren (1972), by Kelly (1955) and by the findings of Miller (1956) on the grounds that the mind is finite and the coding of new information is channelled by existing codes.

The results of work on associative response provide evidence that codes are interrelated, in the sense that the use of one unconsciously activates others.[3] This has led coding theorists to the conclusion that concepts are organized into mental structures which must be identified if we are to understand the implications, connotations or meaning of a given concept. Examples of structures are lists, schema, hierarchies, and spaces.[4]

As yet measurement procedures for researching all or any of the different aspects of information coding have not been well developed as part of the current work on coding theory. Those which do exist have ~~largely been tested~~ for the coding of relatively simple stimuli in a laboratory context.[5] To overcome these problems in this study, it has been necessary to adopt the older theory, Kelly's (1955) personal construct theory[6] which, although increasingly popular in environmental and geographical research,[7] is not widely used in psychology except in clinical studies.

III.2. Personal Construct Theory

Kelly based his theory on the belief that people act in a manner not unlike a scientist undertaking research. "Man-the-Scientist" is constantly and purposely giving mental organization to his/her experience of the world in the form of personal constructs. In this study, these are assumed to be analagous to the concepts discussed in coding theory. As Kelly describes them, constructs are bipolar mental referents not unlike one dimensional scales, which represent the information an individual has abstracted about some aspect of the environment. The theory is formally presented as a Fundamental Postulate and eleven elaborative corollaries. The following discussion is limited to those relating to the organization of the personal construct system. The dynamics of the system are not relevant to this study.

The Fundamental Postulate states that a person's processes are psychologically channeled by the ways in which he/she anticipates events. From the Construction Corollary and Dichotomy Corollary, it appears that people anticipate events by construing their replications. This involves the use of the bipolar constructs on the basis of which at least two elements[8] are seen as similar and another as different. The poles of a construct provide opposite descriptions of some feature of experience and are termed the "emergent" or "replicative" pole and the "contrast" or "nonreplicative" pole. Elements are judged in reference to the poles. It is important to note first, that constructs are not necessarily verbalized. Kelly postulates that people may use preverbal constructs which, although not consciously formulated nevertheless play a part in the interpretation and prediction of events. Second, the words people use to describe constructs are not the constructs themselves, but are simply verbal labels or symbols for the constructs.

The Range Corollary states that a construct is applicable to a finite range of elements only. The set for which it is especially suitable is the "focus of convenience". The wider set over which it is relevant is its "range of convenience" or domain. All other elements fall outside the range. In this study, it is assumed that all forms of housing fall within one domain. According to the Organization Corollary individuals arrange the constructs in a given domain into subsystems embracing ordinal relations among the constructs. This can be conceptualized as an hierarchy of constructs whereby superordinate constructs have, as components of their meaning, any number of subordinate constructs.[9] Other types of relationships among the constructs are possible. A constellatory construct for example, implies other constructs with which it is linked. Different types of linkages have been identified by Hinkle (1965).

The Individuality Corollary states that people develop unique construct systems. However, in the Commonality Corollary, Kelly recognizes that there may be some similarity between the construct systems of different people. Bannister (1962), interprets this to mean that it is possible to look for, and find, similarity in the psychological processes between people with similar construct systems even if they are experiencing different events. This corollary is important since it implies that the theory and procedure for personal construct research need not be limited to idiographic work as is common in clinical psychology. It is possible to look for communalities in the construct systems of different individuals. These may have developed out of similar experiences as Sechrest (1963), argues and may result in similar behavioural responses, (Bannister, 1962). For the purposes of this study it is accepted that Kelly's theory and the associated measurement procedures can be employed in nomothetic research.[10]

III.3. Housing Choice

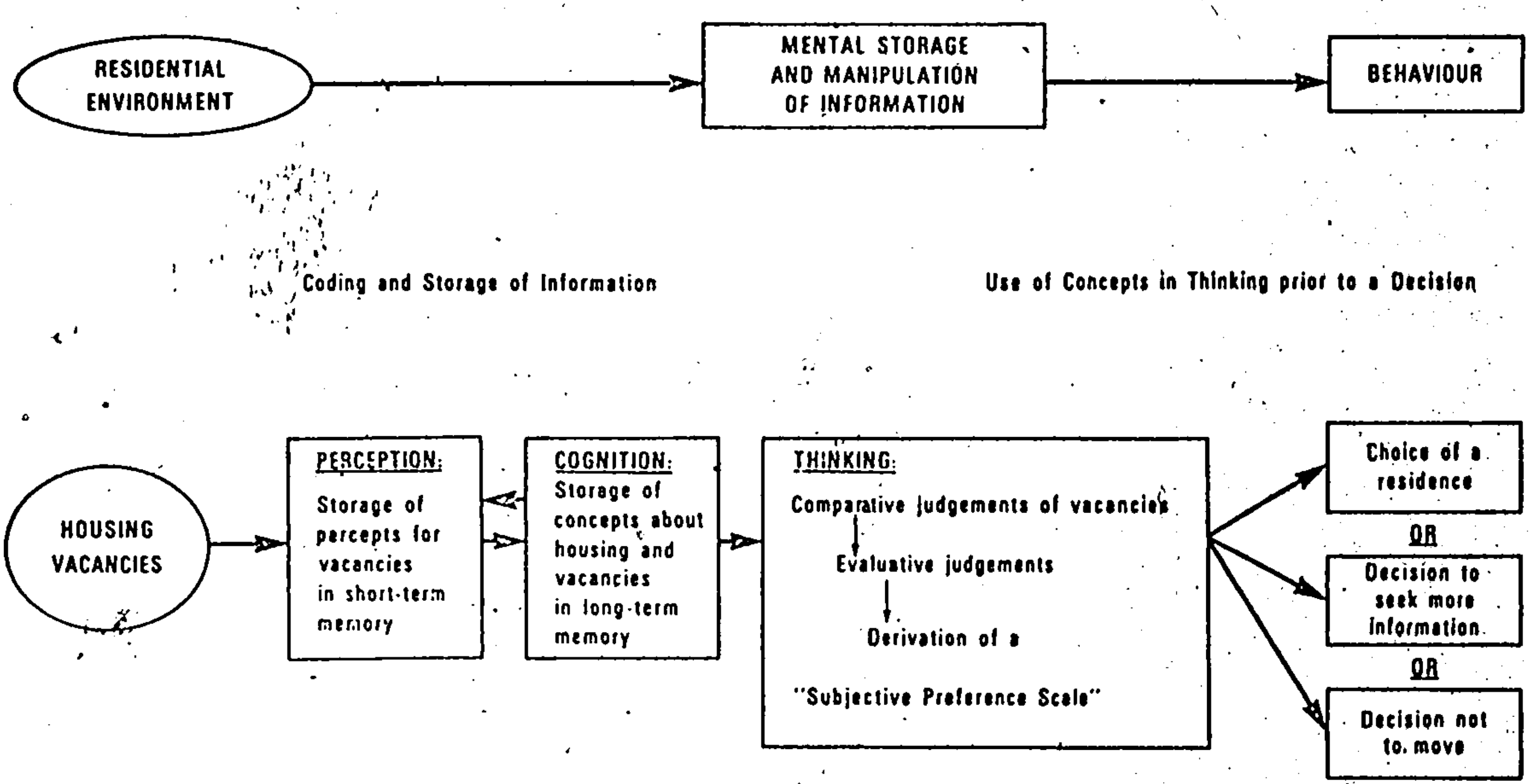
The conceptualization of housing choice adopted here is basically that described for sequential spatial decision-making in different contexts by Brown and Moore (1970), Demko and Briggs (1970), Demko (1974) and Hudson (1970), and is depicted in Figure 1. Two major differences are that in this study, the nature of the subjective attributes or concepts is outlined more fully according to the definition in the previous sections, and the correspondence between the conceptualization and personal construct theory is outlined.

Kelly (1955) views perceptions of similarity and differences as being the basic codes, concepts or constructs of cognitive information. His theory suggests that if we discover the nature of the dimensions used to compare and contrast stimuli, we will have the concepts used to derive preferences. Exactly the same notion underlies the conceptualization of housing choice used here, and the models implicit in the multidimensional scaling (MDS) procedures used in chapters VII and VIII.

It is postulated that decisions relating to housing are made by the household decision-making unit. This may be a single individual or several persons who communicate and compromise between their separate aspirations and judgments of the current residence and alternatives to it. It is also assumed that the decision to seek a new residence has already been made and a search is underway; i.e., we are dealing with Phase II, the relocation decision, of the Brown and Moore conceptualization, (1970).

FIGURE 1

ELEMENTS IN THE HOUSING CHOICE PROCESS



Information about housing in general and vacancies in particular is collected during search to supplement that which the decision-maker already possesses. Sanoff (1973) has shown residential perceptions and preferences are a function at least in part, of past housing experiences. Additional information is sought from such sources as vacancies or dwellings viewed, real estate agents, the media, friends and relatives. The type of information obtained is biased by those housing concepts already used by the decision-maker. The information is organized as a subsystem of personal constructs[11] within which specific constructs may be interrelated in structures.

Prospective dwellings are compared with the current residence and with each other. Judgments of the overall similarity or dissimilarity of residences, often termed comparative or cognitive judgments, are made on the basis of some union of their "scores" on constructs in the domain. The scores may not be weighted equally but will manifest variations in the importance the individual ascribes to the different constructs when comparing residences.

When choosing between residences, the decision-maker evaluates each on the basis of some or all of the constructs used in comparative judgments. In preference judgments, the constructs may be weighted differently than in cognition, since in this case they are weighted according to their value or relative desirability.[12] Preferences are assumed to be realistic;

that is realizable for the household at that point in time. The evaluation of residences ultimately leads to the derivation of a subjective preference scale or ordering of residences in term of preference. The process of evaluation is continuous with search, but the decision to act on a preferred alternative depends on the degree to which it matches expectations, and any time constraint on the search. It is generally assumed a smaller time budget forces the lowering of expectations.

The chosen alternative is assumed to be that which is first on the preference scale. However, in practice the household may not be able to purchase this residence primarily due to competition from other searchers, a probability which increases in a tight housing market. Housing choice is, therefore, distinct from riskless choice as in classical utility maximization theory.

As indicated in Figure 1, the decision-maker has three courses of action open throughout the search: to choose a vacancy and realize the purchase of a home, to drop out of the market by opting to remain in the present dwelling either after an unsuccessful attempt to buy, or because the situation and/or expectations of the household have changed, or thirdly, to continue searching in the market.

A corollary of this conceptualization is that information gathered during search may cause changes both in the personal construct system and the evaluation of given residences. Constructs may be added, deleted, or modified and their relationships changed. The relative saliences of individual constructs in both cognitive and evaluative judgments may shift. The effect of a time constraint on the search may also be pertinent. The nature and degree to which aspirations change over the search period is largely unknown. In this study a cross-sectional approach is taken and hence it must be assumed that either the changes in constructs are minimal or that their effect is cancelled out by aggregating across individuals at different stages in the search process.

The conceptualizations described in Chapter III serve to frame the questions posed in Chapter I; i.e., what is the nature of the concepts used in the cognition and evaluation of housing, what is the relative importance of each in the choice, and what group and individual differences exist? The following Chapter details the methodology used to research these questions.

FOOTNOTES

[1]This assumption contrasts with the thesis of the "category mistake". By ~~this no~~tion it is argued that psychological variables are an artifact erected by researchers; that the only real and measurable variables are the overt actions which mental activity initiates. See Ryle (1949) and Burnett (1975).

[2]Preverbal, visual and nonvisual codes are considered by Arnheim (1969) and Neisser (1966).

[3]Posner and Warren, (1972) are very careful to distinguish between conscious and unconscious activation, and argue that the structural relations important in coding theory are those activated unconsciously.

[4]A list is a set of codes where the inclusion of a code, or the sequence of codes, is not arbitrary but learnt as in the numbering system or a list of cities. A schema is a set of codes representing the communality the individual recognizes in a set of specific events. The schema is in some sense their average. An hierarchy contains codes organized into superordinate and subordinate positions depending, for example on their levels of specificity or generality. Spatially organized codes imply some meaning to distances between them in an imaginary space. Other structural forms are probable as are combinations of any of those just described.

[5]See for example the procedure for identifying codes underlying word meaning developed by Wickens, (1970). Word association and sorting tasks have frequently been used for identifying structural relations.

[6]Kelly (1955). The theory was developed by Kelly and elaborated on by Hinkle (1965). The main ideas have been summarized and explicated by Bonarius (1965), Bannister and Mair (1968), Bannister (1962) and Slater (1969). Bonarius (1965) also reviews research which attempts to validate specific points of the theory. He concludes that hypotheses derived from it are supported more often than not.

[7]See for example, Honikman (1972, 1973), Leff and Deutsch (1973) and Tuite (1973).

[8]The term "element" is used to be consistent with Kelly's terminology. It refers to the objects being construed. In this thesis the terms element and stimuli are used interchangeably to refer to the housing vacancies judged by the respondents in the questionnaires used.

[9]It seems likely that all the structural relations listed on page 46, footnote 4, can be accommodated by personal construct theory. Kelly's organization corrollary however, clearly envisages a combination of the hierarchical and spatial forms.

[10]The argument for nomothetic research must be accepted to rationalize the aggregation of constructs across individuals in Chapter V of this thesis. It is a position which is not universally accepted. The controversy on the use of personal construct theory for nomothetic research is discussed by P. Slater, (1969) and by Bannister and Mair (1968). The former argues against it while the latter argue for it. A nomothetic approach is becoming increasingly common in environmental psychology. See for example Honikman (1972, 1973), Tuite (1973), and Harman and Betak (1974). Although a nomothetic approach is rare in clinical psychology, there are exceptions such as the study by Caine and Smaile (1969).

[11]In strict terms, not only the concepts used to give meaning to residences but the respondents views of the homes themselves are personal constructs, i.e., in Kelly's terminology elements are also constructs. In this study the main concern is with constructs representing cognitive attributes of the housing and the term construct is reserved for these.

[12]Greene and Carmone (1969) have demonstrated the difference in weighting associated with cognitive and evaluative judgments.

CHAPTER IV

METHODOLOGY

IV.1 An Introduction to the Methodology

Data on the concepts used in judgments involving the cognition and evaluation of housing were obtained from a sample of searchers in the local market. Respondents completed either of two main questionnaire formats which were designed with three objectives in mind: (1) to elicit rather than structure the responses of interviewees consistent with an inductive approach; (2) to provide data which are relevant to the thesis and conceptualizations given in Chapter II; and, (3) to produce reliable data on the psychological variables, these being notoriously difficult phenomena to measure.

Elicitation of information is achieved by using Kelly's personal construct procedure and by interpreting multidimensional scaling analyses of dissimilarity and preference judgments made by respondents on a standard display of nine housing vacancies. The constructs provide detailed information on the concepts which respondents are aware of and can describe verbally. These measures are cross checked by the scaling analyses which do not rely on concept verbalization.

Both personal construct and scaling data provide information on the nature and the importance of housing concepts, while the scaling procedures are also particularly useful for exploring group and individual differences in choice behaviour. Construct elicitation is consistent with the conceptualization in Chapter III, while the correspondence between the conceptualization and MDS has been outlined by Demko and Briggs (1970). Further reference to this is made in Chapter VIII where the scaling techniques are introduced more fully.

To ensure reliable measurement of the concepts, a multi-operational or multi-trait multi-method research design is adopted. That is, several procedures are used to measure one variable in the hope that these will converge on an unbiased result.[1] The measurement of psychological variables is subject to bias since such variables occur within the mind and are not directly observable. Frequently, we obtain only a researcher's record of the respondents' interpretations of their experiences. Verbal attempts to express the latter are biased by our variable ability to articulate thoughts or to express unconscious or preverbal motivations. In its purest form a multi-operational design calls for the use of several data bases, while a less desirable form uses several techniques to analyse a given data set. Both approaches are employed here.

IV.2 Instrumentation

Data were obtained from a set of respondents who were then in the market for a new residence. They were interviewed at home by one of five trained interviewers. The respondents completed a variety of exercises primarily designed to simulate the two main components of their choice process, i.e., comparison and evaluation of residences. The exercises involved use of a standard display of photographs of nine dwellings selected to depict a range of vacancies.

The decision to simulate a range of housing rather than to design the study around the vacancies the respondents actually viewed during search[2] was made to facilitate comparison of the responses of different individuals. Meaningful aggregation of the results is made possible by this means. There are two main variants in a choice situation; the elements being evaluated and the concepts on which the evaluation is made. If both are allowed to vary across individuals, as in actual search experiences where different individuals look at different vacancies, the problems of aggregation are considerable. Standardization of the concepts for example by use of a semantic differential, encounters the problem of value transference discussed previously and defeats the purpose of eliciting cognitive meaning. Standardization of the display, as adopted here, allows for variation in concept definition and use, while providing a basis for comparison.

The use of a simulated display introduces the risk of instrument bias however, (Craik 1968, Webb et. al., 1966). Two actions are taken to offset this. First, the sample is drawn from households actively in the housing market. It is felt that this group would be the most likely to construe the exercises using the display as an actual choice situation, which should ensure that responses are as consistent as possible with actual choice behaviour. Second, each aspect of the display used to simulate a range of housing is carefully pretested.

IV.2.1 Environmental Display

The display consists of nine 5" by 3" coloured photographs located on a 33" by 46" map of the built-up area encompassing Hamilton, Burlington, Ancaster and the immediate environs. Each photograph is clearly labelled A,B,C,D,E,F,G, H, and I. Standard real estate information on price, number of rooms and bedrooms, and lot size are typed below the photographs on cardboard, which also serves to back the illustration. The photographs are located on the map according to their actual site in the Hamilton area. The map used is a popular street map on which various residential areas and landmarks such as the Niagara Escarpment are colour coded. The map is extremely legible and one of the few available which depicts all the built-up area at one scale.

The decision to use nine dwellings is based on a compromise between the need for variety in the display and the inability of people to comprehend more than five to nine complex stimuli at one time, (Miller, 1956). The actual dwellings used were selected from among recent vacancies for which standard and up-to-date data were available from the Multiple Listing Service. The variation across such attributes are building type, age, size, price, location and general upkeep is evident in Table 1.

The photographs of the dwellings follow a standard format to minimize bias. They were taken on the same film, on one day, under similar weather conditions. All show a frontal view of the house and part of the lot. People and vehicles are deliberately

TABLE 1

Description of Display Vacancies

Attribute	Vacancy A	B	C	D	E	F	G	H	I
Location	W. York St. Dundas fringe	centre East St Ham. centre	W. mount South St. Ham. subur	N.E. Barnaby Ham, ind.	S.E. Forest Hill Ham. suburb	E. mount Bruce-dale Ham. suburb	N. Long-moor Burl. suburb	centre Herkimer Ham. centre	W. Hwy. 99 Ancas. rural
Dwelling Type	single family	cottage	single family	single family	single family	single family	row condo.	single or could divide	single family
Age	1940's with rennov -ation	pre 1900 rennov -ation	late 50's	1940's	post 1970	late 40's	post 1970	pre 1920	post 1970
Storeys	1	1	1-½	1-½	1	1	2	2-½	1
Material	alumin-ium siding	stucco	brick	wood	brick	brick stone facing	brick	cut stone	brick
Number of rooms	5	5	10	4	6	5	7	12	7
Bedrooms	1	2	4	2	3	3	3	6	3
Lot size in feet	3-1/3 acres	27-130	60'-94'	30'-105'	55'-100	50'-100	-	79'-116	125'-200'

Table 1 continued:

Attribute	Vacancy A	B	C	D.	E	F	G	H	I
Land-scaping	tree shrubs, lawn	small lawn	tree, lawn	poor lawn	lawn	trees, lawn	trees, lawn	shrubs,	poor lawn
Garage Drive	Front Drive	-	drive, garage	-	Side drive carport	-	-	-	drive, garage
Listed price in $	72,000	21,000	54,000	16,000	36,900	27,400	24,500	69,000	42,800

excluded, and the black and white format of most Agency copies is replaced by colour.

Two different pretests were used to examine the usefulness of photographs for this study. In the first, ten subjects were asked to look at a number of photographs and describe on tape what they visualize about the house interior, occupants, and immediate neighbours and neighbourhood. The second, which was in fact a pretest for one of the two questionnaires, involved describing observed similarities and differences between the dwellings. The results confirm that people can and do infer many aspects of a dwelling not visually obvious in a photograph of it. Hence it appears that photographs can be a useful way to simulate vacancies. It was apparent in these pretests, however, that the respondents would have preferred concrete information on price, dwelling and lot size rather than have to infer these. Since such details are commonly available to searchers on the reverse of the photographs used by Real Estate Agents, it was decided that their inclusion would not bias the results unduly and they are included with each of the final display copies.

IV.2.2 The Questionnaires

It was originally intended that information would be collected using one questionnaire. One was designed and underwent seven revisions over a period of four months. Due to its length and the tediousness of some of the exercises it was ultimately divided into two complementary formats, (A and B). The two formats were answered by different samples. Although it was intended that these be matching samples, they were drawn from slightly different populations for reasons to be discussed later. Sample A is comprised of respondents who were still in the process of search at the time of the interview. Sample B is comprised of households who had chosen a new home but not yet moved in. This difference in the samples is reflected in some of the questions in each format.

The manner in which the data collection is divided between the formats is summarized in Table 2. The various aspects of the data collection are discussed in turn following this table. For each item listed there is a discussion of the data, the rationale for their inclusion, method of collection and associated benefits and drawbacks. The questionnaires themselves are included as Appendix A, along with further explanatory notes on their application.

Both formats collect data used for sample description and control. Details on length of search to date, and number of vacancies viewed, provide a guide to what extent the sample

TABLE 2

Summary of Questionnaire Formats A and B

Format A	Format B
* 1. Details of search -description of housing needs and preferences -price range	* 1. Details of search -description of housing needs and preferences -price range
2. Elicitation of personal construsts -scoring of nine houses on Rep. Grid -listing of other factors rank order constructs and other factors in importance	2. Dissimilarity matrix for seven of nine houses
* 3. Preference ordering of nine houses	* 3. Preference ordering of nine houses
* 4. Socio-economic and demographic variables	4. Ordering of nine houses in terms of accessibility to specified destinations
	5. Data on pre and post move accessibility to work
	6. Data on transport modes
	7. Mapping of specified locations in the household activity space
	* 8. Socio-economic and demographic variables
	✓ 9. Tradeoff matrices for four factors

* Data collected in both formats.

✓ Data collected from the second half of sample B only, i.e., twenty respondents.

represents different phases of the search and learning process. A brief description of what the respondent is looking for in a home and the desired price range is useful as an easy means of guiding the respondent into thinking about housing. In addition it provides a source of recall data on housing concepts which can be compared with the construct data which are also obtained and enables the interviewer to observe and check any tendency for the respondent to treat the exercises as a game. Socio-economic, housing and demographic variables collected at the end of the interview are also used in sample description and control.

Format A only, collects data on the basis of a modified version of Kelly's procedure for personal construct elicitation. Personal constructs are elicited from respondents by having them compare successive triads of the standard display of nine vacancies together with the house the respondent intends leaving. On the presentation of each triad the respondent is requested to decide if there is anything on which two dwellings are alike and the third different. The similarity is recorded as the emergent pole. In past studies, the contrast has been considered to be either the way in which the third element differs, (the Difference Method), or the opposite of the emergent pole, (the Opposite Method). In test-retest situations the latter has been found to be the most consistent and is adopted in this study, (Epting, 1971). Following a procedure used by Hinkle (1965) each triad includes the present dwelling in the belief that this will stimulate respondents to voice factors which are important and not simply superficial points of similarity in the photographs.[3] There is evidence that the things people look for in housing are a function in part of what they were dissatisfied with in the previous residence. Once a construct is described, the respondent is asked to specify which pole of the construct is preferred. Occasionally neither pole is seen as desirable as in a construct describing housing with two poles such as "close to the city centre - too far away". In this case an intermediary section perhaps labelled "in the suburbs" will be identified as the preferred section.

Hinkle coined the term "laddering" to describe a procedure for elaborating on a construct to identify related subordinate and/or superordinate constructs. In this study additional insight into the nature of location factors only is sought by laddering constructs including references to distance, place names, or discussion of neighbourhood attributes. It was recognized from the outset that not all location factors would be laddered by this means because they could not be defined rigourously prior to the study.

Each of the nine display homes and the respondent's own dwelling is scored in the <u>Repertory Grid</u>, a matrix of scores for each element on each construct. A variety of scoring procedures can be used including binary choice, ranking or rating scales. A seven point scale is used here. Note that in this study Repertory Grid scores are based on the respondent's evaluation of dwellings A to I and the current home in terms of each construct elicited. Whereas Kelly's original idea was that the grids should measure variation in cognition. The emphasis is given to evaluation in this thesis since this is more directly related to choice than is cognition. Moreover, the factors used in cognition and the relationship between cognition and evaluation can be adequately treated using the dissimilarity data collected under the second questionnaire. In Kelly's grids, extreme scores are allocated to the two opposing poles of a construct. In comparision the repertory grids collected in this study have scores which range between the preferred and nonpreferred sections of the construct. A primary flaw in the scoring is that there is no provision for scoring vacancies outside the range of convenience as defined by Kelly's Range corollary. Such vacancies are probably allocated a score of four at the midpoint of the scale, and hence are confused with vacancies which are given the same score because they are seen as actually scoring midway on the scale. (See page 255).

On completion of the construct elicitation task, respondents answering Format A were required to review their constructs and add any "other factors" that they considered important in their housing evaluations. This provides a check on the comprehensiveness of the elicitation procedure. Respondents then ranked the constructs and the other factors together in order of perceived importance. This is a relatively crude measure of importance which has been used, for example, by Hudson (1974). The problems it involves have already been discussed in chapter II.

Both questionnaire formats A and B require respondents to preferentially rank each of the nine display houses (A to I) using any and all attributes they consider important in housing. The preference ranks were scaled using the MDS algorithm, TORSCA 9. The dimensions of the configuration are interpreted as concepts used in evaluation. By this method the nature and importance of concepts identified through verbal description in the constructs are checked against concepts inferred from preference orderings. A problem with this exercise lies in the tendency for the respondents to disregard factors such as finance which constrain their choices in the real world, and to order the nine alternatives purely on the basis of what they would like to have if they could. To prevent this as far as possible, interviewers instructed subjects to take into account all factors including price, and choose well out of their price range only when the remaining choices were so undesirable that they rather go into "debt" than choose any of them first. It is possible to determine which respondents have possibly violated this stipulation by comparing their choices against their stated price range. The obvious disadvantage of the stipulation is that it may seriously bias the results by over-emphasizing the importance of price. Conversely, without it, the effect of price would almost certainly be underestimated. The analyses of preference orders via TORSCA 9 is also used to identify groups with common viewpoints.

The dissimilarity matrices collected under Format B only are an additional check on the nature and importance of concepts, and the examination of group and individual differences. In this case however, the concepts are inferred from cognitive, not evaluative judgments, and are scaled using INDSCAL. To complete the data matrix, respondents judge the relative similarity of each pair of houses on a scale of zero to one hundred. Zero indicates the two houses are seen as identical and one hundred means they are extremely different. Again, respondents are instructed to use all concepts important to them in judging similarity.

There are several drawbacks with this method of data collection. The task is long and tedious and requires the subject to perform what may be a psychologically difficult exercise. There is some doubt that people can provide reliable discriminations on an interval scale. The particular vacancies judged in this study also seem to have created difficulties. Since virtually all were seen as very different, respondents continually used high scores and had to be reminded not to use the same value twice. (INDSCAL cannot handle ties in the data matrix). To judge all nine alternatives, thirty six separate judgments are required. The costs of this in time and effort seem exorbitant. Hence the number of judgments was reduced in the final survey to twenty-one by arbitrarily eliminating two of the houses, (A and E), from this part of the work only. While this facilitated the data collection it complicated the analysis. Dimensions of scaling configurations are more reliably interpreted with more points.

The remaining data collected under Format B relate to exploring the importance of accessibility where this is defined first objectively in terms of the relationship between residence and various destinations, and then subjectively based on a preliminary analysis of results of the construct elicitation from Sample A. The final twenty respondents of sample B completed six tradeoff matrices representing their preferences for tradeoffs between residential access, price, dwelling and lot size. It will be remembered that price, space and access are the primary variables in the urban macro-spatial models of population density, distribution and land use, while price and space are also cited as important in most empirical research.

IV.3 The Samples

IV.3.1 Criteria for Identification of Samples

Given the exploratory nature of the research, the sample is not intended to satisfy the systematic principles of population sampling which are necessary for making inferences beyond the sample. With the exception of studies such as that by Harrison and Sarre (1971), there are very few guidelines for sample design in exploratory research of this type. Nonetheless, the sample is not unplanned. A number of sometimes contradictory criteria are held to be important. The sample procedure evolved out of the attempt to satisfy as many of these as possible. The criteria relate to the timing of the interview, representation of the household, sample variation and sample size.

The major stipulation is that all respondents be drawn from households actively involved in housing search at the time of the interview. This avoids the problems of information retrieval and bias which characterize studies seeking the motivations for respondents' choices well after the choices have been made. To satisfy this criterion, house searchers were contacted through cooperative Real Estate agents who passed on the names of clients looking in the local market.[4] This approach limited the sample from the outset to prospective owners not renters. This is not a disadvantage. It is likely that owners and renters follow different search and choice processes and should be researched separately. The need to depend on agents for potential respondents is a distinct disadvantage. Contrary to the experiences of Michelson (pers. comm.)and Hempel (1970) in Toronto and Connecticut, neither Agency managers nor individual agents in Hamilton were enthusiastic about supplying names. Many feared repercussions in the form of loss of clients and therefore commissions. Sample A was identified in this way. However, the effort involved ultimately resulted in a slight change of procedure for the pursuit of sample B. In this case, recent buyers were used. Agents seem less chary of supplying names of buyers since their commissions are already guaranteed. Interviews were only conducted with households who had not moved into the new home at the time of the interview. Hence the first criterion is not seriously violated by this change.

The second criterion in the sample design is that wherever possible both adult members of households based on couples should be interviewed since the decision on a new home is theoretically a compromise between the two of them. There is little evidence available on what biases the use of only one respondent introduces into studies of housing choice. For sample A, an effort was made to see both members of the household and interviewers worked in pairs to accomplish this. This was discontinued for sample B. The problems in persuading both members to be interviewed and finding a suitable time while the household is still working with Real Estate agents are considerable. Moreover, preliminary analysis of the results of data collected under Format A seemed to indicate that there is not a significant difference in the responses from males and females. Sample B is comprised solely of female respondents since, at least in terms of construct elicitation, women seem to provide slightly more information. Also, ~~more of~~ them are available for daytime interviews.

Two contradictory notions are associated with the problem of determining a useful degree of variation in the sample across such variables as socio-economic status and life cycle stage. On the one hand, the one guideline stipulated for sample design in inductive exploratory research calls for a small, homogeneous sample (Harrison and Sarre, 1971). This provides a controlled means of obtaining a basic set of knowledge for the derivation of hypotheses. Follow-up work tests these with reference to a wider and more heterogeneous population.

On the other hand, the sample should contain variation to allow testing for differences in the cognition and evaluation of housing. The most efficient means of testing for differences related to socio-economic status and life cycle stage would be to have two subsamples representing extremes on these variables at the outset. An attempt was made to do this by evenly filling the cells of a four way design differentiating households with and without schoolage children[5] and those searching for homes over $35,000 and under $25,000 respectively.[6] This information can be obtained from agents and serves as an initial measure of the extremes sought. However, a number of events mitigated against the success of this procedure. The difficulty in obtaining names and setting up interviews made it unwise to exclude any households simply because they did not fit into the design necessary to test efficiently for group variation. This is not the major concern of the work. Second, it became apparent very early that the subsamples were not all in the market in reasonable ~~numbers~~. The lower income households, especially those with schoolage children, were squeezed out by escalating prices.[7] Access to potential respondents from the higher income extreme was denied by agents reluctant to risk these higher commissions by passing on pertinent names. The sample ultimately collected more closely satisfies the description of homogeneous than heterogeneous.

The fourth and final problem is that of sample size. Since there is no intention of making inferences to a wider population it is not critical that the sample be large or representative. The size was undefined as long as the four way design remained operational and there was optimism about the cooperation of agents. Once the design was dropped it was arbitrarily decided to obtain respondents from at least thirty households for samples A and B respectively.[8] The relatively small size facilitates the indepth analysis necessary to identify regularities in the data - using inductive procedures and techniques which are not yet rigorously tested in environmental contexts.

Interviews were conducted over a five month period from May to September, 1973. In this time just over two hundred names were supplied by agents distributed throughout the market. These households were subsequently contacted by telephone to arrange interview times. Interviews were not conducted if repeated attempts failed to locate the household, the household had dropped out of the housing market, had already moved into a house, or if neither spouse was willing to be interviewed. Of 220 names supplied, members of eighty one households were available and willing to be interviewed. Eighty of the responses are usable and are equally divided between the two questionnaires; forty being responses to format A and forty to format B.

IV.3.2 Description of Samples

Profile statistics for both samples are listed in Table 3. Sixty two respondents completed usable questionnaires for format A, representing forty households. The total includes twenty two couples. Whenever possible the representative for the household included in the main sample of forty is female. Hence, thirty eight females and two males comprise the group for A. The forty respondents and representatives for B are all female.

The premove locations of respondents are all well distributed throughout Hamilton, Burlington and environs. In the aggregate, both samples, given the number of years they have lived in Hamilton, are likely to be familiar with the city. They live in single family dwellings, are married with children, and are basically middleclass. As noted earlier the samples rate well above the Ontario average of 39.61 in terms of the Blishen index of socio-economic status. Sample B differs from A, in being slightly younger, with fewer children and with more members renting, living in high rise accomodation and expecting to spend less on housing. Consideration is given to the effects of these differences where necessary in the following chapters.

TABLE 3

Description of the Samples

	SAMPLE A	SAMPLE B
Female respondents	38	40
Male respondents	24	--
TOTAL	62	40
Number of independent households and number of respondents in the main analysis.	40 (2 males. included)	40
Length of residence in Hamilton - median group	over 10 years	over 10 years
++ Own	24	15
++ Rent	15	23
Occupancy - mode	25 of 40 in single family	15 of 40 in single family 12 of 40 in high rise
Occupancy standard - median	3 i.e. good	3
Median age group	30-39 years	25-35 years
Number married	39	38
Number not married	1	2
With schoolage children	22	14
Mean number of children	2.05	1.97
Median education group	4 i.e. professional or technical beyond secondary	3 i.e. 4-5 years secondary
Median income group for combined husband/wife incomes	9 i.e. $13,000-15,999	9
* Mean occupation code using highest code in household	52.68	53.98
Maximum housing price respondent prepared to pay - mean	43,750	$36,675

++ The entries do not total 40 or 100%; there are missing values.

* Based on Blishen, B.R. "A Socio-economic Index for Occupations in Canada" in Canadian Society: Sociological Perspectives, B.R. Blishen, F.E. Jones, K.O. Naegele, J. Porter (eds.) Toronto: Macmillan, 1968, 241-253.

IV.4 Summary of Methodology

Two complementary questionnaires were employed to collect data on psychological aspects of housing choice from a total of 102 respondents. Personal construct elicitation procedures and judgments to be used in MDS algorithms provide the bulk of the data. Incorporated in a multioperational framework, these produce data which satisfy three important requirements. Responses are elicited from respondents rather than prestructured by the researcher; they provide information on the nature and relative importance of housing concepts consistent with the thesis objectives and conceptualizations; and, insofar as it can be managed, the measures are valid and reliable. The conclusions, and hence hypotheses derived from their analysis, are reported in the subsequent chapters.

FOOTNOTES

[1]See the discussions in Webb et al. (1966), Campbell and Fiske (1959) and Garner et al. (1956).

[2]This has been attempted in a number of recent studies of housing choice; for example by Roger Stough in Boston, (pers. comm.), Vicki Silzer in York, (pers. comm.).

[3]Sanoff, (1973) quoting Olver and Hornsby, postulates that there are five processes involved in judgments of photographs;

1 Perceptible: The individual describes the items equivalent on the basis of immediate phenomena such as size, shape or location,
2 Functional: The individual may base equivalence on the use or function of items,
3 Affective: Items may be described as equivalent on the basis of the emotion they arouse,
4 Nominal: Items may be grouped by a name that exists for them in the language,
5 Fiat: Items may be grouped without providing any further information. The objective here is to have respondents pair houses as alike on the basis of 2 and 3 above and not on the basis of superficial points of similarity as in 1, or relatively meaningless bases as in 4 and 5.

[4]The market is loosely defined as Hamilton city, Burlington, Ancaster, Stoney Creek and their immediate built-up environs.

[5]The use of schoolage children as the critical variable in the life cycle stage as it affects housing choice is supported by the review by Abu-Lughod and Foley (1960), and the evidence produced by Rossi (1955).

[6]These price threshholds were selected to serve as initial indicators of socio-economic status differences on the advice of agents familiar with the market at the time.

[7]The escalating cost of housing over the period is documented in real estate reports and news paper articles at that time. See for example, The Spectator, July 4, 1973, p.7, while evidence that low income buyers are not included in the sample appears in Table 3. The median household income for the samples is in the range of \$13,000 - \$15,999 and the minimum is in the range \$6,000 - \$7,999. By 1971 census records the average male income in Hamilton was \$6896. Similarly on the Blishen socio-economic index which has a

range between a low of about 25 to a high of about 80, the Ontario average is 39.61 whereas the mean for the sample is 52.68 for A and 53.98 for B.

[8]This sample size compares favourably with other studies using personal construct theory for environmental research. Stough (pers. comm.) in Baltimore is using thirty respondents, and Tuite (1973) used ninety.

CHAPTER V

THE DEVELOPMENT OF A TYPOLOGY OF CONSTRUCT TYPES

It will be remembered that the primary aim of the thesis is to develop hypotheses relating to the nature of the concepts which are used in the comparison and evaluation of different residences. The nature of housing concepts is sought by examining the verbal labels used by respondents to describe the concepts and by examining the relationships between concepts as in cognitive associations or structures. Chapters V and VI are given over to different aspects of this objective. Chapter V is a qualitative analysis primarily concerned with the labelling of concepts in the free response and construct descriptions elicited from sample A. Chapter VI is a quantitative analysis of the repertory grids where the emphasis is on the associations between constructs and the possibility of describing housing in terms of broad areas of concern defined by clusters of related constructs.

The two chapters are united by the overriding intention of deriving hypotheses on the nature of housing concepts. This is initiated in Chapter V, where the qualitative analysis leads to the development of a typology of construct types. Each class in the typology represents a set of constructs which describe one, or several related aspects of housing. The classes lay the groundwork for the hypotheses ultimately derived. However, it can be argued that the definitions of the classes in Chapter V are biased by value transference or by prior beliefs held by the author. The transferred beliefs may reflect existing theoretical notions in geography such as those on the nature and importance of accessibility in housing choice which have been legitimized by long usage. Hence, subsequent testing of the classes is undertaken to establish as far as possible whether each class does in fact form a "natural grouping" of constructs and whether each class seems well defined and bounded. This assessment is begun in Chapter V but the quantitative analysis in Chapter VI affords a better opportunity for it.

The derivation of hypotheses on the nature of housing concepts at the conclusion of Chapter VI is made only after a qualitative analysis of concepts and labels in Chapter V, a quantitative analysis of concept associations in Chapter VI and the development, testing and evaluation of a typology of construct types in both chapters.

One cautionary note is necessary. In both of these chapters, respondents are treated as a homogeneous group to permit aggregation of concepts over all individuals. In fact, differences between groups and individuals are identified in Chapter VIII.

V.1 Data and Analysis

There are four data sources containing information on the meaning and labelling of concepts; free response data in which respondents described what they were looking for in housing, personal construct descriptions and repertory grid, obtained using Kelly's procedure, a supplemental list of "other factors" and the dimensions of MDS solutions for both dissimilarity and preference judgments. The MDS analyses provide information on all aspects of housing choice under consideration in the thesis, the nature and importance of concepts and group differences in choice processes. To avoid fragmenting the description of the MDS analyses into three or four different chapters, it is left in total for chapter VIII. This does not detract greatly from the following exploration of the nature of the concepts, since the MDS solutions for the most part only provide a check on the results obtained from the free response and personal construct data. Procedures for analysing the latter are outlined before reporting the classification of constructs.

V.1.1 Free Response and the Master Code

Respondents for both formats A and B answered the question;

"Tell me briefly the things you hope to find and the things you do not want in the home you are looking for?"

The responses are called for convenience "the free response data", and are assumed to describe housing concepts which the respondents can both recall and verbalize.

The free response data are content-analyzed using a detailed coding system described in Appendix B. In keeping with the inductive nature of this study,[1] the code is based on the data and is a result in itself. This first run analysis and the evolution of the code is described in Appendix B. The ultimate form of the code is a six digit classification where each successive digit specifies the nature of the housing attribute or attributes in more specific terms. Responses are analyzed using the original six digit form but are tabulated in Tables 4, 5, and 7 in a more general, mainly three digit form. Twenty-four respondents for example, mention size of the lot (310). Even aggregated to this extent, it is evident that the code is capable of extremely detailed analysis. The aim of the master code is to keep researcher subjectivity in the grouping and classifying of constructs in data analysis to a minimum. It is important to note that the master code does not identify specific concepts; only the housing attributes referred to in concepts. It is possible that a single concept or personal construct may be described using several labels each with its own code. This is, in fact, what happens in many cases. Hence, the original concept is effectively divided by the master code into a number of different categories when presented as frequencies of use of given master codes.

TABLE 4

Content Analysis of Recall Data by Master Code:*

Frequency of References to Desirable Housing Features
(Orientation Code 1 and 2 for Sample A (N = 40)

House Interior

Master Code	Frequency
110	6
121-2	2
121-3	10
121-4	1
121-5	11
121-6	14
121-7	31
121-8	10
121-9	5
122-1	2
122-3	8
122-4	4
122-5	1
122-7	4
122-8	1
124	1
125	1
126	1
127	1
131	1
132	2
134	3
135	4
136	1

House Type & Exterior

Master Code	Frequency
210	1
221	4
2221	15/
2222	3
223	1
224	10
225	3
226	2
227	5

Lot

Master Code	Frequency
310	24
330	2
341	10
342	13
343	
345	2
350	7
360	4
370	1
391	1

Location in Hamilton

Master Code	Frequency
410	3
430	1
440	23
460	
450	5
470	10
490	3

Location-General

Master Code	Frequency
510	5
570	
520	3
530	4
540	1
610	1

Accessibilities

Master Code	Frequency
522	4
5531	5
5532	3
5533	6
5534	1
5535	2

Financial

Master Code	Frequency
710	4
720	2
730	1
790	2

*See Appendix B for a description of the evolution of the code and the meaning of specific code numbers.

/This frequency is inflated. Free responses for 8 respondents only, are coded using 2221 but most mentioned several different numbers of storeys as desirable or satisfactory.

TABLE 5

Content Analysis of Recall Data by Master Code

Frequency of References to Undesirable Features

House Interior

Master Code	Frequency
110	1
121-8	1
122-1	1

House Type & Exterior

Master Code	Frequency
221	4
2222	4
223	1
224	10
226	2
227	1

Lot

Master Code	Frequency
330	3
344	1
345	1

Location in Hamilton

Master Code	Frequency
410	1
420	2
430	3
440	5
460	
450	3
480	5
490	1

General Location

Master Code	Frequency
510	12
570	
530	4
540	3
610	1

Accessibilities

Master Code	Frequency
5532	1

Financial

Master Code	Frequency
710	2
800	1

V.1.2. Personal Construct Data and the Classification of Construct Types

Respondents for format A completed the construct evaluation task. This is intended to be a more detailed description of the housing concepts than is available in a free response. It simultaneously provides a means of identifying and analyzing concepts in an undivided form.

The responses take the form of a description of each construct, which is assumed to be a single concept, by its emergent and contrast pole and in some instances, by an intermediary section. The poles are further characterized by a statement as to whether the respondent views them as desirable, undesirable or indifferent features of housing. Constructs classified as indifferent comprise a very small number of elicited constructs (i.e.,23 of a total of 364). They evidently play a role in differentiating housing but not in evaluating them. Hence, they are excluded from all further analysis. The remaining total of 341 elicited constructs are supplemented by a total of 97 "other factors". The other factors are concepts which respondents claimed to consider when evaluating vacancies but which for some reason were not elicited using the triad procedure. Together, the elicited constructs and other factors are considered the main constructs, concepts or cognitive attributes respondents use in housing choice. A mean of 8.5 elicited constructs and 2.4 other factors, totalling 10.9 in all, were supplied by "A" respondents, (Table 6). Given the large number of constructs used by many respondents, in making a housing choice, the decision is already depicted as extremely complex.

TABLE 6

Number of Constructs Elicited Per Respondent

Sample A (N = 40)

	Mean ($\bar{X}$)	Range	Standard Deviation
Elicited Constructs	8.5	4 - 15	2.2
Other Factors	2.4	0 - 6	1.5
Total All constructs	10.9	7 - 15	2.2

The construct descriptions are analyzed to explore their meaning in the first instance, by using the system of master codes. Table 7 lists the frequency of use of codes in a content analysis of the preferred poles or sections of constructs.[2] This analysis is the basis of the development of a twenty-five class typology of construct types (see Table 8 and Appendix C). For most of the classes in the typology, those that are not groupings of residual or miscellaneous constructs such as Types 13 and 25 in Table 8, the class is defined by a single master code or by a group of master codes which appear to have similar or related meanings.

TABLE 7

Content Analysis of Preferred Pole of Constructs and Other Factors

Sample A (N = 40)

House Interior

Master Code	E.C.*	O.F.**	T***
110	14	-	14
121-1	17	-	17
121-2	2	-	2
121-3	4	5	9
121-4	2	-	2
121-5	1	2	3
121-6	8	4	12
121-7	26	2	28
121-8	1	2	3
121-9	1	1	2
122-1	5	2	7
122-2	1	-	1
122-3	1	-	1
122-7	3	-	3
122-8	-	1	1
124	2	2	4
125	2	1	3
126	-	2	2
131	-	4	4
132	14	1	15
133	2	-	2
134	-	2	2
135	1	4	5
136	1	2	3

Financial

Master Code	E.C.	O.F.	T
710	6	20	26
720	-	2	2
730	2	2	4
790	1	2	3

Miscellaneous

Master Code	E.C.	O.F.	T
800	-	1	1

House Type and Exterior

Master Code	E.C.	O.F.	T
210	10	1	11
221	11	-	11
2221	13	3	16
2222	11	3	14
223	3	2	5
224	19	-	19
225		1	4
226	17	1	18
227	12	3	15
230	2	-	2
241	-	1	1

Lot

Master Code	E.C.	O.F.	T
310	32	1	33
320	1	-	1
330	18	1	19
341	26	4	30
342)	27	6	33
343)			
344	3	1	4
345	-	1	1
350	9	-	9
360	14	2	16
370	2	2	4
380	5	-	5

Location in Hamilton

Master Code	E.C.	O.F.	T.
410	2	-	2
440	7	4	11
460			
450	5	-	5
470	16	1	17
480	7	-	7
490	5	-	5

Location General

Master Code	E.C.	O.F.	T.
510	1	6	23
570			
580			
520	6	1	7
530	5	1	6
540	10	4	14
560	5	1	6
620	2	1	3

Accessibilities

Master Code	E.C.	O.F.	T.
551	2	-	2
552	6	3	9
5531	5	1	6
5532	6	6	12
5533	5	1	6
5534	4	2	6
5535	1	1	2
5536	3	-	3
559	1	1	2

* E.C.-Elicited Constructs
** O.F.-Other Factors
*** T. -Total elicited constructs and other factors

The decision on what are related master codes is made primarily on the basis of what codes regularly occur together in the description of the preferred section of a single construct.[3] Some of these are fairly obvious; for example, the occurrence together of codes for house size (110) and number of bedrooms (121-7) in constructs classed Type 1 (see Table 8). Others are more unexpected; for example, the grouping of codes for age of the dwelling (224), soundness of structure (225), building materials (226), and maintenance concerns (227), as Type 12.

It is at this point that the danger of bias caused by subjectivity and value transference is most acute, and the need for detailed master code, and subsequent class assessment most obvious.

Each of the construct classes is described in turn below on the basis of what housing attributes define the class. Construct Type 14, for example, is defined primarily by code 310 (for references to lot size. Occasionally codes for other secondary attributes appear. Hence in a few Type 14 constructs, the code 340 for trees and landscaping also appears. Secondary cases are taken to be the first indication of possible associations between different construct types, since the secondary codes in one type are primary codes in some other type. Code 340 which is a secondary code in Type 14 constructs in the primary code defining Type 16 constructs. A lack of consistency in the primary and secondary codes which appear in the constructs of any one

TABLE 8

FREQUENCY OF USE OF CONSTRUCT TYPES SAMPLE A (N = 40)

TYPE NO.	DESCRIPTION	NO. OF RESPONDENTS USING THIS TYPE		NO. OF USES		
		No.	% of 40 Respondents	* E.C.	** O.F.	*** T.
1	dwelling size, internal space, no. of bedrooms	37	92.5	48	3	51
2	concerns about a basement	10	25.0	6	4	10
3	concerns about a dining room	6		1	5	6
4	concerns about other rooms	2		0	3	3
5	concerns about room shape, location, versatility, redecoration and maintenance	5		2	3	5
6	concerns about windows	13	32.5	14	1	15
7	concerns about fireplace (s)	4		1	3	4
8	other aspects of dwelling interior	6		3	4	7
9	general appearance of house, cleanliness, and upkeep	9		8	1	9
10	occupancy of dwelling, (single or multiple, attached or detached)	11	27.5	10	1	11

* Elicited Constructs
** Other factors
*** Total elicited constructs and other factors

FREQUENCY OF USE OF CONSTRUCT TYPES SAMPLE A (N = 40)

TYPE NO.	DESCRIPTION	NO. OF RESPONDENTS USING THIS TYPE		NO. OF USES		
		No.	% of 40 Respondents	* E.C.	** O.F.	*** T.
11	no. of floors	12	30.0	10	2	12
12	age of dwelling building material structure and maintenance concerns	28	70.0	36	4	40
13	other aspects of house design	7		8	1	9
14	size & shape of lot	27	67.5	29	2	31
15	privacy of lot & dwelling, spacing from neighbours	23	57.0	26	1	27
16	trees, landscaping and topography	24	60.0	25	2	27
17	parking, garage and drive way	25	62.5	26	6	32
18	other features of the lot	4		3	2	5
19	neighbourhood considerations	19	47.5	22	12	34
20	accessibilities	18	45.0	21	11	32
21	urban downtown "in Hamilton"	5		5	-	5
22	suburban, rural "out of Hamilton"	16	40.0	18	-	18
23	Place names:	12	30.0	9	3	12
24	financial considerations	25	62.5	9	21	30
25	uncoded	2		1	2	3
	TOTALS			341	97	438

class is taken as evidence that the class may be poorly defined. In many instances conclusions about the viability of each class and associations between construct types which are tentatively arrived at in this way in Chapter V are confirmed in Chapter VI by further analysis.

V.2 Construct Types

The 25 construct types are discussed in the order they are listed in Table 8. Thus, references to the attributes of the dwelling precede discussions of the lot, of location and of financial concepts. The order in which the types are described does not reflect differences in importance, although differences in the frequency of the use of concepts are readily apparent. There is a marked variation also in the attention given to the various types as a result of differences in their apparent cognitive complexity, and implications in terms of past research findings.

V.2.1 Type 1: Dwelling Size, Internal Space and Number of Bedrooms

These constructs are identified by the master codes: size of the house (110), number and size of rooms in general (121-1, 122-1), and the number and size of bedrooms in particular (121-7, 122-7). An example of a Type 1 construct in terms of its emergent and contrast pole is:

> "two bedrooms, too few --------- more bedrooms, four preferred."[4]

This group of constructs stands out as that cited by most respondents. Thirty-seven of the forty A respondents, over 90 per cent, used at least one Type 1 construct (Table 8). The dominant concern is for a preferred <u>number</u> of <u>bedrooms</u> (121-7), as opposed to other concerns such as the size and shape of rooms, other types of room, arrangement of space or overall floor space. The concern for the number of bedrooms is clearly defined and respondents are very conscious of it. Notice that with a total of 31 mentions, code 121-7 is the highest of all codes in the free response data (Table 4) and is also important in the analysis of the constructs themselves where it appears 28 times (Table 7). Very few respondents describe their concern for house size in general terms, i.e., "a large house - a small house". Moreover, only two of the over fifty constructs contain secondary references to other housing attributes.

Although not nearly as significant as the number of bedrooms, the number of rooms (121-1) may also be a major component in the meaning of Type 1 constructs, appearing 17 times in Table 7.

It is not unexpected that a set of constructs of the nature of Type 1 should be identified. Quite the contrary. The importance of internal size and number of bedrooms has been a major finding in most empirical studies particularly that of Rossi (1955). Since the concern is very explicit both to researchers and respondents the structured format of conventional questionnaires would not inhibit this finding. What is more surprising is that the elicitation procedure did not lead to respondents describing many references other than to the number of bedrooms. This result suggests that some of the more complicated measures of house size and crowding currently being explored[5] may not be as useful as a simple ratio of the number of household members to bedrooms.

It may also indicate that the acquisition of a given number of bedrooms is seen, at least by middle-class Canadians as ensuring that there is sufficient space arranged in such a way as to allow for privacy between household members. The need for internal privacy and its relationship to crowding and stress, particularly for lower class households is well recognized; (The main findings are reviewed for example, by Schorr, 1966).

Internal privacy was not mentioned once by respondents in this study, and may only be articulated by people reacting to <u>lack</u> of privacy in a previous residence.

Many of the other factors related to internal space found important in previous studies are likely to be satisfied by a sufficient number of bedrooms; for example, space per person (Reimer, 1945; Cottam, 1951), the number of persons per family (Mogey and Morris, 1960) and the availability of space for separate uses. The latter need, however, may also be reflected in the need of some respondents in this study for flexibility in the use of rooms (Type 5).

V.2.2. Type 2: Concerns About a Basement

One quarter of the respondents are concerned about having a basement, finished or unfinished recreation room in their new home (Type 2, Table 8). One code (121-6) defines the class. It appears 14 times in the free response data and 12 times in the constructs and is not associated with any secondary codes. In other words, it is another set of well defined needs of which respondents are well aware.

The awareness of a need for a basement may, of course, be a regional concern and less important in areas and countries where climatic conditions allow less stress on recreational functions in the home; (See also Wheeler, 1968).

V.2.3. Type 3: Concerns About a Dining Room

Defined by the code (121-3) these constructs are generally expressed in terms of the absence or presence of a dining area or separate dining room. Type 3 constructs are minor, being voiced by only six of forty respondents and then mainly as afterthoughts among other factors (Table 8).

V.2.4. Type 4: Concerns About Other Rooms

This is a miscellaneous category containing only 3 of the total 438 constructs.

V.2.5. Type 5: Concerns About Room Shape, Location, Versatility, Redecoration, and Maintenance

To define Type 5 constructs, the codes 123, 124, and 126 are grouped together largely because they all seem to imply a concern that the new residence be adaptable to the respondents' needs and preferences in the use and appearance of the house interior. The group is of minor significance overall occuring only seven times (Table 8).

V.2.6. Concerns About Windows

A single code (132) is used to define this class of constructs. References to windows barely occur in the free response data, but were elicited from over 30 per cent of respondents by the triad procedure. This may indicate that respondents are not immediately conscious of a concern for the nature of windows but will express one when prompted by the photographs.

A type 6 construct typically contrasts dark windows with those that are large or provide a lot of light. There are two references to a desire for windows which are "not modern". The constructs are not complicated by secondary codes. These descriptions express very different concerns than that discussed by Kuper (1953) who saw windows in terms of the privacy they did or did not permit from neighbours; however, in Chapter VI constructs relating to windows (Type 6) and to external privacy (Type 15) are found to be associated.

V.2.7. Type 7: Concerns About Fireplaces

The code 135 is the only one used to define this class, and refers to the presence or absence of one or more fireplaces in the dwelling. The fireplace is mentioned with similarly low frequencies of 4 and 5 times in the free response and construct data respectively (Tables 4 and 7). Type 7 is therefore considered minor.

V.2.8. Other Aspects of the Dwelling Interior

Another miscellaneous category, this includes constructs relating to space for storage (131), reference to doors (138), systems such as air conditioning, wiring and plumbing (134) and any additional uncoded features (136). It is some indication that the construct typology is comprehensive when only 7 constructs are classified in this miscellaneous category.

V.2.9. Type 9: General Appearance of the House, Cleanliness and Upkeep

Two codes define this grouping; that for the external appearance of the residence (210) and cleanliness and upkeep (223). The two codes quite frequently occur together to describe a construct. However, references to appearance dominate. In over half the constructs 210 is the only code used. A typical example of the emergent and contrast pole is:

"A residence which has character, is interesting ----- unattractive".

Type 9 constructs are another instance in which the triad procedure was instrumental in eliciting concepts of some importance which respondents did not seem to be aware of in their free responses. In the free response data, Table 4, codes 210 and 223 each appear only once, whereas they appear 11 and 5 times respectively in the construct data, Table 7.

This set of constructs may reflect some of the attributes listed in other studies of housing preferences, notably "beauty", (Peterson, 1967) and "cleanliness", visual variety" and "uniqueness" (Flachsbart and Peterson, 1973). However, the results of this study may indicate that it is misleading to separate out these various postulated components as separate concepts, particularly at the level of concept aggregation used by Peterson and Flachsbart and when such concepts do not appear to be widely used.

V.2.10 Type 10: Occupancy of the Dwelling (Single or Multiple, Attached or Detached)

Constructs of this type usually contrast a single family dwelling as the preferred pole with a residence which is attached; an apartment, condominium or otherwise shared structure. The primary code is degree of separation of the units (221). Constructs of this type do not occur as frequently as might be expected (Table 8) and in fact, their number is inflated by the inclusion of four constructs which refer to the degree to which the lot and amenities are owned outright or are shared as in condominiums (380). It is possible that in a large sample these four constructs, which refer to the degree to which the lot and amenities are owned outright or are shared as in condominiums (380), would emerge as a separate group.

V.2.11 Type 11: Number of Floors

The code (2221) defines this class. The twelve constructs of this type largely contrast the single storey dwelling with a split level or multiple storey residence and show a marked preference for the latter. In the study by Flachsbart and Peterson (1973) an apparently similar concept is termed "scale".

V.2.12 Age of the Dwelling, Building Materials Structure and Maintenance Concerns

Four codes are grouped to identify Type 12 constructs; age of the dwelling (224), soundness of structure (225) building materials (226) and the possibility or necessity for maintenance and redecoration (227). These codes appear in various combinations in many constructs, Table 9.

The age of the dwelling (224) is the dominant component in the meaning of Type 12 constructs. It is dominant in the recall data (Table 4) and is frequently the only description used to describe the construct as indicated by the high frequency for this code in the diagonal entry in Table 9. Respondents often express their concern not in terms of what dwelling age they want but rather what they do not want; thus there is a relatively high frequency for use of 224 in Table 5 which is the analysis of references to undesirable features of housing in the free response data.

The few secondary codes associated with these constructs relate the age - maintenance concern with Type 5 constructs; that is concerns for cleanliness and upkeep (223) and external appearance (210).

It is important to establish how reasonable it is to group the constructs which comprise this class as a single group. As it stands this type has the second highest frequency or use of all construct types, second only to the concern for house size (Type 1). It could be argued that the various ideas referenced by each of the four codes could be treated as separate constructs. Yet, as Table 9 indicates for many respondents these ideas are either very highly related or describe different aspects

TABLE 9

Combinations of Codes in Type 12 Constructs

	224	225	226	227
224	15			
225	–	1		
226	2	2	7	
227	2	1	7	4*

* An entry in the diagonal records the frequency with which the specified code appears without any of the remaining three

of the same construct. The narrow margin between what is a single construct with several labels and what are separate but related constructs is difficult if not impossible to define. At best, one can simply attempt to assess whether Type 12 constructs do in fact behave as one group. This is undertaken in Chapter [illegible].

Previous studies suggest an age concept is important. Peterson (1967) for example, found age to be a major attribute: one of four orthogonal variables explaining 90 per cent of the preferences of his respondents. Somewhat surprisingly, there [was] no indication of the status connotations often assumed to be related to dwelling or neighbourhood age and appearance, and assumed important in housing preferences (see for instance Johnston, 1973). The relationship observed in this study between age and maintenance or convenient upkeep has not been widely discussed in previous studies, with the exception of a report by S[illegible] (19[illegible]) that age of the dwelling [illegible] correlated with condition.

[illegible] Type 13: Other Aspects of House Design

This is a small miscellaneous category. The main reference is to a concern to find a house with an "acceptable" design (2222). The respondents appeared to have little desire, or perhaps ability, to express either their aesthetic or functional needs, manifest for example in Type 9 constructs, into design principles. This makes the current aims of environmental designers as expressed in recent EDRA conferences, potentially very important since this is exactly what they seek to do.

V.2.14. Type 14: Size and Shape of the Lot

This class is comprised of constructs relating to concerns about lot size (310), lot shape (320), space (350) and to the situation of the house on the lot (350). A typical example is

"a small front lawn - a big front lawn, a lot 120 x 150"

or

"space around the house - crowded"

This is a major group being used by over half of respondents. The dominant idea is the concern for lot size (310) which respondents frequently referred to in their free responses, Table 4. Lot shape and the situation of the house are minor aspects and few secondary codes complicate the meaning of these constructs. Those that do occur, including references to trees and landscaping (340), separation of housing units (221) and site relations [illegible] [illegible] related meanings, (Knight and Menchik, 1975)

The need for spaciousness has been discussed in [illegible] studies as for example by Simmons (1968), who relates it to suburban location, and by Peterson (1967) who lists it as a factor in preferences for residential neighbourhoods. There is a certain ambiguity in these discussions suggesting that the concern for space may be either or both in terms of the lot and of the general neighbourhood environs. In this study, space expressed as lot size is the overriding concern.

V.2.15. Type 15: Privacy of the Lot and Dwelling, Spacing From Neighbours

A type 15 classification is made on the basis of the use of codes for privacy of lot (360) isolation (5141), spacing from neighbours (330, 530), the necessity of shared facilities (380) and locations allowing the pursuit of a given life style outdoors. Despite their apparent variation, these codes frequently appear together. The two major components in the meaning of Type 15 constructs are privacy (360) and separation from neighbours (330) : a typical example is:

"close to neighbours - more space and privacy"

Like Type 12 and unlike Types 1 and 14, it is not immediately apparent that these constructs form a single natural grouping. It is quite possible that they could be divided into two related concerns; one for privacy and the other for separation from neighbours. Eight of the twenty seven constructs in the class do not contain an explicit reference to privacy.

Although privacy rarely appears in the respondents' free responses, it does comprise a major set of constructs, and some of the meaning of these is made clear in their content analysis. In all instances, respondents are concerned about external privacy and space relations, not internal privacy. At least four elements of the physical environment are related to privacy.[6] These are:

a) private outdoor space. Nine of twenty-seven Type 15 constructs include secondary master codes referencing lot size, location or general reference to private outdoor space. Most are references to "a large lot" rather than "a small one".

b) Proximity to neighbours. This is explicitly related to privacy in nine constructs.

c) Building type. This is explicitly related to privacy in eight constructs and is generally expressed as either a preference for a single family dwelling, to avoid an attached dwelling or shared facilities. This result supports a finding of Kuper (1953) who points out that a lack of auditory privacy is promoted in semi-detached dwellings.

d) A fourth correlate may be the rural or suburban character of the location. This is not obvious in Type 15 constructs but appears when the meaning of location constructs, Type 22 are explored by "laddering", Hinkle's procedure for identifying other implied constructs. Elaboration of ten of the eighteen Type 22 constructs leads to comments on privacy. For some respondents, a tripartite relationship seems to hold between external privacy, lot size and the degree of urbanism of different locations in the city. The references to privacy in the location constructs led the author to instigate laddering of constructs which refer to privacy, partway through the survey. The laddering indicates that the perceived advantage of privacy is to avoid intrusion from neighbours; intrusion notably in the form of surveillance, complaints about noise, and interference in property control. This substantiates findings of Kuper (1953) and of Lansing, Marans and Zehner (1970). The lack of privacy is considered by respondents to inhibit their activities, "our freedom to do as we please". This applies particularly in regard to choice of outdoor activities, and apparel. The ability of the family to enjoy each others company, or for the individual members to have solitude for relaxation and appreciation of their natural environment. It appears that privacy contributes to freedom in practising a way of life and as such some notion of freedom of choice may act as a superordinate construct for privacy in housing. This is consistent with Proshransky's (1970) definition of the need for privacy - "the need to maximize freedom of choice, to remove constraints and limitations on behaviour"; and with the findings of Michelson (1970, p.147) who found that private open space is associated with active family pursuits.

It will be recalled that all personal constructs have a bipolar composition. Given that there exists a continuum in human relations running from proximity to too few people to proximity to too many people, the contrast to privacy might be either crowding as suggested by Proshansky, et al. (1970), or isolation (Hedley, 1966). In this sample, the contrast is clearly with crowding.

As with Type 12, an assessment of the validity of this grouping is critical. It involves several secondary codes indicating that the group may not be as clearly bounded as other types. Moreover, although it is frequently used by respondents in this study (Table 8), it has not been widely reported in other studies. External privacy is ignored as a factor in some major works (Brown and Moore, 1969, Moore, 1969, Moore, 1972, Butler, et al., 1968), and only tentatively recognized in others, (for example, Rossi, 1955). Three notable exceptions to this tendency are provided by Hedley (1966) who published a small bibliography relating to privacy in Canadian housing, Kuper (1953), and Michelson (1970, p.140). The latter discusses the affects of building type on privacy, and tentative conclusions, some of which attest to the importance different people place on privacy from neighbours. Hedley's work is unfortunately not well known, Kuper's findings only point to the importance of external privacy, and Michelson's conclusions are tentative and not backed by sufficient hard data.

Privacy has been treated a little better by designers. Architects like Chermayeff and Alexander (1963) and Moshe Safdie (1961 and 1966) are among the most prominent advocates of the need for privacy at all levels in community living. Their attempts to translate these ideas into design are nonetheless handicapped. First, by the lack of real evidence on what lay people, (and not architects), believe privacy to be, and how it can be achieved in housing. Second, by the tendency to stress design for internal privacy over privacy at other levels. (See for example Kira 1966, Chermayeff and Alexander 1963, and the writings of Sommer 1969). The stress laid on external privacy by the respondents in the study reported in this thesis, suggest this emphasis may be inappropriate, at least for those families who can afford to buy in North American cities. This is certainly consistent with Kuper's (1953) finding in the English context.

V.2.16. Type 16: Trees, Landscaping and Topography

Another set, Type 16 constructs are invariably coded 341 for references to trees and landscaping on the lots where it appears to have aesthetic connotations more often than functional, as for example where it provides shade or privacy. An example is:

"new shrubs, effort in landscaping - no landscaping".

No secondary codes indicating a relationship with other constructs such as the lot, privacy, or location appear, although Peterson (1967) found such an association in his factor analysis, and some relationship between these concepts is identified from the analysis of the repertory grids in Chapter VI. The concern for vegetation and landscaping is another which respondents did not often recall when asked to describe what they would like, but did recognize as a need when faced with the photographs; again indicative of their aesthetic rather than functional quality.

V.2.17. Type 17: Parking, Garage and Driveway

The codes for garage (342) and driveway (343) are used in this classification and represent another common concern, (Table 8). References to the presence, absence or nature of the garage dominate and virtually no secondary codes occur.

Examples are;

"Have driveway - no driveway"

"Double garage - no garage"

As will be seen in Chapter VI, this set of concepts holds a unique position in the cognitive organization of the respondents - being partly associated with constructs relating to the dwelling and partly with lot and location concerns.

V.2.18. Type 18: Other Features of the Lot

This is a small miscellaneous group containing five constructs which refer to such features as hydro poles in the lot and sidewalks.

V.2.19. Type 19: Neighbourhood Constructs

This class is identified by a variety of codes. 510 to 580 refer to specific aspects of the local environment ranging from the type of people and ~~housing,~~ to safety and cleanliness considerations. 620 refers to environments and their associated life styles which are considered undesirable. For most respondents these are characteristically "urban". For a few, they are sub-urban. As a class, this is by far the least satisfactory of those identified. No single description (label or code) emerges as the dominant meaning. Respondents frequently described an area using a whole set of labels. While this supports the argument in most neighbourhood studies that the concept is elusive and multidimensional, it created real problems in data collection and analysis. It was not always obvious whether the labels are simply those for a single construct or represent a whole set of separate, if related, constructs. This caused problems for completing the repertory grid. It was eventually decided that if the respondent preferred to score the ideas together, they were treated as one construct. If, however, she found it easier to score them separately, they were taken to be different constructs. Despite these precautions, many still had to be coded using several different codes.

The problems with identifying a common meaning or meanings in these constructs are compounded by inadequacies in the master code itself in this area. A number of the codes are repetitive or too general. The codes 510 and 570 which refer to "general" and "other qualities of the area" need combining and breaking into a new set of specific categories.

Among the thirty-four neighbourhood constructs there seem to be at least seven broad, but not mutually exclusive meanings (Table 10):

1) constructs which refer predominately to the social character of the area. For example:

"people like us - people poor, rough"

The perceived quality and type of neighbours is a widely recognized aspect of housing satisfaction and preference, (Rossi, 1955; Fried and Gleicher, 1961), although it is apparent that socio-economic and ethnic differences underlie the exact meaning and significance given to the social composition of the neighbourhood.

Illuminating in this respect, are the concepts of "place" and "non-place" urban realms discussed by Webber (1964). This component in the meaning of neighbourhood is returned to in Chapter VII in a consideration of importance of access to friends and relatives.

2) references to roads, sidewalks, and traffic. These are frequently coupled with concern for the safety of children and for quiet, e.g.:

"quiet streets - too much traffic, near main road"

3) housing and the built environment; e.g.,

"new, well kept houses - building old"

4) services supplied; e.g.,

"no sewerage - sewerage system"

5) local amenities such as the quality of schools, parks and by-laws. A small number refer to the need to avoid disamenities such as a steel mill, dump or swamp in the locality,

6) trees and vegetation in the vicinity, e.g.:

"lots of trees, grass in the area - no green anywhere"

7) qualitative judgments about the area. These range from general statements such as a "nice" or "good" area, to preferences for a "clean, unpolluted environment", or an area which is "safe", "quiet" or has a "favourable atmosphere", e.g.:

"area not safe for children - good area"

In a qualitative sense, these constructs show some similarity to those identified by Tuite (1973) for a Hamilton neighbourhood. In particular, the mixture of social and physical connotations and the higher frequency of references to roads, traffic and sidewalks in Table 10 does support his findings.

In terms of the description of neighbourhood constructs there is no evidence to support Peterson's results. Peterson (1967) found "age of the area" and "closeness to nature" to be prominent dimensions in neighbourhood preferences. These variables were not elicited from respondents but supplied by Peterson on the basis of a review of past studies. They were not confirmed in the Tuite study of neighbourhoods and although there may be some confirmation in this study from other constructs there is none from the neighbourhood constructs themselves. (The relationship between the findings of this study and those of Peterson is discussed at the conclusion of Chapter VI.)

The range of concepts involved in Type 19 constructs makes the validity of the class suspect. Nothing ties them together except that they are all attributes of the local area and English conveniently supplies the term "neighbourhood" which can be attached to all of them.

TABLE 10

Neighbourhood Constructs

References to:	alone	in combination with references to other aspects of the neighbourhood	total
1. Social character (530, 513)	5	2	7
2. Roads, sidewalks, traffic (540)	8	4	12
3. Housing and Built environment (520	3	3	6
4. Service supplied (560)	1	2	3
5. Amenities (580)	3	0	3
6. Vegetation (570)	1	1	2
7. Qualitative (510, 570, 620)	6	2	8

V.2.20. Type 20: Accessibilities:

The pertinent code in this case, is that for accessibilities (550). Used by 45 per cent of the sample, accessibility constructs do not assume the frequencies of use associated with constructs relating to dwelling or lot size (Types 1 and 14) but nonetheless are relatively important. Respondents voiced their concern both in the free response and construct data.

Some of the problems associated with identifying a single relevant definition of residential accessibility are discussed in Chapter II. Evidence of one of the causes of this appears in the survey data. As individual constructs, accessibility constructs are well defined in that few secondary codes are needed to describe them. Those secondary codes that do appear are predictably references to urban, suburban or rural locations. Within the class however, there is considerable variation in the specific codes used to describe accessibility and individual respondents are very likely to be concerned about several types of access in their consideration of a residence.

Access within the neighbourhood or local area is mentioned most often; notably access to schools (5532) and public transportation (552). Access to shopping and general services (5533) and open space and recreational areas (5534) also figure in the evaluation of residences. Lamanna (1964) also found access to schools and shopping facilities to be of concern although ranked only 8th and 11th of his thirteen variables. Accessibility to destinations outside the neighbourhood, largely to work (5531) and the centre of town (5536) is mentioned much less frequently. It appears that access concerns break into matters relating to children, the spouse at home, usually the wife, and finally those at work outside the home. This is not surprising given the life cycle characteristics of this sample.

The possible dichotomy between local and nonlocal access should be noted. It can be argued that these are two different types of accessibility concerns which exert different influences on the housing choice process,[7] and hence should be treated as separate construct types. This possibility is considered in Chapter VI.

Further insight into the meaning of residential accessibility is contained in the descriptions of Type 20 constructs and their elaboration by laddering. In the initial description, accessibility is not defined in terms of time, cost or comfort. The meaning is unspecified in some cases, and couched in terms of distance by most respondents. However, when the constructs are laddered, it is apparent that distance is simply a surrogate for a variety of connotations (again compounding the complexity of the meaning of residential accessibility). Five respondents explicitly refer to increased leisure as an advantage of accessibility, five mention the need to avoid owning two cars, (which has implications in terms of higher cost and a shift in life style), four mention avoiding the effort and inconvenience of travel, and two are concerned with cost considerations. These results indicate that while a single measure of access in terms of distance may be reasonable, the actual meaning of distance will vary considerably between individuals.

Specific advantages are associated with local access. Proximity to schools is seen as relieving anxiety about the safety of children. Access to open space and recreation promotes a desirable way of life especially for children. Access to highways and public transport is seen as a necessary adjunct of a rural or suburban location. It allows the household to avoid the stresses of an urban location without sacrificing its amenities and without incurring a sense of isolation. As Redding (1970) found, accessibility preferences have a modal character where locations which are too near to or too far are both undesirable.

V.2.21. Type 21: Urban, Downtown, "In Hamilton"

Five constructs are classified Type 21 on the basis that the code 480 appears for the preferred pole of these constructs. Type 21 constructs are apparently identical to Type 22, which groups constructs relating to rural or suburban locations. Types 21 and 22 differ only in that their respective respondents preferred different poles. They are treated as separate classes to avoid problems in the grid analysis in Chapter VI.

V.2.22. Type 22: Suburban, Rural, "Out of Hamilton"

This involves codes for rural (470) and suburban locations (490). In terms of frequency of use, the type is quite significant being cited 18 times in Table 8. Like other location constructs, there is no straight forward meaning, label or code which is given to constructs of either Types 21 or 22. They all have complex meanings. In the neighbourhood location constructs (Type 19), the complexity is a function of the variety of references and as a class Type 19 is suspect. This is not the case with the accessibility constructs where there is considerable variety in the labelling but they are all a general concern for accessibility, albeit, in reference to local and nonlocal access. The complexity which emerges in the analysis of the urban-suburban constructs is of another form again.

There are clear indications even at this stage that a large part of the meaning of these constructs lies in their associations with other aspects of location, of the lot and of the dwelling.

In the intial descriptions of the constructs there are more secondary codes than is common in many other construct types. These secondary codes vary from reference to specific suburbs, to lot size, services and accessibilities. The same gamut appears in the laddering of the constructs but here some pattern emerges. Ten of the eighteen suburban-rural constructs lead to references to privacy suggesting the relationship between Type 22 and 15 already mentioned. Systematic references although much fewer in number are also made to preferences for clean air, trees and local accessibilities.

The results confirm Simmon's (1968) conclusion that a suburban location implies other concepts such as quietness and a natural location. It is tempting also to suggest that concepts such as "naturalness" are a part of this subset.

V.2.23 Type 23: Place Names (Specific Geographical Area in or Near Hamilton)

The relevant codes in this class are 410 to 460. From the codes used it is evident the city is perceived in the first instance as having a strong east-west contrast. Western localities, notably Burlington to the north-west, Ancaster to the south-west, and Dundas and Westdale are listed as preferred locations. (The pre-move locations of the sample are slightly but not markedly skewed to the west). There is some differentiation between mountain and non-mountain locations although this distinction is largely made by respondents who are specifically looking for a home on the mountain.

The laddering of these constructs reveals that not unexpectedly, place names are convenient surrogates for a wide variety of location attributes, i.e., neighbourhood character, accessibilities and occasionally privacy and opportunities for outdoor activities. In Kelly's terminology, Type 23 constructs are likely to be superordinate to types 15, 19, and 20 at least.

V.2.24. Type 24: Financial Considerations

Financial considerations are covered by codes in the 700's. The data on the nature of financial concerns in house evaluation are suspect. The triad procedure did not lead to the elicitation of many constructs of this type (Table 8). This may have been caused by the inclusion in each triad of the respondent's current dwelling. Respondents seemed to have difficulty in thinking of their own home in terms of what it would cost them compared to the price of the display vacancies. This was especially true for those renting at the time of the interview. Hence in the majority of cases, financial concerns appear as other factors and as result they are not described with contrasting poles, but frequently are listed simply as price. Where more information is given the dominant connotation is the notion of being able to afford the dwelling. Virtually no respondent considered the size of the downpayment or mortgage rates, although real estate agents claim these are major criteria. Again, these considerations may have been suppressed by the nature of the display and triad procedure, although at least one writer, (Foote, 1960) believes the importance of price may be exaggerated, particularly by real estate agents.

V.2.25. Type 25: Uncoded

The three constructs in this group could not be coded due to insufficient information.

V.3 Summary and Discussion of Construct Types

A number of important points emerge from this first analysis. Housing is not evaluated on the basis of a few well defined concepts. A large number of complex notions are involved. A mean of over ten constructs are elicited from individual respondents - all of which are claimed to be used in house evaluation. The range of housing attributes mentioned by the sample is extremely wide necessitating the use of a master code of over 200 detailed codes initially (Appendix B1). However, the concepts do fall into twenty-five broad categories. It should be remembered that this typology is only the means to the ultimate conclusions and the derivation of hypotheses at the end of Chapter VI. The classes are tentative and not all inclusive. A likely category which does not appear is the distinction between owned and rented properties. This distinction was rarely made in this sample, probably because the respondents were deliberately drawn from the buyers' market and none of the houses they saw or described was a rental property.

Of the twenty-five classes identified, some are postulated to be "natural groupings". That is, the constructs in the class have the same basic meaning. Types 1, 6, 14 and 22 are of this nature. Other classes are simply convenient groupings of residual constructs as in Types 13 and 18. In subsequent discussion and analysis the latter are largely ignored.

Among the main classes, there is a clear distinction between those which seem uncomplicated and well defined in the minds of both respondents and researcher. The references to house size (Type 1) are an example. Others, such as the age and maintenance concerns (Type 12) and privacy (Type 15) are more complex. As presently defined, these are important groups having a high frequency of use in this study, although they have not been well identified in past work. Hence it is crucial that the definition of types 12 and 15 be examined carefully in the following chapter.

Location constructs (Types 19, 20, 21, 22 and 23) as a group are probably the most difficult of the construct categories to pin down to a specific meaning. It is obvious that residential location is not a single well-defined concept. In the first place, four separate constructs are identified (when we combine Types 21 and 22). Each of these types is, in itself, multifaceted. Part of the meaning of types 21 and 22 seemes to be in their association with lot size (Type 14) and privacy (Type 15). The complexity of the neighbourhood constructs is discouraging. Secondly, respondents rarely use only one location construct or even one type. A mean of 2.00 location constructs and 1.87 types were elicited from each respondent. Finally, location is unusual in that the respondents often found it easier to describe what they did <u>not</u> want rather than what they were looking for in positive terms. The evidence for this appears in a comparison of the use of the different codes in Tables 4 and 5.

The complexity of residential location -- the number of connotations involved in its meaning and the difficulties respondents have in describing what is a desirable location - - may explain why some respondents simply resort to using the place name of a local area or suburb. Presumably, this is a convenient superordinate construct which they can judge as desirable without having to be fully aware of the reasons underlying the judgment.

In Chapter VI, the meanings of the main concepts are further explored by examining the cognitive relations between constructs. This simultaneously provides a means of assessing the class definitions postulated in this chapter and leads ultimately to the derivation of hypotheses on the nature of housing concepts.

FOOTNOTES

[1]A Similar system is used by Michelson, (pers. comm.)

[2]It is worth noting that comparison of the frequencies of code use in the analysis of free response data Table 4, and constructs, Table 7, confirms the belief that the triad procedure is more efficient than the free response or recall task in eliciting the concepts used in house evaluation.

[3]Constructs are classified on the basis of the codes in the preferred pole only. The negative pole is considered only if there is some doubt as to the most appropriate classification.

[4]In this example, the preference is explicit in the contrast pole. In many cases however, respondents prefer a number of rooms which lies between "too few" and "too many"; and hence lies between the poles. In such cases, the construct is described and classified in terms of this preferred section and the two polar extremes become aspects of the non-preferred pole.

[5]The American Public Health Association measures space requirements by number of square feet, while the Economic Council of Canada uses an index of crowding of one person per room per dwelling. Neither index takes into account the effect of the arrangement of space which is important in establishing privacy and territorial rights, (Sommer, 1969). The use of an index relating to bedrooms does allow for this.

[6]The following discussion suggests a relationship between constructs of Type 15 and Types 10, 14 and 22. The analysis in Chapter VI provides a much better opportunity for testing for these associations.

[7]See for example Roseman (1971). The same argument is implicit in models such as that of Lowry (1964) which postulate a different functional relationship between work and residence and shopping centres and residence.

CHAPTER VI

EVALUATION OF THE CONSTRUCT CLASSES AND CONSTRUCT ASSOCIATIONS

VI.1 Aims, Analyses and Assumptions in Chapter VI

There are two objectives in this chapter which are sought simultaneously. These are the further evaluation of each of the construct classes described in Chapter V and the systematic attempt to identify cognitive associations between concepts. It will be remembered that both these objectives have implications first, for pinpointing the meaning of specific types of housing concepts and second, for indicating how the concepts can be reasonably grouped together. Ultimately, this type of information should allow us to describe housing in different ways ranging from the very detailed to the highly general, where the type and amount of information sacrificed at each higher level can be specified as envisaged by de Long (1973). The culmination of Chapter VI is the generation of a set of hypotheses relating to the nature of housing concepts; their labelling, associations, and possibilities for combination into categories operative at different descriptive levels.

The repertory grid data supplied by sample A are the only data used in this chapter. Each grid is an r x 10 matrix containing scores on a 1 to 7 scale for the 9 display houses together with the respondent's current residence, on each of r constructs. The constructs are classified into the 25 types already described in Chapter V. The grids are subjected to several different analyses aimed at identifying patterns of relationships among constructs and therefore among construct types. It is these patterns which allow us to evaluate the strength of the 25 construct classes and to identify construct associations.

As is usual in personal construct studies, a non-parametric principal components analysis is performed on each grid, in this case using Slater's algorithm, INGRID, (Slater, 1972). The failure of this analysis to find order in any of the grids leads to three subsequent approaches; a consideration of both the average angular relationship and the rank order correlation between pairs of constructs of specified types, and the grouping procedure (Ward, 1968). The analyses using angular relations and correlations both involve considering pairs of constructs of two given construct types for <u>all</u> grids in which both types appear. Not all respondents necessarily used one of the types, let alone both. Others used several instances of one or both of the given types. The use of these several different analyses is consistent with a multi-operational approach. The final conclusions are drawn on the basis of their convergence.

Each of the analyses undertaken contributes to the two objectives of Chapter VI; (1) testing of the viability of construct classes and, (2) examination of construct associations. We consider the testing of classes first. An assessment of the viability of each of the main classes involves testing whether the constructs which are included form a natural grouping or class and the group seems well-bounded and labelled. The labelling is achieved through the content analysis and cannot be further tested here. However, the viability of grouping the constructs as one class can be tested.

The different analyses, (principal components, Ward's grouping, angular relations and correlations) all depict relationships between constructs, albeit in different ways. It is postulated here that a viable construct class will contain constructs which relate highly to one another in some or all of the analyses in grids in which at least two instances of the given construct type appear. Moreover, constructs of this class will show a systematic pattern in their relationships and groupings with constructs of other types across the grids of different individuals. Conversely, if constructs of a given class do not relate highly to one another within grids, and display wide variations in their relationships with constructs of other types across grids, then this may indicate that the class has not been well defined.

To consider the second objective in Chapter VI, the identification of cognitive associations between constructs, a major assumption is adopted. It is assumed that two constructs which are shown to be related in a grid are cognitively related, and that the existence of a systematic pattern in the relationship between these two types across all grids is an indication of a communality in the construct systems of the respondents.

Since a large part of Chapter VI rests on this assumption it seems prudent to discuss a number of points relating to it. Discussions in the literature of an assumption that construct relationships implicit in a grid are indicative of cognitive associations or cognitive structure are extremely limited. They are largely restricted to consideration of whether the principal components or factors of a grid analysis represent superordinate constructs (see for example, Honikman, 1972). A case for the assumption is made in some detail here. For convenience, the discussion which follows is limited to the use of the correlation coefficient as a measure of the relationship between two constructs in a grid.

It can be argued that while not all high correlations between constructs may be evidence of cognitive associations, most if not all constructs which <u>are</u> related will produce correlated scores. Constructs measuring opposite poles of the same higher level construct will produce significant <u>negative</u> correlations. Given the way the scores were obtained in the grids used in the study, a high negative correlation would require the respondent to have expressed preferences for the two opposing poles. This is unlikely and in fact very few significant negative relationships are found. Constructs contributing different parts of the meaning of the <u>same</u> pole of a superordinate construct will have positively correlated scores for a set of elements.

However, not all correlations represent cognitive associations. There appear to be five possible sources of significant correlations between any two constructs, and the persistent correlations of two types across the grids of different respondents. Of the five sources identified, the first three do <u>not</u> indicate cognitive associations while the latter two do. In assuming that the correlations in the grids of sample A show cognitive associations it is postulated that the final two sources are the only, or at least the main ones, underlying the patterns of high correlations which are found

The first source of a high correlation between two constructs is the unique occurrence related to coincidence or measurement error. This is discounted here since unique cases do not influence the conclusions which are drawn from the analyses.

The second source is discussed by Slater (1972) who points out that there has to be a statistical relationship between constructs where the number of constructs is less than the number of elements, as it is in many of the grids used here. However, this is not necessarily a high correlation and is unlikely to relate constructs of the same type across a majority of grids.

The third source is the correlation between constructs which result because specific objective attributes of housing are correlated in the housing market or in this case, the display of nine vacancies (A to I), while being quite unrelated in the minds of the respondents. Clearly this can occur, although many of the well known relationships such as price, space and the location are likely to be recognized by respondents and hence part of their mental schema. A great deal of care was taken in collection of the nine display vacancies with the intention of avoiding correlations of this type especially those involving location. The degree to which this is achieved can be assessed from Table 1. In addition, some constructs, notably accessibility of the dwellings, cannot relate to the same reference points for all respondents, but vary across individuals relative to their unique activity spaces. Despite these comments, there is of course, no final assurance that correlations produced by this process are not included in the data. This is unavoidable where the research design calls for a standard display. The results, as hypotheses, can be ultimately tested only where respondents score different residences on a standard set of constructs. Associations between constructs which persist under these conditions would then be more strongly supported.

The fourth and fifth sources of correlations between constructs both represent cognitive associations. It is assumed that most correlations appearing in the analysis are either of these two types. Constructs representing attributes of housing which are perceived to be physically correlated in the housing market and where this is reflected in the mental schema of respondents, will produce correlated scores in the repertory grids. A possible example is the persistent correlation found between lot-size constructs (Types 14) and a rural - suburban location (Type 22). The fourth and final instance, is the correlation between constructs which are cognitively related for reasons other than the nature of the housing market. Examples may be the relationship based on a tendency to organize concepts according to whether they refer largely to the dwelling or to the lot.

The Failure of Principal Components Analysis to Find Order in the Repertory Grids

Nonparametric principal components or factor analyses are the most popular and frequently the only procedures used to analyze repertory grids. The algorithm used here is that devised by Patrick Slater (1972). INGRID is basically a non parametric principal components analysis but it also provides considerable analyses not available from standard component algorithms. These include the computation of angular relations used in a later section.

Like factor analytic procedures, principal components analysis is based on the postulate that several components underlie the variation implicit in a matrix containing data for n variables on m cases.

The analysis is essentially an orthogonal transformation of the set of n constructs as the variables, $(x_1, x_2, \ldots\ldots x_n)$

into a new set $(F_1, F_2, \ldots F_n)$. The first component accounts for the maximum possible proportion of the total variance, and there are as many components as original variables. The model can be written; $x_i = a_iF_1 + a_iF_2 + \ldots a_iF_n$ $(i = 1, 2 \ldots n)$

Slater's programme differs from many component analyses in a number of ways.[1] The most important of the differences is that the computations are based not on the correlation matrix as is usual, but on a matrix D which is obtained by differences of the form:

$d_{ij} = x_{ij} - \bar{x}_i$ where $\bar{x}_i$ is the mean of the scores for construct i in the repertory grid and x_{ij} is the score for construct i for vacancy j.

The aim in employing principal components analysis in the study is to identify relationships between constructs and construct types as these are evident in the pattern of loadings on the main components. Specifically, constructs of the same type in a given grid should load together on the same component, and associations or groupings of constructs of different types should be demonstrated by their loading highly on the same components. Such findings would support the viability of the construct typology and indicate construct associations.

The results of the component analysis of the grids for the forty A respondents are summarized in Tables 11, 12 and 13. Table 12 lists for each respondent, the constructs by type which

TABLE 11

Principal Components Sample A (N=40)

Sample No.	No. of Constructs	No. of Significant Components *	% of variance accounted for by 1	2	3
1	8		40.67	29.61	13.81
2	8		45.30	21.51	13.90
3	11		34.30	26.52	18.60
4	8		44.52	26.21	13.26
5	7		37.74	21.34	19.91
6	9		53.10	16.61	14.02
7	10		52.74	26.53	8.92
8	5	2	71.14	20.17	5.84
9	7	2	52.33	20.73	17.78
10	9	2	53.40	28.07	7.84
11	7		55.48	18.62	11.41
12	7		44.57	22.01	16.32
13	6	3	56.58	29.67	11.07
14	9		34.17	29.22	16.63
15	6		44.92	27.61	11.07
16	4	3	58.60	32.26	8.80
17	8		70.86	12.39	10.99
18	8		39.30	19.96	19.17
19	8		40.70	23.38	16.53
20	10		37.94	20.30	15.46
21	11	4	36.84	34.37	15.74
22	8		51.99	19.03	13.03
23	8		46.34	17.66	13.57
24	7	2	60.67	22.90	10.63
25	10	2	44.44	32.36	9.36
26	7		47.85	25.62	12.42
27	12	2	37.77	24.34	12.06
28	12	4	38.44	27.92	15.64
29	10	5	47.38	17.30	14.48
30	7		39.55	33.51	13.38
31	4	3	53.97	33.55	12.13
32	12		37.14	22.13	11.26
33	8		44.27	26.11	15.62
34	8		59.82	22.10	7.09
35	9		37.20	24.09	12.58
36	9		48.87	18.53	13.73
37	12	6	31.96	17.90	16.96
38	9		42.87	23.85	14.78
39	8		60.63	18.33	12.36
40	15	4	54.79	20.94	10.48

*INGRID does not test for the significance of one component. It is assumed that the first is significant.

TABLE 12

Components 1, 2 and 3: Loadings by Construct Type*

Sample No.	Component 1	Component 2	Component 3
1	9 6 16	20 21 15	1 16
2	22 14 20	10 1	18
3	15 15 6	12 1	16 20 20
4	12 23 14	16 10 13	1
5	14 (15 19 20)	13 1	6
6	19 17 19 (12 11)	13	19
7	5 6 1 (15 12 14)	16 12 14	14
8	17 23 (16 16 1)	16 16	1
9	22 19 14	16	1 12
10	14 2 1 1	20 20	17 21
11	11 22 9 5	16 1	16
12	15 22 (2 14	1	16
13	12 25 12	15 17	1
14	1 16 17 23	12 12 15	14
15	17 1 (17 14)	19 11	14
16	1 1	23	-
17	22 16 22 19 14	10	12
18	11 15 (12 15 2)	20 16	10 15 15
19	9 18 12	19	17
20	1 1	22 18	1 18 16 17
21	1 2 12 12	22 15 20 22	15
22	17 22 14 20	12 12	24
23	22 15	10 12 15	23 1 12
24	24 15 22 14	1	12
25	12 22 14 15 15	19 9 24 1	24
26	17 (6 17)	1 1	14
27	12	19 15 1	19 16
28	1 19 3 12	20 20 12 14 16	17
29	15 17 2	1 12 14 17	21
30	24 19 (14)	20 1 1	14
31	23 14	1 12	12
32	2 17	13 12 13	6 1 16
33	1 17 12 1	13 16	16
34	12 11 23 17 1	14 16	14
35	1 1 (24 9)	14 23	10
36	16 22 14	6 7	1 15 14
37	17	22 19	14 8
38	12 (1 17 8)	15 22	16 6
39	19 20 20 20 19	1 21	12
40	15 13 12	20 24 19	24 19

* The choice of how many high constructs to list is made by identifying "breaks" in the loading values for each component in each grid. All constructs with values above the break are included. Where more than one break occurs, the large number of constructs is included and the second break is indicated by brackets. This procedure is preferred to adopting an arbitrary value to decide on what are high loadings. In almost all instances, the loadings on component one for constructs listed here, are over .7, and 80% are over .8. They are listed in order of size of loading.

TABLE 13

The Distribution of the Main Loadings for Constructs
By Type Between Components 1, 2 and 3*

Construct Type	No. of elicited constructs	Frequence of high** loadings on Component 1: No.	Component 1: % of elicited constructs	2: No.	2: %	3: No.	3: %
1 size of dwelling	48	37	77.09	20	41.67	10	20.83
6 windows	14	10	71.43	3	21.43	4	28.57
10 occupancy	10	6	60.00	7	70.00	2	20.00
11 no. of floors	10	7	70.00	3	30.00	2	20.00
12 age & maintenance	36	29	80.55	13	36.11	6	16.66
14 lot size	29	23	79.31	8	27.58	7	24.13
15 privacy	26	22	84.62	11	42.31	6	23.08
16 trees & landscaping	25	16	64.00	10	40.00	7	25.93
17 parking	26	21	80.76	5	19.23	5	19.23
19 neighbourhood	22	14	63.63	5	22.72	5	22.72
20 accessibilities	21	10	47.62	11	52.38	1	4.76
22 rural-suburban	18	14	93.33	6	33.33	0	0.00
24 financial	9	7	77.77	2	22.22	3	33.33

* The construct types included are restricted to those with a frequency of ≥ 10 as <u>elicited</u> constructs, (Table 8) plus Type 24.

** All loadings ≥ .5 are included. Hence a construct which loads sufficiently heavily on two components will be included twice, and the percentages may total more than 100. across the rows.

load most heavily on each of the first three components. The analysis does not produce the anticipated results. Components are interpretable for the data of only a very few respondents. A component is considered interpretable if the constructs loading highly on it can be shown to have related meanings. Sample No. 21 for example, has a first component with high loadings from dwelling constructs (Types 2, 12, 12), a second component relating to location (Types 20, 22, 22), and the third to privacy of the lot (Type 15). However, in most instances, components are not as reasonable as this. Moreover, there is no convincing regularity in the way in which construct types are grouped on the components of different respondents. Hence, it is not possible to identify possible associations of constructs. At most there is limited evidence that constructs of the same type <u>do</u> tend to load as hoped for on the same component. This gives some support to the viability of construct classes 1, 12, 15 and 20 in particular. It will be recalled that the viability of types 12 and 15 was in some doubt in Chapter V.

It might be tempting to conclude at this stage that the evaluation of housing by individuals is simply too complex to produce substantive results in research of the type undertaken in this study. However, rather than draw that conclusion at this stage, other methods of analysis are used since it is suspected that the problem lies not in the data, but in the use of principal components analysis.

The major suspicion, later confirmed, is that the constructs used in evaluating residences are highly interrelated. Principal components analysis is characterized by an orthogonal transformation of the variables and the first component is located such that it explains the major proportion of the variance. When the constructs in a grid are highly interrelated as constructs on housing appear to be, they all load highly or relatively highly on this first component. Some may be split between the first and the subsequent ones.

There is circumstantial evidence in the component analysis that something like this is happening. In 26 of the 40 grids only one component is considered significant (Table 11), and in most grids a much larger number of constructs load heavily on this first component than on the second or third component (Table 12). Moreover, the majority of constructs of virtually all the main constructs types load heavily on the first component (Table 13). Constructs relating to accessibilities (Type 20) represent the only major type which is not largely explained by the first component in the grids.[2] Summing the percentage across the rows in the same table shows that several construct types sum to well over one hundred per cent since they load heavily on more than one component. This is an indication of which construct types are susceptible to splitting between the first component and subsequent ones, an example being constructs referring to privacy of the lot (Type 15). Of these, 84 per cent have a loading of at least .5 on the first component, 42 per cent on the second and 23 per cent on the third.

In effect, what these results indicate is that principal components analysis is not an appropriate procedure for analyzing these grids. What are required are techniques capable of distinguishing more closely between the degrees of construct relationships implicit in the grids. In the following section, three approaches are used; an examination of the average angular relationship and the rank order correlation between constructs of specified types, and the grouping of constructs in each grid using Ward's hierarchical grouping procedure (Ward, 1963).

VI.3 Mean Angular Relations Between Constructs and the Beginnings of Order in the Data

Angular relations between the constructs in each of the 40 grids are given as part of the output from INGRID. The angles are analogous to correlations coefficients but have an added advantage in that the mean of a set of angles can be meaningfully computed. This feature has been used to construct Tables 14 and 15. The cells in the upper right of the matrix in Table 15 record the number of cases in which constructs of the two specified types appear in a grid. The frequencies are approximately equal to the number of grids containing both types. However, since some grids contain more than one of either or both the two types, some frequencies may be inflated by these extra pairs. For each pair of the designated construct types in a grid, an angular relationship is computed. For all such pairs the mean and standard deviation is calculated (Tables 14 and 15 respectively).

The cells of the upper right of Table 14 record the mean angle between constructs of selected types and the most important relationships are summarized in the lower left of the same table. Mean angles of less than 65°, are taken as evidence that, at least in aggregate, the two designated construct types are positively related (P in Table 14). Conversely, angles near 90° indicate independence or a slight negative relationship between the two types (I in Table 14). None of the average angles indicate strong negative relationships between the construct

TABLE 14

Average Angular Distance* Between Selected Construct Types

Sample A (N = 40)

	1	6	10	11	12	14	15	16	17	19	20	22
1	44.36 - P	75.64	83.48	74.63	63.34	82.29	82.00	81.82	66.27	76.80	91.00	73.29
6		50.33 P	88.83	101.47	75.42	81.13	61.80	87.67	67.24	89.43	105.88	74.59
10			-	109.75	85.10	67.78	73.68	86.48	64.67	90.79	77.00	67.03
11		I^{o}	I^{o}	-	63.51	82.15	94.80	73.44	77.37	68.09	89.24	- -
12	P			P	49.82 P	80.32	77.33	70.07	65.75	69.75	88.80	75.27
14						69.96	49.36	60.02	57.63	74.52	83.78	50.62
15		P		I		P	42.83 P	68.71	48.11	75.99	98.31	55.28
16		I				P		46.20 P^{o}	73.13	66.45	74.46	59.03
17			P^{o}			P	P		56.11 P^{o}	72.78	87.97	65.37
19		I^{o}	I^{o}							73.75	+ 70.61	64.35
20	I	I		I^{o}	I		I		I	+	53.53 P	86.93
22						P	P	P		P	I	42.93 P

P positive relationship mean angularity $< 65.00^{o}$

I independence on a negative mean angularity $>$ 85.00

* Angularities as computed by INGRID

0 Based on less than five cases

\+ The average angularity between construct types 19 and 20 is biased by two respondents who use several constructs of both types. If these two are excluded the number of cases drops to 11, and the average angularity of these is 87.39^{o}, with a standard deviation of 19.34.

TABLE 15

Number of Cases and Standard Deviations in Computation of Average Angularities between Construct Types

	1	6	10	11	12	14	15	16	17	19	20	22
1	12 21.12	18	11	10	36	35	30	27	30	22	23	13
6	16.71	1 –	2	4	11	11	11	11	8	5	5	8
10	17.80	18.78	– –	2	4	5	6	5	3	2	4	3
11	27.17	22.14	4.13	– –	7	7	6	6	7	4	3	–
12	26.77	21.52	16.54	28.34	9 20.49	27	26	23	23	21	20	16
14	19.62	~~22.90~~	14.24	7.27	19.39	2 19.04	19	17	18	15	17	13
15	22.40	28.03	22.41	24.15	16.50	18.38	6 31.18	15	12	14	17	16
16	19.20	15.87	15.02	21.80	17.63	22.89	18.21	2 14.85	16	16	14	11
17	14.77	15.21	17.10	27.61	18.74	20.56	21.40	23.24	4 14.17	19	9	8
19	18.64	23.90	24.12	22.01	24.74	28.82	24.14	23.63	22.82	9 23.12	21 +	10
20	22.75	19.06	16.02	22.43	20.41	29.33	22.10	17.01	27.42	+ 25.84	7 31.75	8
22	13.78	18.24	7.04	–	25.56	19.98	24.66	21.82	16.1[illegible]	33.91	46.06	2 25.09

* Standard Deviation

* Mean Standard Deviation: 21.06

+ See footnote for Table 14.

types. The standard deviation (Table 15) provides some evidence of the consensus of the sample on the degree of association between construct types represented by the mean angle.

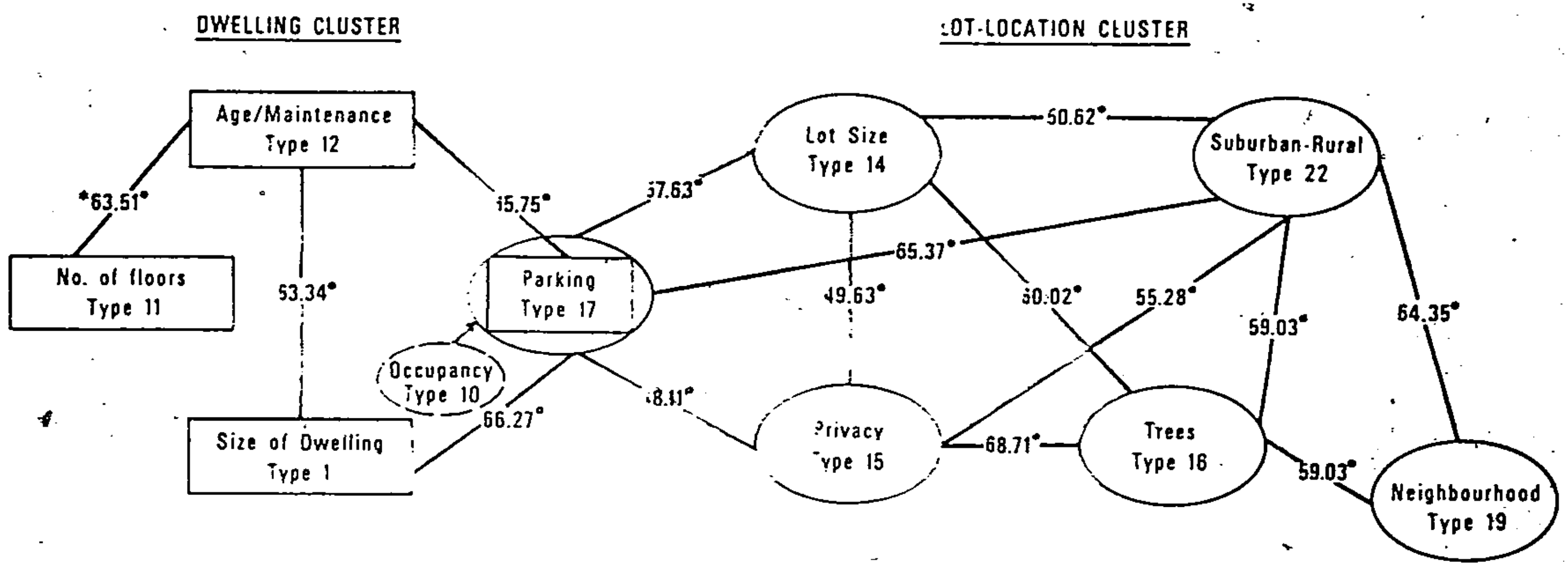
Tables 14 and 15 provide evidence for both issues being considered in Chapter VI. Information on the viability of construct classes appears on the diagonal. The smaller the angle between constructs of one type, the stronger is the assertion that they represent similar concepts. Information on associations between different construct types is in the off-diagonal cells. With the exception of the class of constructs labelled neighbourhood concerns (Type 19), those main construct classes for which data are available are viable. This conclusion is based on relatively low mean angles between constructs of each of the given types. The majority of the classes have mean angles well below 65 degrees, including the two dubious cases, age and maintenance (Type 12), and privacy (Type 15). Note that the viability of the class relating to accessibilities (Type 20) is among those upheld and as such there is no support for the tentative suggestion made in Chapter V, that there may in fact be a distinction between constructs relating to local and non-local access respectively. Constructs belonging to the class for lot size (Type 14) have a mean angle of approximately 70° which is not convincing but is based on only two cases. The angle of 74° for Type 19 is based on 9 cases and is a further indication of the weakness of this class.

Looking for low average angles between <u>different</u> construct types in the main body of Tables 14, we find indications of several clusters of associated constructs. These are diagrammatically represented in Figure 2. There is an association between three dominant concerns relating to the dwelling itself; that is, the concern for its size (Type 1), age and maintenance (Type 12), and the number of floors (Type 11). Other concerns relating to the house are not apparently drawn into this cluster. In fact, concerns about windows (Type 6), and occupancy (Type 10) have more affinity with characteristics of the lot.

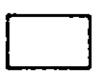
A second major cluster relates to aspects of the lot and location. This is a far more complex grouping than that for the dwelling being comprised of more construct types with a network of relatively strong linkages. Lot size (Type 14), and the desire for rural-suburban location (Type 22), play pivotal roles in this cluster, being positively related to one another (50.62°) while both are also related to privacy (Type 15) and vegetation (Type 16). Note the similarity of this grouping and the one found by Peterson (1967) between open space, privacy and greenery, of which more will be said in the conclusion to this chapter. Neighbourhood concerns which show signs of being related to both Types 16 and 22 may be on an outer extreme of the cluster. Parking concerns (Type 17) lie at another edge linked to lot size. Since Type 17 constructs also show an association with age and

FIGURE 2

ASSOCIATIONS AMONG CONSTRUCTS BY TYPE



KEY:


Dwelling-related constructs.


Lot-location related constructs.


Relationship for which the evidence is very limited due to insufficient or dubious data.

* Mean angle taken from Table 14.

maintenance of the dwelling (Type 12), the two main construct clusters are very effectively linked. The association with the lot may be explained either by the presence of a driveway, or by the use of the lot for parking. That between parking and dwelling constructs may be explained either as an association of house and garage as built structures, or by the spatial correlation between dwelling and age and availability of parking; older homes are often in crowded areas of the city where residential parking is at a premium, while newer dwellings have parking facilities.

The grouping of neighbourhood concerns with vegetation should be treated skeptically. Very little indication of this appears in the content analysis of either type, and as a class, Type 19 is suspect. On the other hand, Peterson (1967) did identify greenery as a major variable in one of his primary factors.

The only one of the main construct types to show a strong tendency for independence is Type 20, accessibilities. Evidence of this appeared earlier in the principal components analysis. It suggests that the concern for accessibility operates as a dimension of house evaluation in its own right. This makes it a very significant construct regardless of how important respondents rate it relative to other considerations since it is a unique dimension serving to differentiate housing. Hence the consideration given to access in the normative models is supported although the restriction of its definition to work locations alone, is not supported.

This analysis of the main angular relations between constructs by type, succeeds in providing a test of the viability of some construct classes and identifies the nature and strength of important construct relations. In particular, the complexity involved in 341 elicited constructs supplied by 40 respondents is reduced to at least three major dimensions; some aspects of the dwelling, of the lot and location, and accessibilities. However, these results are based on data aggregated over the sample and they do not necessarily hold true in the cognitive processes of individuals (Robinson, 1950). Hence, for the results to be very meaningful, the extent to which they hold in the cognitive schema of individuals must be established. This is attempted using two further treatments of the 40 repertory grids, one involving the significance of rank order correlations and the other, a grouping algorithm.

VI.4 The Correlation of Constructs by Type in Individual Grids

The rank order correlations[3] between constructs of selected types are organized in Tables 16 to 21 on the basis of whether or not they are significant at the 0.05 level. According to Labovitz (1970), it is reasonable to use a larger significance level where the objective is hypotheses generation, not hypotheses testing. The correlations given are selected to demonstrate whether the primary conclusions reached from the

TABLE 16

Evaluation of Selected Construct Classes:*
Correlations Between Constructs of the Same Type

Type		No. Significant at .05	%	Not Significant	%	Total
1	Dwelling Size	9	75.0	3	25.0	12
12	Age/Maintenance	7	77.8	2	22.2	9
15	Privacy/Separation	5	83.3	1	16.7	6
19	Neighbourhood	3	33.3	6	66.6	9
20	Accessibilities	7	100.0	–	–	7

* Only those types for which at least five correlations are available are included. (See the frequencies in the diagonal of Table 15).

TABLE 17

Independence of Accessibility Constructs (Type 20):
Correlations between Type 20 and Other Constructs

Type		No. significant at .05	%	Not Significant	%	Total
20	Accessibilities, with					
1	Dwelling Size	5	21.7	18	78.3	23
6	Windows	1	20.0	4	80.0	5
10	Occupancy	1	25.0	3	75.0	4
11	No. of Floors	0	0.0	3	100.0	3
12	Age, maintenance	4	20.0	16	80.0	20
14	Lot Size	6	24.0	11	76.0	17
15	Privacy, Separation	3	17.6	14	82.4	17
16	Trees, Landscaping	4	28.6	10	71.4	14
17	Parking	3	33.3	6	66.6	9
19	Neighbourhood	8	38.1	13	61.9	21
22	Rural-Suburban	4	50.0	4	50.0	8
24	Financial	4	50.0	4	50.0	8

TABLE 18

Association of Dwelling Constructs
Correlations Between Dwelling Size (Type 1)
and Age, Maintenance (Type 12)

	No. Significant at 0.05	%	Not Significant	%	Total
Type 1 with Type 12	22	61.1	14	38.9	36

TABLE 19

Association of Lot-Location Constructs
Correlation by Type

Types*	No. Significant at 0.05	%	Not Significant	%	Total
Type 14, Lot size with					
-Type 22, Rural, Suburban	9	69.2	4	30.8	13
-Type 17, Parking	12	66.6	6	33.3	18
-Type 15, Privacy	11	57.9	8	42.1	19
-Type 16, Trees	7	41.2	10	58.8	17
Type 22, Rural Suburban with					
-Type 17, Parking	4	50.0	4	50.0	8
-Type 15, Privacy	8	50.0	8	50.0	16
-Type 16, Trees	6	54.5	5	45.5	11
Type 19, Neighbourhood with					
-Type 16	7	43.8	9	66.2	16
-Type 22, Rural-Suburban	6	60.0	4	40.0	10

* The reasons for selecting this set of correlations and the order they are given in, follows the pattern associations illustrated in Figure 1.

TABLE 20

The Lack of Association Between Primary Constructs in the Two Clusters: Correlations Between Type 1 (Dwelling Cluster) and Types 14 and 15, (Lot-Location Clusters)

Types	No. Significant at 0.05	%	Not Significant	%	Total
Type 1, Dwelling size with					
-Type 14, lot size	7	20.0	28	80.0	35
-Type 15, Privacy	3	10.0	27	90.0	30

TABLE 21

The Link Between the Dwelling and Lot-Location Constructs Through Parking (Type 17): Correlations with Selected Construct Types

Types	No. Significant at 0.05	%	Not Significant	%	Total
Type 17 with Dwelling Cluster					
-Type 1	15	50.0	15	50.0	30
-Type 12	11	47.8	12	52.2	23
Type 17 with lot-location					
-Type 14	12	66.0	6	33.0	18
-Type 15	7	58.3	5	41.7	12
-Type 22	4	50.0	4	50.0	8

previous analyses hold in individual grids.

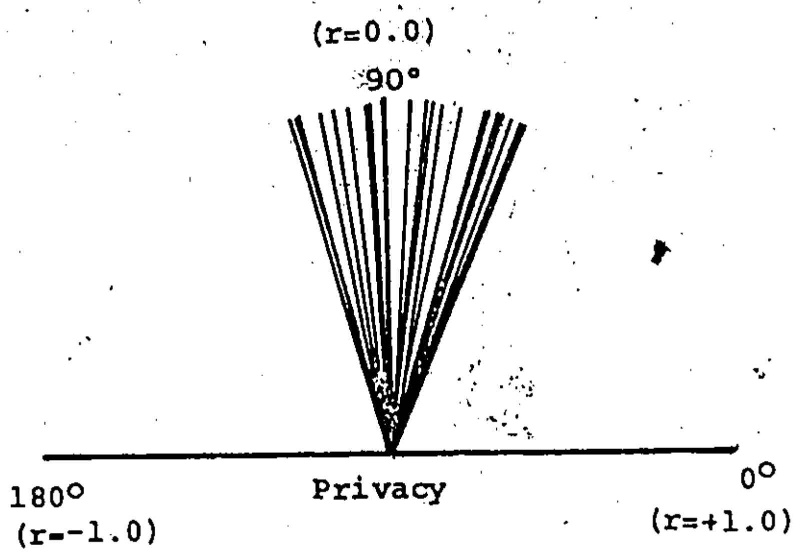
The high percentage of significant correlations for four of the construct classes in Table 16 supports the assertion that at least these classes (Types 1, 12, 15 and 20) group similar constructs for most respondents. As expected, the same cannot be said for the neighbourhood constructs (Type 19). Moreover, the association of privacy constructs with lot size (Table 19) but not internal space (Table 20) supports the assertion in Chapter V that privacy for this sample is a matter of external not internal space relations. Of thirty correlations, between privacy and dwelling size, only three are statistically significant at the .05 level. By contrast, over half of the nineteen correlations between privacy and lot size constructs are significant, most at the .01 level. This difference is obvious in Figures 3a and 3b. In both instances the abscissa represents privacy constructs. In Figure 3a, the angles indicate the relations between privacy and dwelling size in the grids of different respondents. These are grouped around a median of 92.82 degrees. Figure 3b, the median angle between privacy and lot size constructs is 43.14 degrees, and the relationship is consistently closer.

In most cases in Table 17 a very low proportion of respondents record significant correlations between accessibility constructs (Type 20) and constructs of another type. This upholds the conclusion that accessibility is an independent concern in house evaluations for most respondents. The association of the

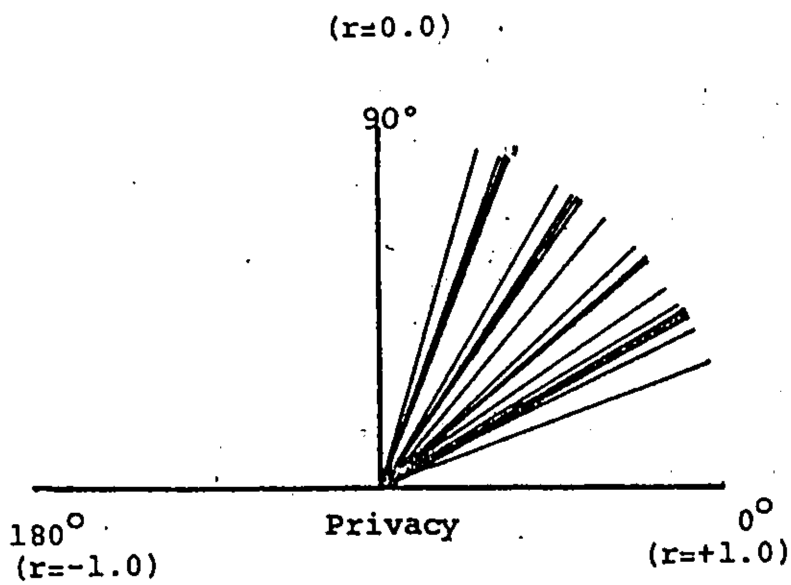
FIGURE 3

ANGULAR RELATIONS BETWEEN PRIVACY CONSTRUCTS, DWELLING SIZE AND LOT SIZE

3a: Dwelling Size and Privacy



3b: Lot Size and Privacy



main constructs in the dwelling cluster and lot - location cluster are considered in Tables 18 and 19 respectively. Although for all but one construct type, the majority of respondents do produce significant correlations between the specified pairs of construct types, this majority is often small. There is,however, a strong consensus that the main constructs of each of the two clusters belong to quite different dimensions (Table 20), although they may be related through a common association with parking concerns (Table 21).

In summary, the pattern of construct associations previously identified from the mean angular relations is upheld in an examination of the percentage of individual cases with significant rank correlations between specified construct types. In the final analysis, Ward's algorithm is used to move even closer to the grouping of constructs that appear in each individual grid in an effort to see whether the basic pattern persists at this close range.

VI.5 Ward's Hierarchical Grouping

Ward's algorithm is selected as a means of grouping the constructs on the basis of their interrelationships within each of the repertory grids. Ward's procedure is a means of hierarchically grouping cases into mutually exclusive subsets, where the members of the groups are maximally similar with respect to a number of variables. To group m cases, in this case m constructs, on n variables, there are m groups in the first instance and m-1 groups at the second phase, after two constructs are combined as one group. Successive groupings are made until only one group containing all m constructs is obtained. At each stage, the grouping is accomplished so as to minimize the loss of information as measured by an objective function, the ESS or error sum of squares. The error associated with each grouping is calculated, as is the increase in error with each successive grouping.

Each of the 40 grids supplied by A respondents is transformed into an m x m correlation matrix, where m is the number of constructs scored in the grid. Taking this as input, Ward's algorithm is used to group the constructs in each grid. The m constructs represent both the cases to be grouped and the variables on which the variation is measured. Hence, constructs are grouped on the basis of similarities of their association with each other and all other constructs in the grid. It is important to note that the signs on the correlation coefficient can be treated in different ways. If the signs are excluded, (or all are made positive), those constructs which effectively measure the opposite poles of the same superordinate construct will be grouped together early in the procedure with a relatively small increase in error. On the other hand, such constructs are in fact likely to be negatively associated with each other and will have inverse patterns of association with other constructs. When their negative relationship is recognized by the algorithm they are likely to be treated as separate groups rather than part of the same group until later in the grouping procedure, when the amalgamation leads to a relatively large increase in error. In the grids in this study, there are in fact very few significant negative correlations, the reason for which is discussed earlier, and it seems unlikely that there will be a noticeable difference between the two treatments. The constructs are grouped in both ways and the results summarized in Appendix D. This confirms that the pattern of construct grouping remains basically the same whether or not the negative sign on correlations are recognized. Unless otherwise stated, the following discussion of the results of the grouping analysis pertains to that in which negative signs are included in the input matrices.

The hierarchical grouping of the constructs for each grid is examined to identify an "optimal grouping". In most instances, this is defined as the grouping which precedes the first noticeably large increase in error as measured by the objective function. In those cases where two such increases occur at successive stages, the more interpretable grouping is used. As before, groupings are considered interpretable if the constructs allocated to each group can be shown to have related meanings. Results for the grouping analysis which appear in Tables 22 to 25 all relate to the optimal grouping in each of the 40 grids.

VI.6 Order in the Data

The grouping analysis provides the final evidence that there are a few basic dimensions underlying the large variety of concepts used by individuals in house evaluation.

The 341 elicited constructs supplied by the 40 "A" respondents are reduced to a total of 166 groups by Ward's procedure. This represents a range of 2 to 8 groups of constructs for each respondent, or a mean of 4.15 groups (Table 22). Effectively, grouping has cut the mean number of elicited constructs (8.5 in Table 6) to a mean of just over 4 groups of constructs. Some indication of the possible meaning of the underlying dimensions represented by these groups has already been found in examination of the viability of construct classes and of the associations of constructs by type, using other approaches to the grid data. It remains to be seen whether the results obtained in these previous analyses can help explain the groupings of constructs now identified in each of the 40 grids and thereby confirm that the conclusions they lead to are useful in explaining the

TABLE 22

Number of Groups in the Optimal Groupings of Constructs

Total No. of Constructs in the Analysis:	341
Total No. of groups over all optimal groupings for 40A respondents:	166
No. of groups in each optimal grouping Range: Mean:	 2-8 4.15

TABLE 23

Grouping of Constructs of the Same Type in the Same Group

Type	Number of cases in which two constructs of this type are allocated: a) to different groups	b) the same group	Number of grids containing two constructs of this type
1 Dwelling Size	3	9	12
6 Windows	-	1	1
12 Age/Maintenance	5	4	9
14 Lot size	1	1	2
15 Privacy	3	3	6
16 Trees	2	-	2
17 Parking	2	2	4
19 Neighbourhood	9	-	9
20 Accessibilities	2	5	7
22 Rural-Suburban	1	1	2

TABLE 24

The Independence of Constructs by Type

or

The Frequency with which Constructs are Grouped Alone or Only with Constructs of the Same Type in the Optimal Groupings

Type	Number of Constructs Grouped Alone	As % of the total number of elicited constructs of this type	
		%	total elicited
1 Dwelling Size	17	35.4	of 48
2 Basement	1	16.6	6
3 Dining Room	-	0.0	1
4 Other Rooms	-	0.0	0
5 Room Shape etc.	-	0.0	2
6 Windows	6	42.8	14
7 Fireplace (s)	-	0.0	1
8 Other Interior	1	33.3	3
9 Appearance	1	12.5	8
10 Occupancy	4	40.0	10
11 No. of Storeys	3	30.0	10
12 Age/Maintenance	8	22.2	36
13 Other Dwelling	3	37.5	8
14 Lot Size	4	13.8	29 +
15 Privacy	4	15.3	26 +
16 Trees	8	32.0	25
17 Parking	2	7.7	26 +
18 Other Lot	1	0.0	3
19 Neighbourhood	5	22.7	22
20 Accessibilities	12	57.1	21 *
21 Urban, "In Hamilton"	-	0.0	5
22 Rural, Suburban	-	0.0	18 +
23 Place Names	1	11.1	9
24 Financial	6	66.66	9 *
25 Uncoded	-	0.0	1

+ Important Construct types frequently associated with other construct types.

* Important Construct types which frequently operate independently of other types.

TABLE 25

The Nature of the Construct Groups by Construct Type

Construct Types in each Group	No. of Groups	% of Total	No. of Groups	% of Total
A. Constructs of Dwelling Cluster				
1. of Dwelling cluster only (1, 11, 12, 17)	32	19.28		
2. of Dwelling Cluster plus other dwelling types (2-11, 13)	12	7.22	68	40.95
3. other dwelling types only (2-11, 13)	21	12.65		
4. largely dwelling constructs	3	1.80		
B. Constructs of Lot-Location Cluster				
5. Lot only (14, 15, 16, 17, 18*)	24	14.46		
6. Location only (19, 21, 22, 23**)	7	4.21	64	38.55
7. Lot and Location (14-19, 21-23)	19	11.45		
8. Largely lot-location	14	8.43		
C. Accessibility Constructs				
9. Accessibilities only (20)	10	6.03	17	10.25
10. Accessibilities plus others	7	4.22		
D. Financial Constructs				
11. Financial only (24)	5	3.02	8	4.38
12. In combination with other types	3	1.81		
E. Miscellaneous				
13. All other groupings	9	5.42	9	5.42
TOTALS	166	100.00	166	100.00

* Type 18 included because it is both reasonable & convenient.

** Types 21 & 23 included. Their relationship to Type 22 especially is discussed in Chapter V.

residential decision making behaviour of individuals.

As a precaution, the first step in examining the groups simply involved testing that they broadly support the previous findings. Table 23 records whether constructs of the same type are allocated to the same group, hence testing the viability of the main construct classes. As usual, neighbourhood concerns (Type 19) are the only constructs which do not show a consistent tendency to be grouped together. Table 24 confirms the independence of accessibility constructs (Type 20), and provides some new evidence that financial concerns (Type 24) may also operate as a relatively independent dimension. By contrast, and as expected, constructs of the lot - location cluster, (Types 14, 15, 17 and 22 respectively), are shown to be more frequently grouped than operating alone. The frequencies with which constructs of all types are grouped together are recorded in Appendix D. They are not included in the text since the frequencies are not strictly comparable due to the fact that the number of constructs in each case is not controlled. Moreover, the table provides no additional data to those in Table 14, "Average Angular Distance".

The most significant results of the grouping analysis appear in Table 25. This summarizes the results of an attempt to classify each of the 166 groups found in the 40 grids according to the clusters of constructs identified by the previous analyses. In other words, the clusters are used to hypothesize the nature of the newly identified groups of constructs.

Significantly, only 5.4 per cent or 9 of the 166 groups cannot be classified by this means. Of the remainder, financial and accessibility concerns account for 5 and 10 per cent respectively, while the great majority, almost 80 per cent of the groups are split about evenly between groups of constructs relating to the dwelling and those relating to aspects of the lot and/or location.

Almost half of the groups containing constructs relating to the dwelling are comprised of only those constructs types seen as the core of the dwelling cluster (Types 1, 11, 12 and 17), thus confirming the existence of this set of construct associations in the cognitive processes of these respondents. However, almost one third of the groups referencing the dwelling contain constructs relating to aspects of the dwelling other than those of the core cluster. In a larger sample, it may be possible either to identify a second dwelling cluster, or to elaborate on the meaning of that already tentatively established, by adding new linkages. The fourth of the clusters relating to the dwelling is a very small number of groups (3 of 166) which contain a mixture of constructs not relating to the dwelling with a majority that do. This suggests that overall, the clusters of constructs relating to the dwelling have, like the constructs which comprise them, a meaning which is relatively well defined and bounded.

The same is not quite so true of the 64 lot - location groups, of which 14 mix other construct types with those listed as lot - location. This is not unexpected since we have already recognized that many of these constructs, and probably the clusters they form, are not as well bounded as those for the dwelling. On the other hand, given the common belief that part of the meaning of location lies in its supposed correlation especially with specific attributes of housing and financing, 14 of 166 groups is a very small number in this category.

It is clearly evident that characteristics of the lot contribute a major part of the meaning of the lot-location groups. Alone, lot constructs (Types 14 to 18) account for 24 of the 64 groups, and in combination with references to the location, they account for 43 of the 64, or more than 67 per cent. By contrast, location constructs on their own (Types 19, 21, 22 and 23) make up a mere 7 of the 64 groups. Even the inclusion of the groups relating to accessibilities does not allow the frequency of location groupings to match those relating to the lot.

In summary, the analysis of grids using Ward's hierarchical grouping procedure demonstrates conclusively that the major conclusions relating to the nature and associations of constructs reached from the earlier analysis using aggregate data, hold for individuals.

VI.7 Summary and Hypotheses on the Nature of Concepts Used in Residential Choice

It will be recalled that the main aim of Chapters V and VI is to identify the concepts used in the cognition, evaluation and ultimately choice of housing where the concepts are to relate to both detailed and more general levels if possible. The 40 respondents in sample A used a total of 438 constructs in evaluating the display vacancies, including 341 which were elicited and scored in the 40 repertory grids. This is a mean of over 10 for each respondent of which 8.5 appear in the grids. In terms of the aspects of housing which they refer to, the constructs are sufficiently varied to require coding by a master code containing over 200 different descriptions. This is the most specific set of dimensions identified in the analysis.

The first attempt to discover more general dimensions led to the classification of all constructs into the twenty-five basic types of the typology outlined in Chapter V. The analyses in Chapter VI are intended both to validate the usefulness of the classes and to continue the search for more general dimensions underlying the constructs. These tasks are treated first by using principal components analysis. This is found to be inadequate since, in most cases, it collapses into one main component which is difficult to interpret. This could mean that house evaluation is such a complex and individualistic process, it is impossible to identify more general factors which are meaningful. However, it may also indicate that housing constructs are highly interrelated and principal components analysis is simply inadequate for the task of separating out the various areas of meaning. Assuming the latter to be true, techniques capable of finer discrimination are employed to analyze the grids; specifically mean angular relations, correlations and Ward's hierarchical grouping procedure. The latter two approaches simultaneously establish that the results, although first obtained from aggregate data, do hold in the cognitive processes of individual respondents.

As befits a multi-operational approach, these main results are summarized in terms of the convergence of all contributing analyses (Table 26). From Table 26 it is possible to establish which construct classes seem well defined and which do not, and the main associations between constructs of different types. The results provide the basis for the generation of hypotheses relating to the nature of concepts used in housing choice, - the first of three objectives outlined in Chapter .

Before listing the hypotheses, it is important to note that they can only represent a partial list of housing concepts. For a number of reasons, notably small sample size and shortcomings in the methods of data collection and analysis, it is evident that important considerations are poorly covered, if at all. The distinction between owned and rented dwellings

TABLE 26

Convergence of the Analyses of Construct Associations

	Content Analysis Chapter V	Principal Components Table 12	Average Angularity Table 14	Corre- lations Table 16	Ward's Grouping Table 25
Viability of Main Classes					
Type 1: Dwelling Size	&	&	&	&	&
6: Windows	&	*	&	*	&
10: Occupancy	-	N.T.	N.T.	N.T.	N.T.
11: No. of Floors		N.T.	N.T.	N.T.	N.T.
12: Age/Maintenance	-	&	&	&	&
14: Lot Size	&	*	*	*	&
15: Privacy	-	&	&	&	&
16: Trees	&	&	&	*	*
17: Parking	&	&	&	*	&
19: Neighbourhood	-	-	-	-	-
20: Accessibilities	-	&	&	&	&
22: Suburban - Rural	&	&	&	*	&
24: Financial	N.T.	N.T.	N.T.	N.T.	&
Main Construct Associations	Chapter V	Table 12	Table 14	Tables 18 & 19	Table 25 AppendixD
Types: 1 & 12	-	-	&	&	&
1 & 17	-	-	&	N.T.	&
11 & 12	-	-	&	N.T.	&
12 & 17	-	-	&	N.T.	&
14 & 17	-	-	&	&	&
14 & 15	&	-	&	&	&
14 & 16	-	-	&	*	&
14 & 22	-	-	&	&	&
15 & 10	&	-	-	N.T.	-
15 & 16	-	-	&	N.T.	-
15 & 17	-	-	&	N.T.	&
15 & 22	&	-	&	&	&
16 & 22	-	-	&	&	&
16 & 19	-	-	&	-	&
19 & 22	-	-	&	&	-
Independence of Types	Chapter IV	Table 13	Table 14	Table 17	Table 24
20: Accessibilities	-	&	&	&	&

*Not supported, but there are mitigating circumstances i.e. data are insufficient or suspect.
N.T. Not Tested or could not be tested.
& Result Supported.

does not appear although it is clearly crucial to searchers in both markets. For some reason, the triad procedure did not elicit this concern perhaps because all vacancies which the respondents considered both in their actual searches and in the display simulation, were seen as nonrental properties. Rental dwellings simply lay outside the range under consideration. The triad procedure also appears to have been the cause of a gross under-representation of constructs relating to financial considerations. This makes it impossible to establish the cognitive associations that such constructs are likely to have with other types. It seems possible, for example, that searchers will recognize in their mental schema, relationships between price, and house size (Type 1) and lot size (Type 14) respectively which reflect the correlation of these factors in the housing market. Peterson (1967) found an association between area age and expensiveness.

The results relating to two other concept types, neighbourhood and accessibilities, should be treated very cautiously. All the analyses point out that the neighbourhood constructs (Type 19) do not represent a common group (Table 26). A variety of master codes are needed to describe the constructs in this set, but due to inadequacies in the code, the small sample size, and complexity in the constructs themselves, it is difficult to distill a general set of meanings. Hence, although neighbourhood concepts appear in the summary hypotheses they should be considered carefully.

The problem with the accessibility constructs is almost the reverse. Virtually all the analyses uphold these as a single grouping. On the basis of their content analysis however, and intuitively, it seems more reasonable to consider that there is, or should be, two different concerns here; one for local or neighbourhood access, and the other for nonlocal, especially employment destinations. Access to work which is poorly represented in the construct data is given much greater consideration in respect to its importance in housing choice in Chapter VII which follows.

VI.7.1 Hypotheses

The results are summarized as four major hypotheses, although each could be catalogued in terms of the innumerable lesser hypotheses on which it is built.

It is hypothesized that:

1. Housing concepts can be described on at least two levels;
   i) elicited concepts; which are defined as those which house searchers are aware of and can articulate; and
   ii) dimensional concepts; each of which is comprised of one relatively independent elicited concept, or several elicited concepts which have related or overlapping cognitive meanings. Dimensional concepts are often more general or summary descriptions of several elicited concepts.

It is probable that for a given individual, a dimensional concept is analagous to the superordinate construct of Kelly's Personal

Construct Theory, while its component elicited concepts, are subordinate constructs.

2. Elicited concepts include concepts of all 25 types as defined in Chapter V, the most frequently used being:

   i) dwelling size, especially the number of bedrooms;

   ii) dwelling age, maintenance and related concerns;

   iii) lot size;

   iv) external privacy and separation from neighbours;

   v) trees and landscaping of the lot;

   vi) parking and garage facilities;

   vii) accessibilities;

   viii) degree of perceived urbanism ("urban", suburban, or "rural" locations);

   ix) local suburbs, satellite towns or areas designated by place names;

   x) financial concerns.

This list is neither exhaustive, nor are the concepts equally well defined in Chapter V. There remains some ambiguity on the definition(s) of accessibilities, and financial concerns are hardly defined at all. Major considerations may be excluded (for example, to own or rent), while others are excluded owing to insufficient or confused data. The concepts labelled "neighbourhood concerns" in the study are a case in point. Many of the less frequently mentioned concerns described in Chapter V, notably a variety of references to other aspects of the dwelling such as concerns about the basement, dining room, windows, occupancy and number of floors, although not listed above, are housing concepts which may be used in residential choice.

3. Dimensional concepts in house evaluation include concepts or concept clusters relating to:

   i) the dwelling, specifically dwelling size, age, maintenance and parking.

   ii) lot and location, specifically parking, lot size, privacy and separation from neighbours, degree of perceived urbanism, trees, landscaping and neighbourhood concerns.

   iii) accessibilities .

Major concerns not represented include tenure and financial considerations. It has been impossible to establish whether the latter comprises an additional separate dimension or is strongly related to an existing cluster.

A number of points about the lot - location cluster are important. The term "lot" appears to have its own relatively well defined connotations quite apart from its association with location. The evidence of this is in Table 25, where it is recorded that a large number of the groups of constructs are comprised of references to the lot only, to lot size, privacy, trees and landscaping, parking and a few additional miscellaneous features.

In marked contrast, the term "residential location" has no such obvious coherent meaning, and use of this expression in either structured questionnaires or incipient theory may be both simplistic and confusing. In the first place, relative location or access may be quite a distinct concern from all other considerations about location. Secondly, references to the nature of the location especially in terms of its perceived degree of urbanism, seem to be closely and possibly inseparably tied in meaning to the lot. Thirdly, an additional connotation or set of connotations of location is here labelled "neighbourhood". In fact, these comprise an extremely complex set of concerns which cannot be convincingly defined either individually or as a group. Finally, place names used to refer to prospective residential locations act as superordinate constructs for any or all of the three previous aspects of location, (of which more is said later). Hence, unless elaborated their specific meanings are ambiguous.

Finally, in reference to the lot-location cluster, the relationship with Peterson's (1967) findings are significant. This study supports his results in one major respect; the association of concepts relating to greenery, open space and privacy. However Peterson called these major variables in the explanation of preferences for residential neighbourhoods. The connotations given to the word neighbourhood (Type 19) in this study, do not support this assertion. Hence, it would seem that Peterson was not measuring preferences for neighbourhoods as the word is used by respondents in this study, but was probably measuring preferences for housing and housing environments. This study also contradicts Peterson's assertion that preferences can be explained in terms of a few orthogonal variables. The lack of orthogonality in the data used here required use of alternate procedures to principal components and in fact, is well depicted in Figure 2, by the association between many major constructs.

4. <u>Individuals use a mean of approximately 10 elicited concepts in house evaluation which collapse into at least three dimensional concepts</u>.

The ability of individuals to handle seemingly large numbers of complex concepts in house evaluation may, therefore, be explained by concept combination in mental processes into cognitively and functionally related sets.

A major caveat is important at this point. While the preceding discussion stresses a two-level description of housing in terms of elicited and dimensional concepts, it is likely that more levels will eventually be identified, possibly to the extent of an elaborate heirarchical system. One major indication of this which could not be adequately tested in this study is represented by concepts involving place names (Type 23). These appear to form the apex of a tri-level arrangement having as components of their meaning, two dimensional concepts; accessibilities and lot-location (see V.2.23), where the latter is in turn composed of several elicited concepts. Another indication of other levels is that several of the elicited concepts, such as age-maintenance (Type 12), privacy (Type 15) and accessibilities (Type 20), appear to have distinct and separate connotations within them which may emerge as separate subordinate types in a study using a larger sample.

If supported, the main hypotheses described above, and the many lesser notions implicit in them have important implications for future empirical research in housing choice and for the development of behavioural theory in this area. The definition of housing is not a simple listing of independent and discrete concepts but is a complex of highly interrelated notions pertaining to the dwelling, lot, and to a lesser extent, location, which can only be subdivided with a significant loss of information The grouping of attributes by logical associations, such as the use by Lansing and Marans (1969) of "physical", "social" and "symbolic" attributes, may be a helpful intellectual exercise but may not be meaningful to respondents. The physical category, for ecample, includes housing site and condition (Type 12), landscaping (Type 16) and available facilities (part of Type 19). These are not strongly associated concepts.

One cautionary note should be added. The results of this study are very likely biased towards the attitudes and values of middle-class Canadians. Note for example, the emphasis in the elicited concepts on physical attributes of housing and the few references to social needs, such as those found important to the working class in studies by Fried and Gleicher (1961) and Hartman (1963). Nor is there an obvious concern for a "secure" home as described by Rainwater (1966) for the working class, although there is some need expressed for safety in the neighbourhood streets which Rainwater associated with more prosperous groups.

Together, the hypotheses of Chapter VI represent the completion of the first of the three aims in Chapter 1. Psychological measurement procedures are used to generate well grounded hypotheses on the nature of concepts used in housing choice.

FOOTNOTES

[1]For a summary of other differences see Tuite (1973).

[2]This point should be kept in mind. It is the first indication of the relative independence of accessibility constructs, something which becomes much more evident in the later analyses. This is a major finding since it implies that accessibilities comprise in themselves, one of the dimensions of residential evaluation. As such, it also suggests that it may be unreasonable to group accessibilities with other concerns; that accessibility must be explictly recognized in general as well as detailed lists of the dimensions of housing if these are to be meaningful to the choice behaviour of individuals.

[3]Kendall's tau is used since this is reputed to be a more reliable statistic than Spearman's r where the data contain ties as they do in the grids where 10 residences are scored for each construct on a 1-7 scale. See Nie et al. (1970, p. 153).

CHAPTER VII

The Relative Importance of Housing Concepts Especially Accessibilities in Choice

VII.1 Introduction

Chapter VII considers the relative importance of different attributes of housing in the evaluation, and hence, in the choice of a dwelling. Recall that the development of hypotheses on the relative importance of concepts is the second objective outlined in section 1.2. Also recall that in developing the research design, this objective is subordinate to the first, the examination of the nature of housing concepts.

In the following section, three sets of data relating to the importance of specific concepts are briefly outlined, prior to a discussion of the main findings from each and their implications. The results of the scaling analyses are a fourth data set directly relevant to this section but are left for consideration in Chapter VIII. Consistent with the stress given to problem areas in research on residential decision-making, particular emphasis is given in this chapter to the relative importance of accessibilities to all destinations, but most notably from the residence to work.

The first data set used is the respondent's rankings of constructs in order of their relative importance and produces findings of three types:

1) it supports previous conclusions on the paramount importance of price, dwelling space and occupancy in choice;
2) it provides new insight into the meaning and relative importance of residential location; all aspects of location when summarized as a place name rank in importance only behind price, and are as important as space and occupancy considerations; the individual aspects of location such as accessibilities and the lot-location cluster are less important;
3) the relationship between dimensional or aggregated concepts and their elicited components is further clarified; the former being apparently more important than the latter when both are ranked.

Two further data sets are used to explore more closely the relative nature and importance of accessibility, notably access to work, since this has been at the centre of a controversy for a number of years. Access to work has been central to research using normative and aggregated frameworks, (for example, the work of Alonso, 1965) while being simultaneously declared unimportant by empirical researchers using survey procedures

(Stegman, 1969). Data on the likelihood of respondents changing their church, shopping place, school and work place to achieve the planned residential move, indicate:

1) that respondents are generally willing to change shopping and school locations, and as such the concern expressed in accessibility concepts (Type 20) is for access to <u>any</u> shopping area or school which represents a reasonable alternative to the ones then being used;

2) conversely, respondents are unwilling to change their work location and,therefore,the concern for access to work in Type 20 concepts relates to the <u>present</u> work place;

3) however, respondents still sacrifice some access to work to achieve the move.

Data derived from an analysis of a tradeoff exercise support and elaborate on these conclusions with several additional findings:

1) too much proximity to work defined as 5 minutes distance as well as too little access, defined at 60 minutes travel time, are both undesirable, while the most preferred distance is approximately 15 minutes;

2) while as expected, some levels of access and price may act as constraints on choice, so too do some levels of dwelling size, thus suggesting that a negative determinants

approach to housing choice may be more appropriate than the preference approach commonly proposed for residential choice (see for example, Demko and Briggs, 1970).

VII.2 The Ranking of Construct Types in Terms of their Relative Importance

The 40 respondents who answered questionnaire format A, not only supplied a list of elicited constructs and other factors; they ranked these in order of their relative importance in evaluating dwellings. These constructs and factors were subsequently classified into 25 types (Chapter V). The median and modal ranks in terms of importance for each of the major types, are recorded in Table 27. The values and the rank order of constructs on the right hand side of the table are based on all constructs. However, since this gives respondents who use several instances of any one type an added influence on the measures, the left hand column of Table 27 shows the adjustment to the median and modal values when only one construct of a given type is included for each respondent. In this case, the highest ranked construct is taken to represent all others of the same type used by the respondent.

TABLE 27

The Relative Importance of Constructs by Type

Ranked by Median over all Constructs		Ranked by Median; one construct per respondent per type †	
Median		Median	
2	Financial	2	Financial
3	Place names, occupancy	3	Dwelling Size, Occupancy, Place names
4	Dwelling Size	4	Neighbourhood, Accessibilities
5	Privacy	5	Age-Maintenance, Privacy
6	Lot Size, Urban Rural, Accessibilities	6	Lot size, Urban-Rural
7	Age-Maintenance, Trees, Neighbourhood	7	Trees, Windows
8	Windows, Number of Floors, Parking.	8	Number of Floors, Parking.

Ranked by Mode* over all Constructs		Ranked by Mode*; one construct per respondent per type	
Mode		Mode	
1	Financial, Place Names Occupancy, Neighbourhood	1	Financial, Place Names Occupancy, Neighbourhood
2	Dwelling Size	2	
3		3	Dwelling Size
4	Accessibilities	4	Accessibilities
5	Privacy	5	Privacy, Parking
6	Windows,	6	Windows, Rural-Urban
7	Lot Size, Trees	7	Lot size, Trees
8	Number of Floors, Age-Maintenance.	8	Number of Floors, Age-Maintenance.

* Where several modes occur that closest to the median is used.

† Where a respondent used more than one example of a given construct type, that with the highest rank is used.

Of all the major construct types, financial concerns are consistently ranked as most important, or among the most important concepts (Table 27). This is consistent with the findings of other researchers such as Rossi (1955) and Butler et al., (1970). Only slightly less important overall, are the preferences for a single family dwelling (occupancy constructs), number of bedrooms (dwelling size constructs) and the location as reflected in a local place name.

Of the remaining concepts, those relating to the dwelling are particularly insignificant, thus confirming the overriding importance of the preferences for a single family detached unit (occupancy constructs) and number of bedrooms. The only other dwelling-related concept to show any major significance, is the age-maintenance concern (Type 12). This has a median rank of fifth when the rank for one construct per type per respondent is used as the basis of the analysis. Otherwise, constructs such as dwelling age and maintenance, windows, number of floors and parking are the least important of the main construct types.

Accessibilities (Type 20) head the remaining concepts, having median and modal values around four to six regardless of whether they are taken together or divided into local, particularly neighbourhood accessibilities and non-local, particularly journey to work accessibilities. Hence, as in the previous chapter, the intuitive division of accessibilities into these two types is not upheld by the data. Nonetheless, the relatively high ranking given to accessibilities confirms the significance of this group of constructs; already established by the unique role they play in differentiating between dwellings, as indicated in Chapter VI. The implications of this finding, as it relates to the current controversy on the importance of access to work is discussed later, in conjunction with other results reported in sections VII.3 and VII.4.

The various concepts belonging to the lot-location cluster come behind access. Privacy constructs (Type 15) appear to be almost, if not as important as accessibilities, having a median rank of five. Ranked slightly below privacy but always close to it, are the lot size and rural-urban construct types which are closely associated with privacy. Their lesser ranking in this case, suggests they are subordinate constructs compared to privacy in the lot-location cluster. With the exception of the neighbourhood concepts (Type 19), the other concepts in this cluster such as concerns about trees and landscaping and parking are judged to be relatively unimportant in house evaluation.

The median and modal ranks for neighbourhood concerns (Type 19) are erratic. Type 19 constructs appear to divide into two groups, one with a very high ranking (around one, or most important) and the other a much lower rank order, around seventh in importance (Table 27). Although a closer examination of the verbal labels used to describe the constructs in each group could identify no obvious differences between them, the confusion in the data again suggests that more than one set of concepts is involved in the description of neighbourhood as discussed at the end of the previous chapter.

In summary the price of a home, the number of bedrooms it has, the occupancy of the dwelling and its location as represented by a place name are the most crucial concepts in choice. The concepts which represent various connotations of the meaning of a place name are only slightly less important, with accessibilities ranked higher than the lot-location cluster. Various minor aspects of the dwelling are relatively insignificant in determining choice.

The tendency for individual location concepts to be ranked less than the set of place names suggests that aggregated or dimensional concepts are more important than their individual components. (This could not be further tested since it would require a simultaneous ranking of dimensional and elicited concepts). The order of importance of the dimensional concepts identified in Chapter VI appears to be first, price, followed by dwelling size and occupancy, accessibilities, and lot-location.

In the absence of other indicators of the importance of the different attributes of housing, rankings such as those used above are useful. Nevertheless, they suffer from a number of limitations some of which have already been reviewed in Chapter II. They require, for example, an assumption that respondents' statements on the importance of attributes are reliable indicators of their actual importance in determining choice. An indirect means of estimating importance may be more accurate. A possibility suggested by Hudson, quoted in Stringer (1974), is use of regression analysis to predict weights for each attribute or construct type, using preferences on each of the display houses as the dependent variable. Secondly, the use of rankings makes it impossible to ascertain how the different attributes influence the respondents decision process. Which concepts, for example, are constraints on choice and which operate to determine preferences? Economic theory postulates that financial concerns are important as a function of their overriding ability to constrain housing choice. Geographers and regional planners add distance, especially access to work, as a second constraint. Results reported in section VII.4 suggest that other main concepts such as dwelling size may also act as constraints on choice.

Third, and most important, ranking the attributes of housing in terms of their relative importance is not a realistic approximation of the choice process. It is not the attributes themselves which we are concerned about when evaluating residences, but the levels of each attribute. This is the argument implicit in Lancaster's (1966) analysis of consumer behaviour where he suggests that a consumer's preference ordering of a set of alternatives is based on bundles of characteristics of goods, not bundles of goods. The same rationale underlies the use of Conjoint Scaling and its offshoot, Tradeoff Analysis, to estimate preferences for different levels of attributes. This technique is used later in this chapter, to analyze a limited set of data relating to four housing attributes, access to work, price, dwelling and lot size. For all other attributes, the limitations discussed above should be kept in mind. They explain the difficulty most respondents had in completing the ranking task. At worst, they have been called meaningless (Knight and Menchik, 1975, p.26). At best, they can be considered an approximation of the importance of the various concepts to be supplemented by additional analyses.

VII.3 Access to Different Destinations

Information on the relative importance of access to various destinations was obtained from the forty respondents who answered format B. They stated whether or not they would be likely to change their current church, shopping place, school and work place to achieve the planned move, and provided information on expected changes in access to various destinations.

The data indicate that a residential move has an approximate 50 per cent chance of leading to a change of shopping location (21 of 40 respondents were willing to change), and a change of school (8 of 10 respondents with school-age children). Respondents were less willing to change their church and access to church does not appear to be significantly affected by the move. All but 2 of 40 respondents were <u>un</u>willing to change their work location. The concern for access to shopping and schools in the accessibility constructs (Type 20), therefore, is a concern for access to reasonable alternatives to the places respondents were using at the time of the interview. Conversely, access to work is to the <u>present</u> workplace.

While place of work does not appear likely to be influenced by a residential move, it is not a sufficient constraint on the choice to prevent losses in accessibility. More respondents expected an <u>increase</u> in the travel times of both spouses with the move, than those expecting a <u>decrease</u>. The expected increase is greater for working females than males, moving from a pre-move mean time for the 20 working females, of 16.38 minutes to a post-move mean of 24.75 minutes. The average travel time for the 36 working males changed marginally from 21.08 minutes to 26.53 minutes.

VII.4 Tradeoff Analysis and the Importance of Access to Work

This section examines the relative importance of access to work more closely. Some of the data came from all 40 B respondents. Additional information was obtained from the last twenty respondents who answered questionnaire format B, stating their preferred and maximum travel times to work, and completing a tradeoff task (Appendix A 3). The latter exercise demonstrates the respondents' preferences for four specific travel times, price levels, lot and dwelling sizes respectively (Table 28). These particular variables include some of those identified as important concepts in Chapter VI and in section VII.1 Access, price and space considerations are also major variables in the population density and landrent models. The selection of the four levels listed for each variable in Table 28 was based, as far as possible, on the construct data reported in Chapters V and VI.

TABLE 28

Attributes Used in the Tradeoff Analysis

A 1	Distance to Work	- 5 minutes
2		15 minutes
3		30 minutes
4		60 minutes
B 1	Number of Bedrooms -	2
2		3
3		4
4		5
C	Size of Lot	
1	Small lot, (30 x 100); no trees, close to neighbours	
2	Average lot (60 x 100); some trees and landscaping	
3	Large lot (125 x 200); trees and landscaping, spaced from neighbours	
4	Very large lot (3 acres) well landscaped	
D 1	Price	The price respondent paid
2		$1000 more than paid
3		$3000 more than paid
4		$5000 more than paid

In the tradeoff exercise, respondents were asked to assume that they were evaluating residences represented by the individual cells of six matrices. The dwellings were to be seen as comparable to the dwelling the respondent actually chose on all but the four variables and their levels listed in Table 28. By ranking the choices represented in the 16 cells of each matrix from the most preferred alternative (1) to the least preferred (16), the respondent effectively demonstrated the relative importance of the four variables and their respective levels in house evaluation. A measure of this importance, described as a utility, is estimated for each level and variable and for each individual, using a conjoint scaling procedure known as Tradeoff Analysis. This is described in Appendix E and is a variant of multidimensional scaling described in chapter VIII.2.1.

Further evidence of the greater importance of financial and dwelling size concerns compared to access, appears in Tables 29 and 30. These record how many of the final 20B respondents ascribe highest utility and lowest utility values respectively, to any level of the four variables. Access to work is not judged most important by any respondent, while a price level is most important to the majority (11 of 20 respondents). Consistent with this finding, the preferential ordering of the nine display vacancies by all 40B respondents, does not have a significant positive correlation with the order of vacancies in terms of

TABLE 29

The Frequency with which
Attributes Received the Highest Utility at Some Level

Attribute	No.	%
Access	0	0
Dwelling Size	4	20
Lot Size	5	25
Price	11	55
TOTAL	20	100

TABLE 30

The Frequency with which
Attributes Received the Lowest Utility at Some Level

Attribute	No.	%
Access	4	20
Dwelling Size	8	40
Lot Size	3	14
Price	5	25
TOTAL	20	100

their access to the place of work of either spouse, with the exception of 3 of 58 relevant cases.

The slight tendency for some level of access to be judged most <u>un</u>desirable in Table 30 as compared to none judged <u>most</u> desirable in Table 29, suggests that access to work acts more as a constraint on choice than a determinant of preference. This may explain, at least in part, the unique role accessibility constructs play in house evaluation (Chapter VI). Note however, that price and more particularly, dwelling size, also have levels which are highly undesirable and therefore probably act as constraints on choice. This is important and is discussed in the conclusion of this section.

Evidence on exactly how much access to work is desirable was derived from the Tradeoff Analysis and from respondents' statements of their preferred travel times. In Table 31 the utility values given to each of the four access levels, 5, 15, 30 and 60 minutes, are ranked from one to four and summed over the twenty respondents. On an assumption that more access is more desirable, the expected sum for 5 minutes is 20, and for 60 minutes is 80. A ratio of the actual to expected sum of rank scores produces a simple measure of the relative preference for each level (Table 31). A ratio of less than one, as for 15 minutes indicates that the given level is ranked more desirable than expected; a ratio of more than one, as for 5 minutes, indicates the access level is less desirable than expected.

TABLE 31

Preferential Orderings of the Four Levels of Access

Levels of Access	Sum of Ranks (1-4) over 20 respondents	Expected Sum	Ratio of Actual Over Expected
5 minutes	39	20	1.95
15 minutes	32	40	0.80
30 minutes	52	60	0.87
60 minutes	77	80	0.96

Table 32 lists measures of the respondents' stated preferred and maximum travel times to work. Together with Table 31, these data suggest the preferred travel time is around 15 minutes, (the mean preferred time is 14.38 minutes). Too much proximity, specifically 5 minutes, or too much distance are both undesirable states. These results confirm those of Redding (1965).

TABLE 32

Preferred and Maximum Travel Times to Work

	Preferred Time in Minutes	Stated Maximum Time in Minutes
Range	5 - 30	20 - 60
Mean	14.38	37.50
Median	15	30

The final tables (Tables 33 to 38) in this section provide further confirmation of all these conclusions. Tables 33, 34, and 35 are predictions of the number of respondents willing to trade off accessibility to work to obtain their most preferred levels of each of the other three attributes in turn.

TABLE 33

Willingness to Trade-Off Access to Obtain a Desirable Dwelling Size.

Willingness to travel 30 minutes to obtain the preferred dwelling size: (Choice B).

Choice A	Number Choosing A	%	Choice B	Number Choosing B	%
4 bedrooms* 5 or 15 minutes**	13	65%	Most Desirable Dwelling Size 30 mins.	7	35%

Willingness to travel 60 minutes: (Choice C)

Choice A	Number Choosing A	%	Choice C	Number Choosing C	%
4 bedrooms 5 or 15 min.	19	95%	Most Desirable Dwelling Size 60 min.	1	5%

* Whichever time has the highest utility value, 5 or 15 minutes, is used

** The option for dwelling size, lot size, and price level which is neither the most preferred nor the most disliked over the sample is selected as the most neutral level.

TABLE 34

Willingness to Trade Off Access to Obtain a Desirable Lot Size

Willingness to travel 30 minutes to obtain the preferred Lot Size: (Choice B)

Choice A	Number Choosing A	%	Choice B	Number Choosing B	%
Average Lot 5 or 15 minutes to work	14	70%	Most Desirable Lot Size 30 min. to Work	6	30%

Willingness to travel 60 minutes: (Choice C)

Choice A	Number Choosing A	%	Choice C	Number Choosing C	%
Average Lot 5 or 15 minutes to work	18	90%	Most Desirable Lot Size 60 minutes to Work	2	10%

TABLE 35

Willingness to Tradeoff Access to
Obtain a Desirable Price Level

Willingness to travel 30 minutes to obtain
the preferred price level: (Choice B)

CHOICE A	No. Choosing A	%	CHOICE B	No. Choosing B	%
$1000 more than paid 5 or 15 min. to work	7	45%	Most desirable price 30 min. to work	13	65%

Willingness to travel 60 minutes: (Choice C)

CHOICE A	No. Choosing A	%	CHOICE C	No. Choosing C	%
$1000 more than paid 5 or 15 minutes to work	11	55%	Most desirable price 60 minutes to work	9	45%

The predictions are based on the estimated utility values obtained from the Tradeoff Analysis and an additive preference model. The choices are between: Choice A, a residence which is accessible (i.e., is 5 or 15 minutes from work), but does not have the most desirable dwelling size, lot size or price, and Choice B, which is a residence which is not accessible being 30 minutes from work, but which does have the most desirable dwelling size, lot size or price. Choice A is also compared to Choice C, which is similar to B with the exception that 60 minutes travel time is involved, not 30 minutes.

The results indicate that at least 30 per cent of the respondents will travel 30 minutes to obtain the more desirable dwelling size (Table 33) or lot size (Table 34). This percentage increases to 65 per cent when the extra travelling involves gaining a reduction in price (Table 35). All the percentages fall off drastically when the travel time is increased to 60 minutes in the choice between A and C, although 45 per cent of respondents still are prepared to go this distance to get the better price (Table 35). Hence, 60 minutes appears to act as a constraint on choice more frequently than 30 minutes.

Tables 36, 37 and 38 turn the rationale around in a prediction of the willingness of respondents to trade off access to avoid undesirable levels of each of the three other attributes. In this case, access is much more readily sacrificed. At least 90 per cent of the sample are predicted to be willing to travel the extra distance so as to avoid living in a home which is

TABLE 36

Willingness to Trade Off Access to Avoid An Undesirable Dwelling Size

Willingness to travel 30 minutes to avoid the most undesirable dwelling size: (Choice B)

CHOICE A	No. Choosing A	%	CHOICE B	No. Choosing B	%
Most undesirable Dwelling Size (2 Bedrooms) 5 or 15 mins. to work	2	10%	4 Bedrooms 30 mins. from work	18	90%

Willingness to travel 60 minutes: (Choice C)

CHOICE A	No. Choosing A	%	CHOICE C	No. Choosing C	%
Most undesirable dwelling size 2 bedrooms 5 or 15 mins.	8	40%	4 bedrooms 60 mins. from work.	12	60%

TABLE 37

Willingness to Trade Off Access to Avoid An Undesirable Lot Size

Willingness to travel 30 minutes to avoid the most undesirable size: (Choice B)

CHOICE A	No. Choosing A	%	CHOICE B	No. Choosing B	%
Most undesirable lot size 5 or 15 minutes to work	1	5%	Average lot 30 minutes from work	19	95%

Willingness to travel 60 minutes: (Choice C)

CHOICE A	No. Choosing A	%	CHOICE C	No. Choosing B	%
Most undesirable lot size 5 or 15 minutes to work	7	35%	Average Lot 60 minutes from work	13	65%

TABLE 38

Willingness to Trade Off Access to Avoid An Undesirable Price Level

Willingness to travel 30 minutes to avoid the most undesirable price level: (Choice B)

CHOICE A	No. Choosing A	%	CHOICE B	No. Choosing B	%
Most undesirable price ($5000 more than paid). 5-15 minutes to work	2	10%	$1000 more than paid 30 minutes to work	18	90%

Willingness to travel 60 minutes (Choice C)

CHOICE A	No. Choosing A	%	CHOICE C	No. Choosing C	%
Most undesirable price ($5000 more than paid). 5-15 minutes to work	6	30%	$1000 more than paid 60 minutes to work.	14	70%

considered undesirable in terms of dwelling or lot size, or is priced too high. The proportion falls off when the distance is increased from 30 to 60 minutes but is still well over half the respondents for all three attributes.

These results suggest one further conclusion; that housing choice is made on the basis of an attempt to avoid <u>undesirable</u> levels of several of the main attributes, not only accessibility to work. If this is the case, it may be far more useful to attempt to model housing choice as an elimination of alternatives, than as the selection of a residence approximating some hypothetical ideal. The same conclusion is reached by Stephens (1975) who is working on a simulation model of behaviour based on sets of objective and subjective constraints in the belief that a negative determinants approach to behavioural research is more fruitful than one based puraly on preferences.

VII.5 Summary and Hypotheses on the Relative Importance of Concepts

Nine hypotheses are derived relating to the relative importance of concepts, particularly accessibility, in house evaluation and choice.

1. Dimensional concepts, such as location represented as a place name, are more important determinants than the individual elicited concepts which contribute to their meaning.

   This conclusion suggests that dimensional concepts can be used as generalized descriptions of housing, and that the inclusion of both a dimensional concept and any of its elicited components in questionnaire designs or models may result in double counting.

2. In house evaluation and choice, people seek more actively to avoid the most undesirable levels of the main attributes than to obtain the most preferred level.

   This hypothesis is based on the lesser number of respondents willing to trade off access to work to obtain preferred levels of other main concepts (Table 33 to 35) compared to the greater numbers prepared to trade access to avoid undesirable levels (Tables 36 to 38). Related to this, may be the observed tendency for respondents to articulate their dislikes more easily than their preferences, particularly in reference to location (Chapter V). Similar ideas have been expressed by Stephens (1975) in reference to the development of a negative determinants approach to choice.

3. <u>Financial concerns are the most important of all the elicited concepts</u>. Consistent with past studies (for example, by Rossi, 1955; and Butler, <u>et al</u>., 1970), financial concerns are ranked most important by respondents, and access to work is consistently most readily sacrificed if a reduction of price is involved.

4. <u>The most important of the elicited attributes relating to the dwelling are size (Type 1) and occupancy (Type 10)</u> This represents the commonly known preference for a single family dwelling with sufficient bedrooms to accommodate the household. The equal importance of occupancy with dwelling size suggests occupancy may operate as a separate dimension in house evaluation; something which could not be ascertained in Chapter VI owing to the small number of constructs of this type elicited in this study. All other dwelling-related concepts, with the possible exception of age-maintenance concerns, are relatively insignificant being rated less important than accessibilities and the various lot-location concepts.

This result explains the inability of past studies to identify any major dwelling-related attribute outside size, occupancy and tenure; it confirms the relatively simple nature of the dwelling cluster described in Chapter VI and validates the use of a limited number of descriptions of the dwelling in questionnaires and theoretical frameworks.

5. Location is amongst the most important of all concepts ranking consistently lower than price only, and being equally as important as dwelling size and occupancy.

   Location is this important, however, only when all its various connotations are combined and summarized by the use of a place name. The individual components of location are ranked as less important.

6. Accessibilities are the most important of the individual connotations of location, followed by the lot-location cluster which is in turn, headed by privacy.

   Accessibilities have a median ranking of around fourth, making them apparently more important than either Stegman (1970) or Lamanna (1964), found in their studies. The discrepancy may be explained by the fact that Type 20 constructs in this study, include various kinds of accessibilities, while Stegman was concerned specifically with the journey to work, and Lamanna, with access to schools and shopping centres. Individual accessibilities possibly rank lower than a number of them in combination. This would also explain why lot size, which has a lower ranking relative to accessibilities in some cases in Table 27, dominates preferences for access to work in Tables 33 to 38. One implication of this is that the importance ascribed to access in the landrent and population density models, is most easily justified when access is defined relative to a multiple of destinations, and when the unique role played by accessibilities as a dimensional concept in the cognitive differentiation of dwelling is understood.

The importance of privacy supports findings in the architectural and environmental design literature and points to a need for a greater inclusion of this attribute in geographical research.

The confusion in the data relating both to the nature and the importance of neighbourhood concepts, makes it difficult to comment on this group with confidence.

7. <u>Access to the present work location and possibly also, to church, are more important than access to the present location for shopping and schools</u>. The latter may be changed along with the change of residence. Nonetheless, access to <u>other</u> available shopping centres and schools is important in evaluating alternative residences and comprises a significant part of the meaning of accessibility constructs (Type 20).

8. <u>Access to work acts a constraint on choice rather than as a determinant of preference</u>; the intent is to avoid too little access, commonly defined as 60 minutes or more, and to a lesser extent, to avoid too much proximity, defined as within 5 minutes travel time.

This hypothesis is consistent with the findings of Redding (1970) although the exact travel times specified in this chapter may be applicable only within cities of the same approximate size and cultural context as Hamilton.

9. Access to work is not, however, a sufficient constraint to prevent some losses of accessibility with a choice of residence, particularly if this involves perceived improvement in price, dwelling size or lot size.

   This finding accords with the postulate that many residential moves, particularly those to suburban locations, are in response to family life cycle changes and the need for more room with increases in family size.

Throughout Chapters V, VI, and VII, the respondents are treated as one group. In the following chapter, the nature and extent of group and individual differences in the cognition and evaluation of housing are explored, primarily using two multidimensional scaling algorithms, TORSCA 9 and INDSCAL.

FOOTNOTES

[1] The exact figures are: 16 of 36 respondents with working males in the household expected an increase in his travel time and 7 of 36 expected a decrease; 11 of 20 with female workers predicted an increase in their travel time and only 3 of 20 expected a decrease.

CHAPTER VIII

Group and Individual Differences in the Cognition and Evaluation of Housing

VIII.1 The Two Problem Areas

Chapter VIII relaxes the assumption of sample homogeneity held in all previous chapters in an exploration of two substantive questions relating to group and individual differences in the cognition and evaluation of housing. The analyses produce conclusions, and hence, hypotheses which refer first, to the variables which define groups with different choice behaviours, and secondly, to the manner in which groups actually display differences in choice processes.

The first problem is one which has been popular in past research and three variables are considered in this thesis: differences based on sex, such as those proposed by Beshers (1967) and reported by Klemesrud (1971) and Hempel (1970); and differences related to life cycle stage and socio-economic status which have been demonstrated as important at an aggregate level in the studies of urban ecology. The results suggest that of the three variables, only life cycle stage appears to be related to significant differences in the cognition, evaluation and therefore, choice of housing. Any difference in choice behaviour which is associated with socio-economic status is an effect of the constraining influence of different incomes, since different socio-economic groups do not display different housing preferences, and while minor differences occur between male and female partners in their use of housing concepts, these are insufficient to lead to major differences in housing preferences.

The manner in which group differences are manifest in the processes preceding choice has been virtually untouched in past research. In section VIII.3.3. the variation displayed by several groups is examined, leading to valuable hypotheses relating in particular, to differences in the definition of housing submarkets. Multidimensional scaling is a major tool used in this chapter, and an introduction to MDS and the two algorithms used, is included as section VIII.3.1.

VIII.2 Sex-related Differences of Couples in Housing Choice

Twenty-two couples supplied usable responses to questionnaire format A, thus providing data for this section on personal constructs and preference orderings on the nine standard vacancies. Each spouse answered the questionnaire simultaneously, but out of hearing of the other, thus ensuring the independence of their responses.

On average, the females provided slightly more information than the males, producing a mean of 11.2 constructs as against 9.7. In terms of the type of concepts elicited, the results show slight but not convincing support for Besher's notions (1967) and sex-related differences reported by Hempel (1970). Females, for example, have a greater tendency to refer to the dwelling itself (construct Types 1 to 13, Table 39), and to trees and landscaping on the lot(Type 16). At the same time, nonetheless, both sexes mention the postulated male concerns of finance and accessibility about equally, although women rank them very slightly lower in importance. In this respect, also it should be noted that access, as it is defined by the respondents and reported in Chapter V, refers not only to work, but also to schools, shopping centres and open space. The latter are often seen as female concerns. However, the concepts used by male and female respondents are very similar. When the data on constructs used by males and females, in the first two columns of

TABLE 39

MALE - FEMALE DIFFERENCES IN THE USE OF HOUSING CONSTRUCTS

CONSTRUCTS		NO. OF RESPONDENTS WHO USE THIS TYPE		MEDIAN RANK	
TYPE	DESCRIPTION	MALE(22)	FEMALE(22)	MALE	FEMALE
1.	dwelling size, internal space	18	20	5	4.5
2.	basement	1	8	5	6
3.	dining room	1	1	3	6
4.	other rooms	2	0	6	0
5.	room shape, location, versa-tility, etc.	2	4	4.5	4.5
6.	windows	2	7	11.5	9
7.	fireplace(s)	1	1	10	13
8.	other aspects	5	5	9	10
9.	house cleanliness, upkeep	7	7	9	9
10.	occupancy	8	7	3	2
11.	no. of floors	6	6	5.5	6
12.	age, building, materials, struture	11	15	5.5	7
13.	other aspects of design	2	5	14	9.5
14.	lot size and shape	18	15	5	5.5
15.	lot privacy	11	13	5	5
16.	trees, landscaping, etc.	6	15	6	7.5
17.	parking, garage, driveway	10	12	7	6.5
18.	other features of lot	3	1	5.5	9
19.	neighborhood	15	13	4	8
20.	accessibilities	11	12	8	6
21.	urban, downtown, etc.	1	3	12	7
22.	suburban, rural, etc.	8	8	4.5	6
23.	specific geograph-ical area	8	6	4.5	3
24.	financial	16	17	2	3.5

Table 39, are treated as ordinal, they have a rank correlation of .7 (significant at .001). Moreover, when asked to preferentially order the set of nine vacancies, sixteen of the twenty-two couples independently ranked them sufficiently alike to produce rank correlations significant at the .05 level.[1] This suggests that minor differences in the criteria they use, do not lead to important differences in the housing preferences of husband and wife. If, as is possible, the existing minor differences are due to residual cultural role stereotypes which are now diminishing in Western societies, the differences may ultimately disappear completely.

The results of this section also suggest that in the case of couples the housing choice process is relatively equalitarian, being based on a consensus on the nature and relative importance of concepts to be considered, rather than domination by either sex as reported by Klemesrud (1971), or a division of the decision as hypothesized by Beshers (1967). This consensus on housing needs and preferences may be the product of the couple's mutual needs as a household unit, and may change radically for either or both partners in the event of their separation. It may also result from a convergence of their individual preferences brought about during search by the inherent similarities of two people who live together, and by information sharing and mutual persuasion.

VIII.3 Group and Individual Differences in Cognition and Evaluation

Two MDS algorithms; Individual Differences Scaling (INDSCAL) and TORSCA 9 are employed to explore group and individual differences in cognition and evaluation respectively. The nature and limitations of these algorithms are described in the following section prior to a discussion of results.

VIII.3.1 Multidimensional Scaling

The basic objective of psychological scaling is to assign scores to a set of objects, which in this case are the nine vacancies, such that differences between scores on the scale represent the differences that respondents see between the vacancies. In the more complex multidimensional scales, vacancies are located as points in a r dimensional space where r is specified by the researcher, and any given vacancy is assigned a score on each of the r dimensions. In this study, the analyses are not taken beyond three dimensions due to difficulties with interpreting the results of higher dimensionalities.

Data suitable for scaling contain some measure of the "distance" between pairs of points. Two basic data sets are scaled in this thesis. Matrices containing judgments of the perceived <u>similarity</u> of seven of the nine vacancies which were provided by the 40 female respondents who answered format B are analysed using INDSCAL as a model of <u>cognition</u>. (Table 40 is an example of an input matrix for one respondent).

TABLE 40

Example of an Input Matrix for INDSCAL

Respondent B1

VACANCY	B*	C	D	F	G	H	I
B	0+	95	10	23	55	97	70
C	95	0	90	65	60	30	43
D	10	90	0	24	73	96	87
F	23	65	24	0	35	80	50
G	55	60	73	35	0	85	45
H	97	30	96	80	85	0	25
I	70	43	87	50	45	25	0

* Vacancies A and E were excluded to simplify the exercise. See the discussion in Chapter IV.

\+ Scores represent judged dissimilarity of the two vacancies on a scale where 0 represents identical vacancies and 100 completely dissimilar vacancies.

Preference orderings of all nine vacancies provided by the 80 respondents answering either format A or B, are scaled using TORSCA 9 as a model of evaluation.

The technique employed in MDS algorithms to locate the stimuli (vacancies) as points in a space of specified dimensionality and metric, involves an iterative procedure which seeks point locations such that the order of interpoint distances in a space of r dimensionality is monotonically related to the order of distances in the input data.

Originally the technique was considered to be simply a method of data reduction. Later a conceptual interpretation was put on the output whereby the dimensions of the space are interpreted as the subjective attributes which differentiate the scaled stimuli (vacancies). The positions of the points representing vacancies are seen as determined by the union of their attributes in cognition (in the case of dissimilarity judgements), or evaluation (in the case of preference statements). Interpreting the nature of the dimensions remains a major problem in MDS application.[2]

In this thesis, the dimensions are seen as analgous to one or more housing concepts or personal constructs. The analogy is most reasonable when the constructs are described by the types outlined in Chapter V since these, like the scale dimensions, are obtained by aggregating over the individual responses of the sample.

The usefulness, assumptions, and specific nature of the output from INDSCAL and TORSCA 9 differ substantially. INDSCAL is most useful for testing for differences in the importance ascribed to concepts used in housing cognition and is mainly used for that purpose here. It is assumed in the model that, although respondents may weight concepts differently, they all use the same basic set, which is restricted here to those represented by, at most, three dimensions. Moreover, the model cannot easily handle correlated dimensions, although as already demonstrated in Chapter VI, many housing concepts do show strong intercorrelations. Despite this, two of the three dimensions in the INDSCAL solutions reported in subsequent sections are interpretable.

There are three forms to the output of this algorithm. The stimulus or group space represents the vacancies as points scaled on one, two, or three dimensions, and is the sample's average perception of the comparability of the houses. (See for example, Figure 6).. The value of this output for identifying housing concepts and choice sets is, as already mentioned, limited in this study by the complexity of housing concepts.

More useful is the source space. In this configuration, each respondent, represented as a point, is scaled according to the salience she gives to the concepts manifest in each of the dimensions; points are located closer to more salient dimensions, (see, for example, Figures 4,5 and 8). The source space is used in this chapter to identify groups of individuals who display basically the same cognitive view of the vacancies. The third output is derived from a combination of the stimulus and source spaces and is a personal space which can be obtained for each respondent. Effectively, this illustrates the stimulus space with dimensions "shrunk" or "stretched" according to their relative salience for that individual.

The output from TORSCA 9, which is used to scale the preferences or evaluative judgments of respondents, is restricted to one configuration only at each dimensionality. Both the vacancies and an estimation of each respondent's "ideal" vacancy, are simultaneously located on the scale depicted by the configuration.[3] More preferred vacancies are mapped closer to an individual's ideal point than those that are less preferred.

Theoretically it should be possible to use the TORSCA 9 scales to supplement the results from INDSCAL on cognition by identifying groups of individuals with a similar evaluation of housing, and to interpret the nature and importance of concepts used in evaluation as these are represented by the axes. In practice, this proved almost impossible, since the attempt to scale the preferences orders to the nine vacancies for even twenty of the eighty respondents at one time produces degenerate or near degenerate solutions. As before, the complexity of housing concepts, particularly where these are complicated by the effects of value judgments, and the simultaneous scaling of vacancies and ideal points in one configuration, is beyond the capability of these models. The results of the scaling of preference judgments are reported where they seem useful.

VIII.3.2 The Effect of Life Cycle Stage and Socio-economic Status on the Cognition and Evaluation of Housing

Two contrasting groups of equal size are derived for life cycle stage and status variables respectively. Fourteen individuals under 39 years of age and having no children comprise the first life cycle stage group and fourteen with school-age children provide the contrast. Ten individuals comprise each of the upper and lower socio-economic status extremes [4] (Table 41).

Differences are sought both on the basis of cognition (dissimilarity judgments of the display vacancies) and preferences (rank orderings of the vacancies). The preference data show no obvious group variation. It is impossible, however, to assess whether this is due to an actual lack of difference or to the weaker nature of the methods used for collecting and analyzing preference data. Forcing respondents to rank order alternatives can be unrealistic and as already mentioned TORSCA 9 could not handle the data easily. The dissimilarity judgments on the other hand, do display interpretable differences between the life cycle stage groups, but not the socio-economic groups, (Figures 4 and 5).

Figure 4 is the two dimensional source space derived by scaling the dissimilarity judgments of the two life cycle stage groups simultaneously. Figure 5 is the equivalent

TABLE 41

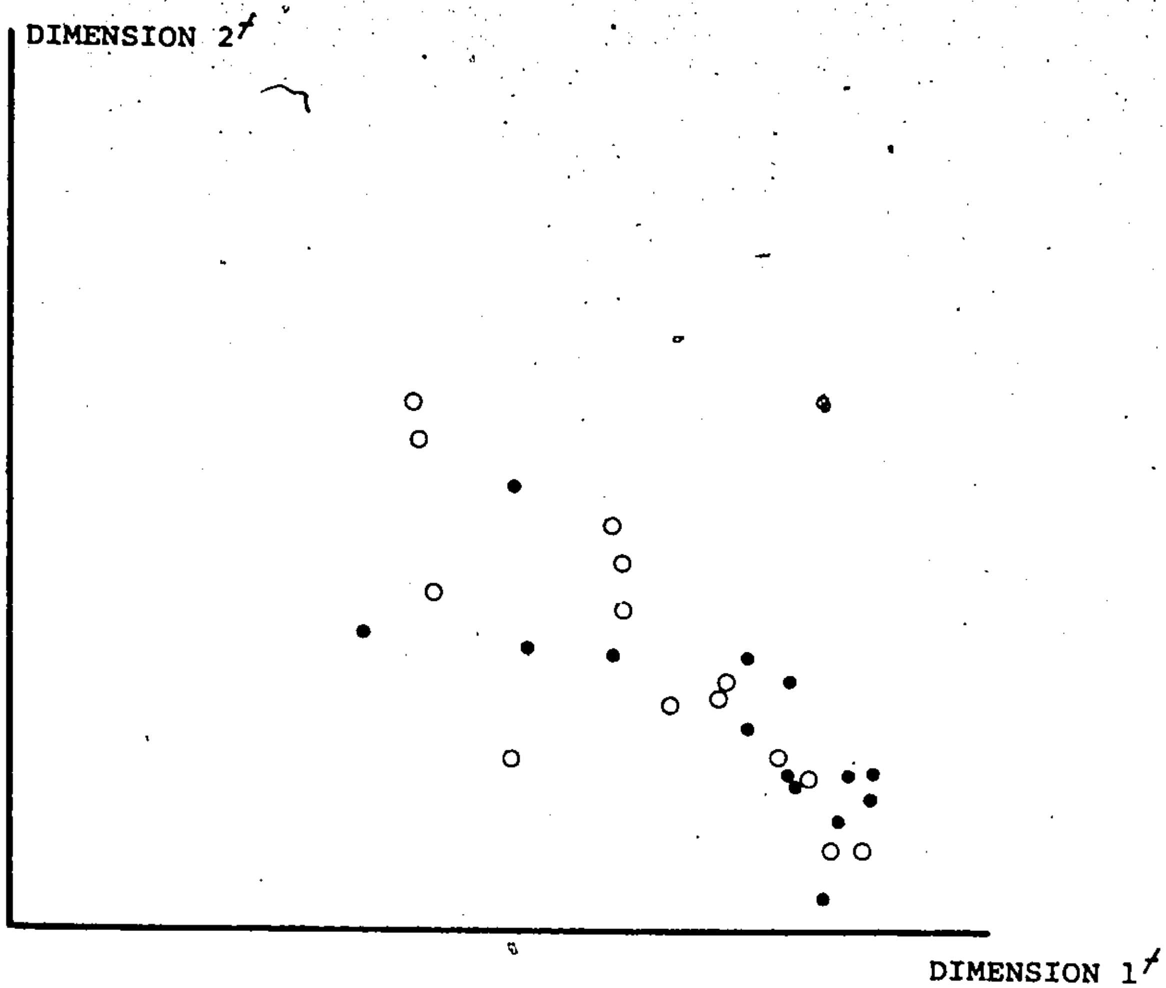
GROUPS DEFINED BY LIFE CYCLE STAGE AND SOCIO-ECONOMIC STATUS USED IN MDS ANALYSES

	SAMPLE A		SAMPLE B		
	TOTAL	NO. USED IN TORSCA ANALYSIS OF PREFERENCES	TOTAL	NO. USED IN INDSCAL ANALYSIS OF COGNITION	NO. USED IN TORSCA ANALYSIS
LIFE CYCLE STAGE					
1. Under 39 years, no children	11	11	14	14	14
2. Pre-School children	7	-	11	-	-
3. School aged children	21	11	15	14	14
4. 40 and over, no children or adult children only	1	-	0	-	-
TOTAL	40	22	40	28	28
SOCIO-ECONOMIC STATUS*					
1. Ten lower extreme Indices	10	10	10	10	10
2. Intermediate Indices	20	-	20	-	-
3. Ten upper extreme Indices	10	10	10	10	10
TOTAL	40	20	40	20	20

*Based on Blishen's Index (1968), for the spouse with the highest index score.

FIGURE 4

INDSCAL Source Space for Groups Based on Life Cycle Stage: Two Dimensional Solution



KEY

- ● Respondents who are under 39 years, no children
- ○ Respondents with school aged children
- * Difference significant .05 level (signs test)
- ** Difference not significant

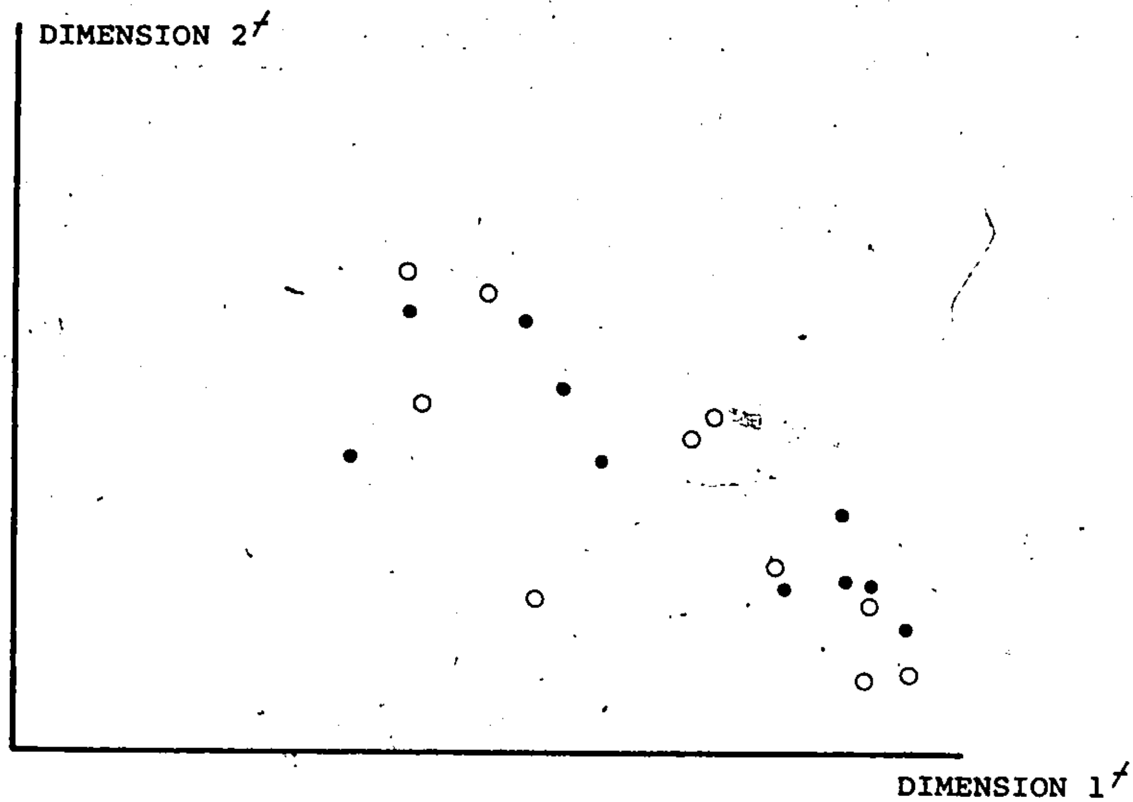
Average Scale Values (Weights)

Dimension 1*	Dimension 2**
73.1	30.0
65.4	40.0

/ The dimensions are interpreted in section VIII.3.3.

FIGURE 5

INDSCAL Source Space for Groups based on Socio-economic Status: Two Dimensional Solution



KEY

- ○ Lower Socioeconomic Status group (N=10) Blishen Index < 4000
- ● Upper Socioeconomic Status group (N=2) Blishen Index > 7000
- * Differences not significant

Average Scale Values (Weights)

Dimension 1*	Dimension 2*
67.0	41.5
66.7	39.8

/ The dimensions are interpreted in section VIII.3.3.

configuration for the two socio-economic groups. If these variables underlie important differences in cognition the two groups in each case, would appear as separate clusters in the configurations, and the mean scale values given to each dimension by the groups would be significantly different.

Figure 4 reveals that the two life cycle stage groups show a small but interpretable difference in cognition. The younger, childless respondents put slightly more weight on the first dimension which will be shown later to be a price factor. The group with school-aged children sacrifices some of the importance given to price to stress the second dimension, which is either or both internal space, and age and maintenance concerns. The need for space at the child rearing stage is a recurring theme in the literature, (see for example, Glick, 1949, 1955, 1957 and Rossi, 1955). The difference in the weighting given to dimension 1 by two life cycle stage groups is significant at the .05 level of significance (signs test). Unlike the life-cycle stage groups, those based on socio-economic differences do not display differences in cognition; rather the scale values the two groups allocate to the main dimensions are virtually identical (Figure 5).

Overall, the weight of the evidence from both preference and dissimilarity judgments suggests that the differences between socio-economic and life-cycle stage groups which are apparent at an aggregate level in the studies of urban ecology, do not hold true at the level of individual behaviour. If there is any difference at this level it is much less predictable. More importantly, there are different causes for the variation. As Michelson (1972) suggests, and as shown here, there is some tendency for groups at different stages in the life cycle stage to weight different aspects of the housing environment, such as price and space, differently. On the other hand, while income differentials constrain the housing choices of socio-economic groups to different degrees, there is little direct evidence here, or in past studies, that their preferences differ. The only evidence reported in the literature of differences between socio-economic groups is that which is inferred from housing satisfaction studies for groups socially much more disparate than those examined here, (see for example, Fried and Gleicher, 1961; Rainwater, 1966.)

VIII.3.3 The Nature of Group Differences in Cognition and Evaluation

The analysis of group differences in the previous sections allow for differences related to sex, socio-economic status and life cycle stage, and provide tantalizing glimpses into some manifestation of these differences; as for example in the differential stress given to major housing concepts by the groups.

In this section, an alternative, inductive approach is utilized to identify other group differences but most particularly, to explore the ways in which these differences are manifest. Group differences are sought in both the main phases preceding a choice, cognition and evaluation, using an INDSCAL analysis of dissimilarity judgments and a joint space (TORSCA 9) analysis of preference judgments, respectively. The results simultaneously lead to the interpretation of the dimensions of MDS configurations mentioned earlier, and also provide additional support for the nature and importance of major housing concepts discussed in Chapters VI and VII.

The results of the INDSCAL analysis of cognitive judgments made by all 40B respondents are summarized in Table 42 and Figures 6 and 7. The three dimensional solution accounts for 76 per cent of the variation in the data but the axes are not equally important (Table 42). The first dimension is paramount, explaining 55 per cent of the total 76 per cent of explained variance; the second contributes a further 16 per cent, while the

TABLE 42

SUMMARY MEASURING FOR THE INDSCAL SOLUTION FOR 40 B RESPONDENTS

SIMULTANEOUS SOLUTION

A. GOODNESS OF FIT MEASURES:	IN 1 DIMENSION	IN 2 DIMENSION	IN 3 DIMENSION
1. Correlation between Data and Estimated Similarities	.74	.84	.87
2. Percentage of Variance Accounted for by the Solution	55.00	71.00	76.00
B. WEIGHT ON EACH DIMENSION:	DIM. 1*	DIM. 2**	DIM. 3***
Average Scale Values for each Dimension in re 3 dimensional solution.			
Group A (N = 5)	40.2	67.4	35.2
Group B (N = 13)	61.8	46.4	21.5
Group C (N = 18)	71.0	18.3	32.7

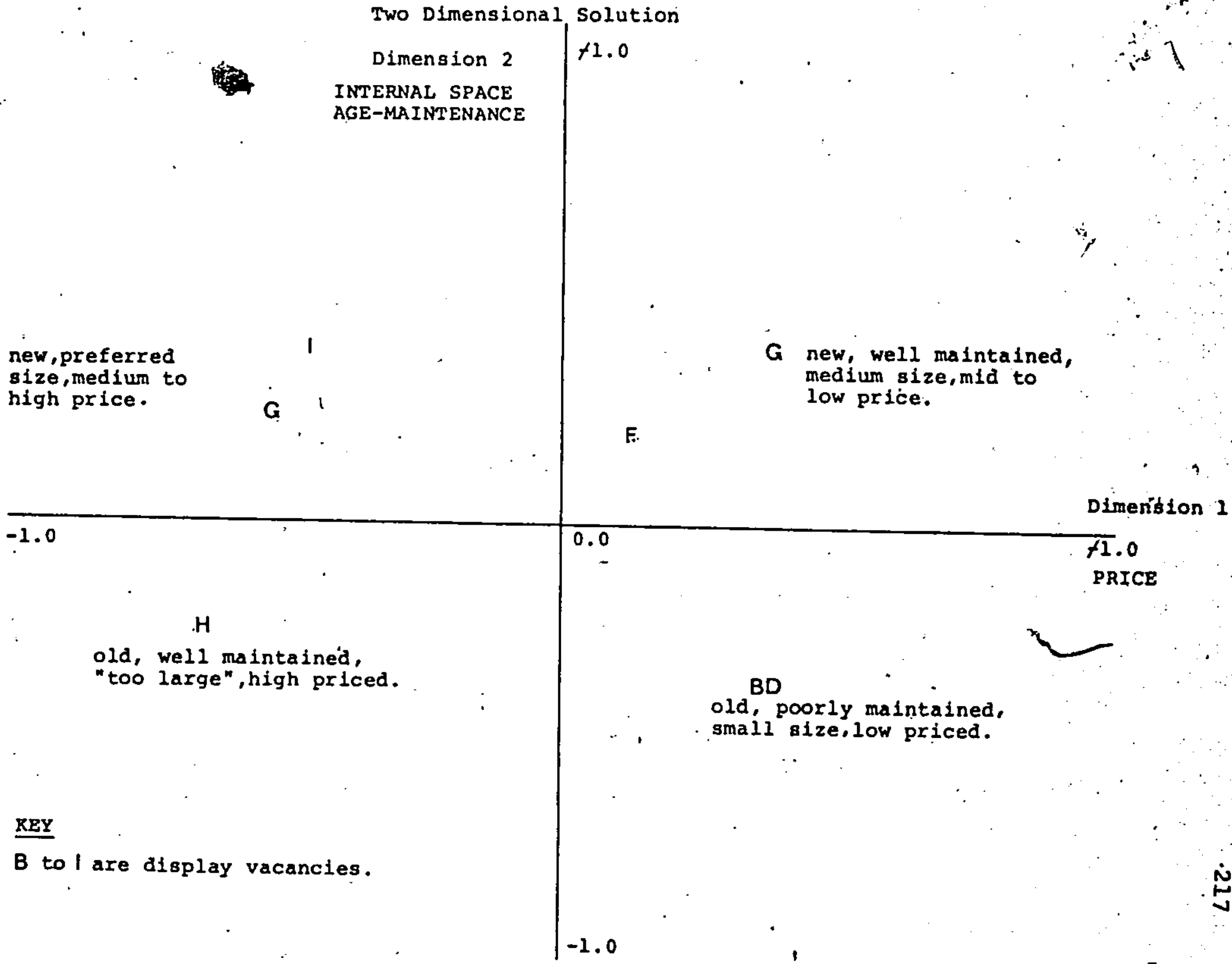
* Differences between the 3 groups are tested using the Kruskal-Wallis. H statistic and are significant at .005.

** Differences significant at .005.

***Differences not significant.

FIGURE 6

INDSCAL STIMULUS SPACE FOR SEVEN VACANCIES (40 RESPONDENTS)



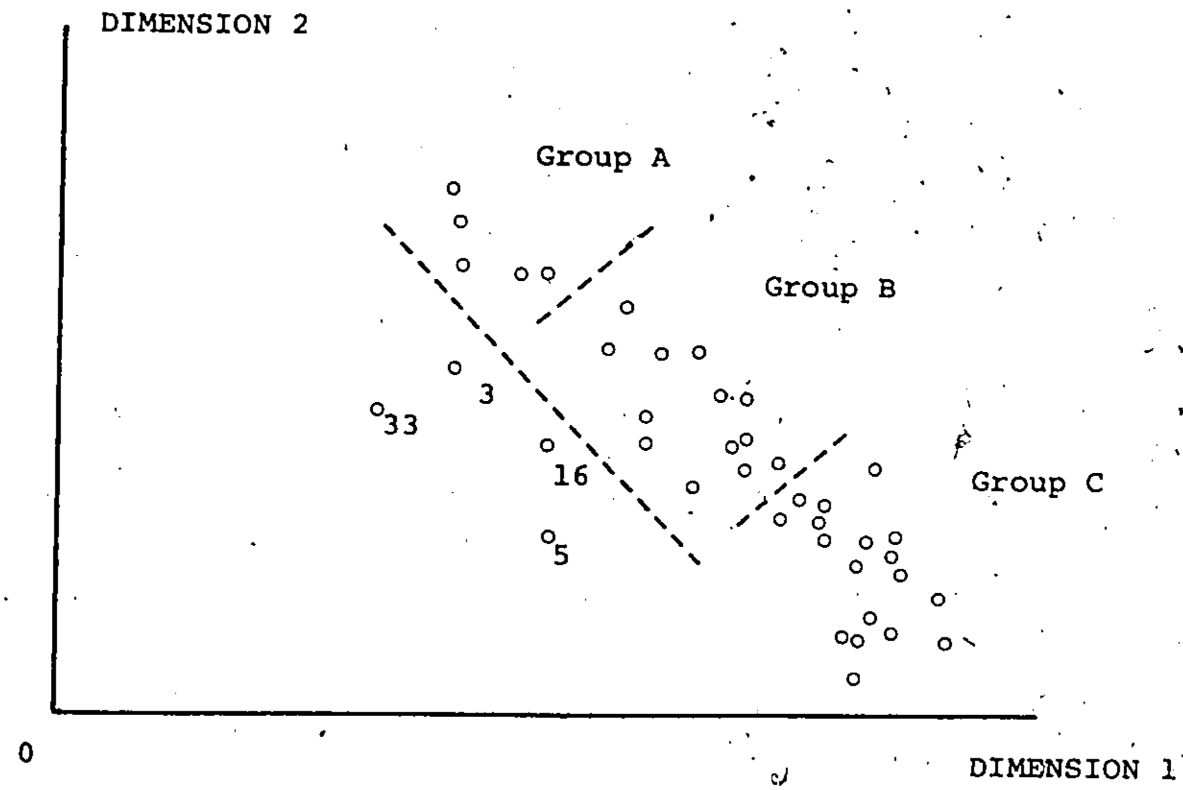
KEY

B to I are display vacancies.

FIGURE 7

INDSCAL Source Space for 40 Respondents

Two dimensional solution



Selected Measures of Fit:

Average Respondent correlation between data and estimated similarities - 2 dimensional solution		.84
Correlation for Respondent	3	.68
	16	.67
	5	.58
	33	.57

third axis is relatively insignificant with only 5 per cent of the variance.

The distribution of respondents relative to the two main dimensions in the source space (Figure 7) reveals four individuals and three groups of respondents with distinct points of view. The four individuals represent unique cases in this sample which are poorly explained by the general solution and are not considered further. The three groups differ in terms of the salience they give to the major dimensions; Group C stressing the first dimension very strongly, Group B putting some weight on both and Group C, emphasizing the second (Figure 7 and Table 42).

The distribution of vacancies relative to the two main axes in the stimuli space (Figure 6) divides the seven-house "market" available to the sample into four apparent choice sets, (Vacancies C and I, F and G, B and D, and H). The solution simultaneously provides an opportunity to interpret the two dimensions which define these submarkets in terms of the concepts used in choice and identified in earlier chapters. The interpretation is achieved by comparing the rank order of the vacancies on the two dimensions in turn, with the order of vacancies as they are scored on each of the main types in the repertory grids supplied by sample A (Figure 8).[5]

7

FIGURE 8

MEDIAN AND MODAL SCORES FOR VACANCIES BY CONSTRUCT TYPE

A score of 1 indicates that the vacancy is seen to have attributes relating to the construct type, which are highly preferred.

A score of 7 indicates that the vacancy is seen as having attributes which are most undesirable.

CONSTRUCT TYPE	SCORE (Median above the line, modal score below the line) 1	2	3	4	5	6	7
1:INTERNAL SPACE Median		CIE	G	FH			ABD
Mode	CIGFH	E					ABD
12:AGE-MAINTENANCE Median	E	CIG	FH	A			BD
Mode	ECIGFH			A			BD
14:LOT SIZE Median	I	A	H	CF	E		BDG
Mode	IAH					CFE	BDG
15:PRIVACY Median	AI	FCE	H		D		BG
Mode	AIH	F CE				D	BG
16:TREES & LANDSCAPING Median		AH	C	G	FE	I	BD
Mode	A	H		G	F	C	EIBD
17:PARKING AND GARAGE Median	CI		E		H	A	BDFG
Mode	CIE						HABDFG
22:RURAL - SUBURBAN Median	AI			CE	F	HG	BD
Mode	AI			CE		FH	GBD
24: PRICE* (in thousands of dollars)	72 69 54 42 36 27 24 21 16						
	A H C I E F G B D						

*This ordering is based on actual prices since there were too few constructs of this type scored in the Repertory Grids to allow meaningful use of measures of central tendency.

Note: Construct Type 19 (neighbourhood) is excluded due to inconsistent data, and Type 20 (accessibilities) does not produce meaningful scores for each vacanacy since respondents are concerned about access to different destinations.

The major dimension which is used by all three groups, but most obviously by the eighteen respondents in Group C (Figure 7), is a price axis. The order of vacancies B,C,D,F, G,H, and I, when projected onto dimension 1 in Figure 6, corresponds exactly to their order on concept type 24 (price) in Figure 8, and bears little or no relationship to the ordering on any other main concept type. Moreover, when the dissimilarity judgments of the three groups of respondents are scaled separately in one dimension, the solution for Group C, which stresses the price factor, is the only one to exactly reproduce the order of vacancies on construct type 24, even to extent of denoting a perceptual gap between the relatively cheap vacancies priced below $30,000 (F,G,B and D) and those of above average price over $40,000 (I, C, and H). (See Figure 9).

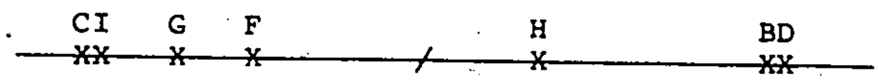
The second dimension is relatively less important overall, although paramount to the five individuals who comprise Group A (Figure 7). It appears to be defined by either or both internal space, and age and maintenance differences between the vacancies, Construct Types 1 and 12. The order of the vacancies on these two main types in Figure 8 is identical; (this, of course is to be expected, since the same data show Types 1 and 12 to be related construct types in Chapter VI, Figure 2).

FIGURE 9

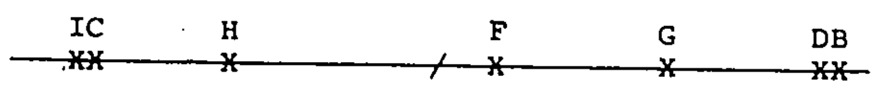
INDSCAL STIMULUS SPACE IN ONE DIMENSION

Seven Vacancies

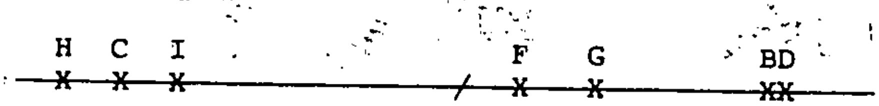
9a: Stimulus Space for Group A (N = 5)



9a: Stimulus Space for Group B (N=13)



9c: Stimulus Space for Group C (N = 18)



Several conclusions are possible at this point which hold at least for cognitive judgments:

1) major factors used in house discrimination are, as earlier concluded; price, and a cluster of dwelling-related concepts dominated by given requirements for internal space, but including also, references to age and maintenance concerns;
2) The main concepts group available vacancies in the housing market into sub-markets such as those depicted for the display vacancies in Figure 6;
3) People differ in the extent to which they attach importance to the main concepts and may therefore, perceive different submarkets. The considerable stress given by Group C to the price factor in Figure 6 and 7 indicates for example, that this group has effectively, not four, but only two submarkets defined at the extremes of the price axis in Figure 9c.

These conclusions, however, are based on an analysis of dissimilarity judgments or housing cognition. Their usefulness in explaining choice behaviour therefore, depends on understanding their relationship to the subsequent evaluative phase in the decision process.

An examination of group differences in <u>evaluation</u> is sought using a joint space (TORSCA 9) analysis of the preferences of respondents for the nine display vacancies (Figure 10).[6] Three critical differences are immediately apparent between housing cognition and evaluation.

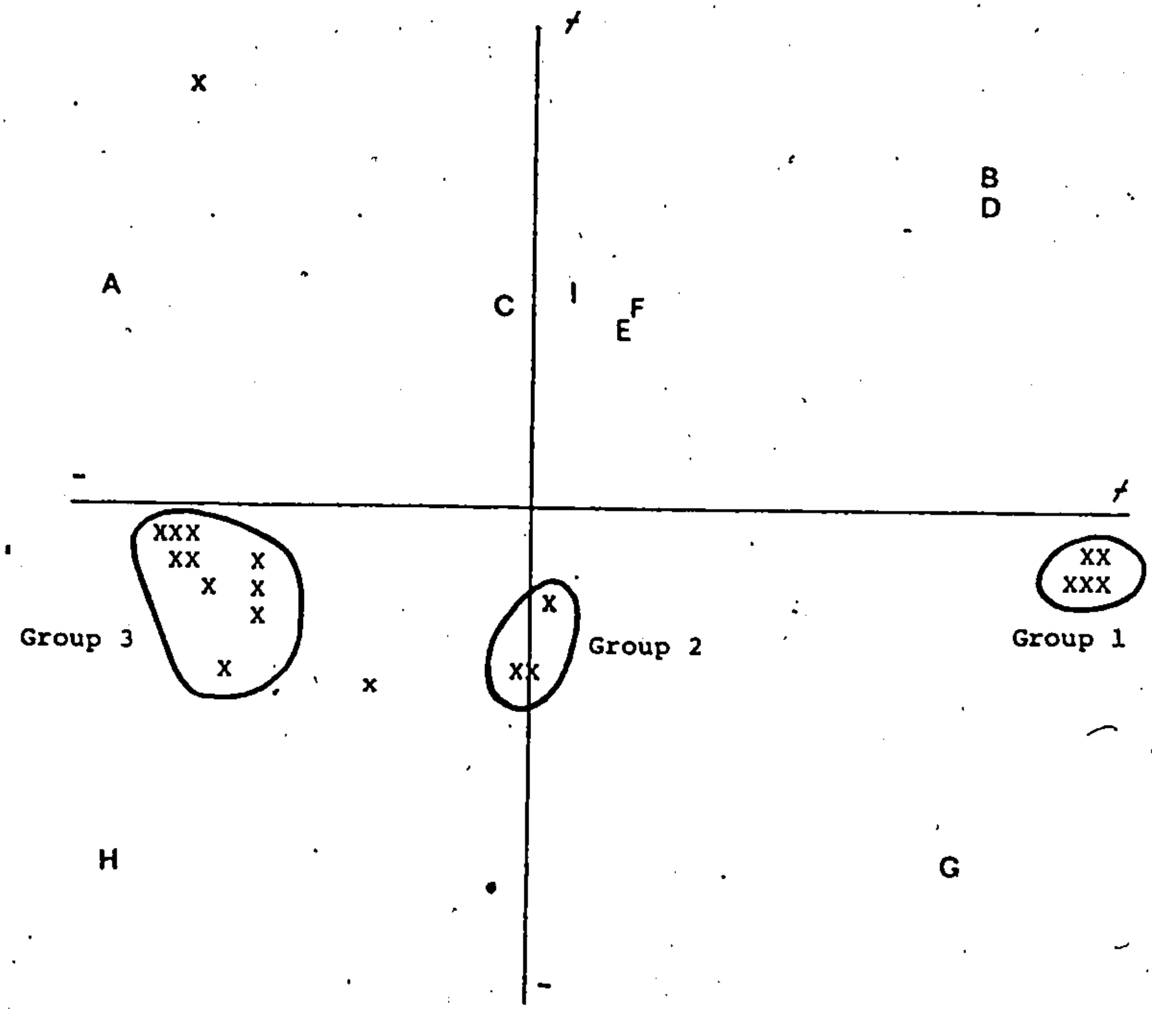
First, the price dimension remains, but the second dimension has changed. The only vacancies in the display set which are not single family dwellings are the condominium G and House H which could be subdivided. Both are now well separated in the MDS space from the remaining vacancies. No other construct type unequivocally separates these two dwellings from the others. This suggests that occupancy (construct type 13) has a greater salience in the evaluation of housing than in the comparison of dwellings; a finding which is consistent with the high ranking given to occupancy constructs in Chapter VII.

This change is also consistent with the findings of Steinheiser (1970) who concludes that cognitive and evaluative judgments differ on the basis of changes in the relative weighting of their dimensions. In this study, occupancy is relatively more important in evaluation than cognition, while age-maintenance is more salient in cognition than in evaluation. Secondly, although the changes of relative location of vacancy points between Figure 6 (INDSCAL solution) and Figure 10 (TORSCA 9 solution) are small in absolute terms, they lead to a new interpretation of the nature of the housing submarkets which are defined by the dimensions. The cluster of vacancies C,I,E and F nearest the centre of the space in Figure 10 are a close approximation of the conventional, popular housing choice;

FIGURE 10

JOINT SPACE ANALYSIS OF PREFERENCES FOR NINE VACANCIES

(2 dimensional solution)



Key: A to I are the nine vacancies; see Table 1.
X: Individual respondents (only 20 A respondents are used in this solution)

all are relatively new and well-kept homes, with average to large dwelling and lot sizes and in the average to above-average price range (Table 1). All are, incidentally, suburban, although no location dimension is interpreted. In each of the four quadrants of Figure 10, less popular, less available and more extreme submarkets are represented. Vacancies B and D are cheap, small, old, ill-kept, inner-city and industrial single family dwellings. House G is a relatively inexpensive, new well-kept condominium. At the other extreme of the price dimension, vacancy H is an expensive, old, very large, inner-city dwelling which could be a duplex, while house A is a very small home, made expensive by an extremely large lot on the urban fringe.

Finally, the analysis of preferences reveals an additional difference between population subgroups in housing choice behaviour. Groups may not only weight dimensions differently, they may also prefer different scale values or positions on a dimension. In Figure 10, for example, the majority of respondents (Group 3) give the highest ranks to those vacancies which have average to high prices (C,I,E,F, then A and H). Conversely the five individuals in Group 1 have a very clear preference for the lowest priced dwellings, ranking B,D, and G highly.

The hypotheses derived from this analysis of group differences are discussed in the concluding section.

VIII.4 Summary and Hypotheses of Group Differences

The analyses in this chapter produce conclusions and therefore, hypotheses, which refer first, to the variables underlying differences in individual choice behaviour, and secondly to the manner in which groups actually display differences in the various phases of decision-making.

The first problem is tackled by seeking significant differences in some aspect of the choice behaviour of groups such as those defined by sex, life cycle stage and socio-economic status; groups which are postulated to demonstrate differences in some part of the literature on residential site selection. Small differences in the use of concepts by males and females may explain the stress given in the past to sex differences. Similarly, the effect of income constraints on housing choice, together with the demonstrated importance of socio-economic status at an aggregate level in the urban ecological studies, may explain the tendency in the past to emphasize socio-economic status. In this study, however, neither sex nor socio-economic status appears to be a major source of differences at the level of the individual decision-maker.

Two hypotheses are suggested:

1. the housing preferences of male and female spouses are basically alike despite small differences in the number, nature and importance of the concepts they use in house evaluation;

2. socio-economic status is not a major explanatory variable at the level of the individual decision-maker in residential choice; this is not to say, however, that income does not constrain the selections of some groups; in this study for example, relatively young respondents, without children reveal a particular concern for price;

However, for groups at different stages of the life cycle, there is some evidence in this study and in other studies reviewed by Michelson (1972) for a predictable variation. The related hypothesis is:

3. life cycle stage influences the housing choice of individual decision-makers in that different aspects of housing are more significant at different stages; the amount of internal space for example is especially significant for those in the child-rearing stage.

In a subsequent analysis of group differences in cognition and evaluation, several groups with distinct points of view are identified. The nature of the groups is not established. Nonetheless, the manner in which they manifest differences in choice behaviour is analyzed, leading to the following hypotheses:

1. People weight the main housing concepts differently both when comparing and when evaluating alternative vacancies; and therefore,

2. <u>people perceive different choice sets when considering the same housing market</u>.

It is important to recall however, that the salience of individual concepts and the definition of choice sets, differs when the purpose is simply comparison of vacancies from when the intent is to evaluate and select from among the alternatives. Since evaluation is the phase on which the choice is most immediately based, this should be paid the most attention. In terms of evaluation, a third basis for group differences exists:

3. <u>People prefer different poles or sections of the same concept while giving the concept equal weight in the evaluation of housing</u>. The dichotomy between groups choosing on the basis of the price dimension is a good example.

Together, the conclusions drawn in this chapter; on the one hand, negate or refine existing notions relating to the bases of group differences such as sex, socio-economic status and life cycle stage. On the other hand, the analysis provides insight into a previously unexplained, but important aspect of this topic; the ways in which group differences are manifest prior to an actual choice. All these various aspects have implications for the further development of the behavioural theories of housing choice introduced in Chapter II.

FOOTNOTES

[1]The preference orders were also scaled using TORSCA 9, but provided no additional insight into sex related differences in housing choice.

[2]There are a number of other problems associated with the use of MDS algorithms. The most important of these are first, that the ways in which stimuli are judged must be assumed to conform to the requirements of a geometric model, i.e., the axioms of a metric space must be assumed to hold. The reasonableness of this assumption has been questioned by Stefflre (1972). Second, there is a little evidence on what is a suitable metric. This is an important question since the metric determines the way in which the dimensions are combined. Third, interpretation of the dimensions must be made on the basis of exogenous information and, as such, is frequently subjective. Finally, there is no objective way of aggregating individuals. INDSCAL provides the most information in this respect but the distinction between groups may still be ambiguous.

[3]The scaling of preference orders relative to an ideal point is a special form sometimes termed "unfolding" or joint space analysis and is derived from notions originally developed by Coombs (1964).

[4]Recall that these are not true socio-economic extremes since the sample is basically middle-class (Chapter IV).

[5]Recall that seven of the nine vacancies only are scaled using INDSCAL as a result of an attempt to reduce the questionnaire length. The two vacancies which are excluded from the INDSCAL solutions but which appear in the repertory grids and TORSCA 9 solutions are A and E.

[6]Figure 10 and the results in this section are largely based on the analysis of a random selection of 20 of the 80 respondents who provided preference data. The difficulties in obtaining non-degenerate solutions using TORSCA 9 for larger groups is discussed in VIII.2.1. Results from other runs of 20 respondents are basically similar.

CHAPTER IX

CONCEPTS USED IN HOUSING CHOICE: SUMMARY AND IMPLICATIONS FOR FUTURE RESEARCH

IX.1 Introduction

Considerable effort has been expended in geography and other social sciences in the last two decades in the area of housing choice behaviour. The most popular approach, dating from Rossi's (1955) study Why Families Move, has been a survey of recent movers using a structured questionnaire. In recent years, however, there have been signs of difficulty associated with the use of this one direction. The major problem now recognized, is that we are at an impasse caused by an insufficient understanding of the definition of the subjective concepts which people use to think about housing - an impasse which the structured questionnaires cannot break.

The lack of a well-defined and verified list of housing concepts is manifest in many ways; in the ambiguities of terms like neighbourhood; in the confusion between what are physical or objective descriptors of housing and what are the terms in which dwellings are actually thought about; and finally in the difficulties faced in attempts to operationalize the conceptual models of housing choice behaviour proposed by

Wolpert (1965, 1965), Brown and Moore (1970), Demko and Briggs (1970) and Gale (1972, 1973). It is now evident that continued reliance on the structured questionnaire which presumes a prior knowledge of the nature of housing concepts, cannot resolve this difficulty, and may in fact, perpetuate it.

A very recent innovation has emerged, however, in the form of a retreat to inductive exploratory empirical research which offers hope of new information on the nature of the concepts. Studies of this new genre have appeared mostly in the 1970's, although a well known precursor is Peterson's (1967) study of preferences in residential environments. This thesis belongs in this category although it differs from other studies yet published in that it is more comprehensive, seeking to identify in a reliable way, all main housing attributes rather than be limited to particular subsets of attributes. The study has one major objective; to use an experimental survey design to clarify the nature of housing concepts. It has two secondary concerns; to assess the relative importance of these concepts and to examine group differences in their use. Given the exploratory, inductive approach which is taken, the results are in the form of well-grounded hypotheses. Unlike much current geographical research, the intent is not to test existing beliefs or postulates, with one exception. Where the data facilitate it, controversial notions in our present thinking, such as the importance of access to work in choice, and the effects of socio-economic status and life cycle stage, are tested. To ensure that inductively derived hypothesis which form the main conclusions of each chapter are well grounded, a multi-operational design is employed to converge on major results. Psychological procedures, notably Kelly's Personal Construct Theory and Multidimensional Scaling models are the main techniques used to obtain and analyze the data obtained from two samples, each of 40 respondents.

Given the exploratory approach taken, there are, in fact, two forms of results; first, conclusions relating to the value of the overall methodology and specific techniques employed and secondly, substantive results in the form of hypotheses on the nature and importance of concepts, and group differences in housing choice. The following sections discuss these two types of results. Both have implications for future research on the behavioural bases of housing choice which are discussed in a final concluding section to the thesis.

IX.2 Methodological Results

The data on which the thesis is based were obtained mainly from two samples of home searchers, each comprised of 40 respondents, virtually all of whom were female. Both samples answered questionnaires requiring comparative and evaluative judgments on a set of nine standard display vacancies presented as photographs located on a map of the Hamilton metropolitan area. The first sample (A) supplied a list of elicited constructs and a repertory grid in which each vacancy is rated on each construct. The design is derived from Kelly's (1955) personal construct theory. Sample A supplied a preferential ordering of the vacancies used in an MDS analysis. The second sample (B) also provided the preference ordering, plus a comparison of the vacancies, providing data for an INDSCAL analysis of cognitive differences.

The design of both the survey questionnaires and subsequent data analyses are according to a principle of multi-operationalism as an aid in avoiding the ambiguities and doubts often associated with the measurement of subjective data. Overall, this strategy has been well endorsed by the study for two main reasons; first, the capacity with which a series of disparate techniques can converge on a single conclusion relating to the subjective meaning of housing, has been amply demonstrated. Secondly, the multi-operational design prevented potentially disastrous effects on the study, from the poor performances of some individual analytical tools; examples of which are the principal components analysis of repertory grid data in Chapter VI, and some of the TORSCA 9 multidimensional scaling analyses in Chapter VIII.

The performance of the individual procedures varies widely. The elicitation of concepts using personal construct techniques (Chapter V), produced a mean of 8.5 constructs, thus demonstrating much greater effectiveness than the two concepts elicited by the free response approach tried by Rossi (1955). Clearly, however, the method must be supplemented by other means since important criteria may still be missed. In this case, the most important concept, price, often appears in the list of other factors which were obtained as a follow-up check to constructs elicited by the triad procedure. A further recommendation for studies using personal construct methods, is to score such additional constructs in the repertory grid; - something which was not done in this study, and handicapped analysis of concept interrelationships, as a result.

The complexity of concept associations determines the type of procedure most applicable for the analysis of the repertory grid. In terms of housing, it appears that considerable overlap occurs in the cognitive meaning of many concepts. As a consequence, an analysis based on the restrictive assumptions of a principal components model is most unsuitable, while simpler methods, such as concept groupings or the basis of concepts correlations are much more sensitive to the nature of the cognitive structures relating to the meaning of housing.

This complexity in the meaning of housing also limits the ability of the various MDS models, particularly TORSCA 9, to depict the scaling of vacancies or of respondents, in terms of more than a few main concepts. Consequently, the use of MDS in inductive research on the nature and importance of concepts would seem limited, although it has clear potential for testing the postulated importance of concepts, in a deductive research design. The major use of MDS in this study is in the insight it provides on the manner in which groups differ in their predecision thought processes, of choice set definition, housing cognition and housing evaluation. In this situation, MDS has a valuable and still unexplored role, although somewhat limited by the assumptions of the model which predetermine the number and type of ways in which group differences can be depicted.

Four summary recommendations seem worthwhile for behavioural research methodologies:

1) use a multi-operational design;
2) use personal construct procedures but supplement the elicitation techniques with other methods;
3) avoid limiting the analysis of data matrices which depict concept associations, to heavily structured models, such as principal components analysis, particularly in complex domains like housing;

4) use multidimensional scaling algorithms primarily in a deductive approach for the purpose of hypothesis testing.

IX.3 Hypotheses on the Nature, Importance and Use of Concepts

A total of nineteen specific hypotheses are listed at the conclusion of Chapter VI on the nature of housing concepts, Chapter VII, on their relative importance; and chapter VIII on group differences in concept use and in choice processes. The reader is referred to these sections for a listing of the hypotheses. The following description simply refers to them by chapter within a general summary and assessment of their implications.

The subjective concepts used to describe and evaluate housing are sought in Chapters V and VI where it is found possible to define housing at various levels of generality. At the most detailed level, the 40 respondents who supplied personal construct data used over 200 different words or phrases to describe their housing concepts. This description is summarized as the master code given in Appendix B. The master code, however, does not maintain the internal coherence of each concept used to think about housing, but fragments concepts by the verbal labels used to express them. Therefore, while the master code is a very detailed description of housing, it should be limited to use as an analytic tool only, and <u>not</u> as a listing of housing concepts. In this thesis, for example, it is invaluable for the analysis and classification of personal constructs, and may prove useful in relating concepts to their physical or objective counterparts in residential environments.

Each respondent used a mean of over 10 housing concepts to express what he/she used to compare and evaluate the nine display vacancies. These are termed <u>elicited concepts</u> and are those which home searchers are aware of and can articulate, (Chapter VI, hypotheses 1 and 2). These concepts group into 25 classes or types on the basis of similarities or differences in meaning which are indicated by a content analysis based on the master code.

The concept types vary in the extent to which they are apparently well defined, unambiguous notions, and the reader is referred to Chapter V for detailed descriptions of the connotations of each. In a very summary form, the most frequently used of the concept classes are:

1. dwelling size with particular emphasis on the number of bedrooms;
2. dwelling age, maintenance and related concerns;
3. lot size, related to external privacy, in particular;
4. external privacy and separation from neighbours;
5. trees and landscaping of the lot;
6. parking and garage facilities;
7. accessibilities, both to work and to schools, shopping facilities and downtown;
8. the degree of perceived urbanism expressed by such terms as "urban", "suburban" or rural locations;

9. place names used to refer to local suburbs, satellite towns or residential areas;
10. financial concerns.

Neither the list of ten concepts above nor the twenty-five from which they are drawn, are exhaustive or equally well defined. Tenure is excluded possibly because the sample is comprised of prospective home owners. There remain ambiguities in the definition of accessibilities, notably the separation of local and non-local concerns, and the financial concepts are hardly defined at all. Neighbourhood considerations are excluded from the above summary since the data are extremely confusing on both the nature and importance of this class.

Research on the association between the 25 concept classes in Chapter VI, is primarily based on the correlation of ratings given to the nine display vacancies on any pair of concepts in the repertory grids supplied by sample A. By this means, the 25 classes are further generalized into three clusters of concepts termed <u>dimensional concepts</u>, (Chapter VI, hypotheses 1 and 3). These are depicted in Figure 2 and include:

1. the dwelling cluster which is an association of concepts relating to the dwelling size, age and maintenance concerns, and parking;
2. lot and location which is a complex of concerns about parking, lot size, privacy and separation from neighbours, degree of perceived urbanism, trees, landscaping and neighbourhood concerns;

3. accessibilities.

As with the elicited concepts, important considerations are obviously excluded. Financial concerns are not listed since they were not included in most repertory grids and hence their association with other concepts could not be established. In contrast to Peterson's (1967) results, in this study the dimensional concepts are not orthogonal, independent criteria. Accessibilities appear to be relatively independent, but the dwelling and lot-location concepts are related through their common association with parking and garage concerns.

These results on the nature of housing have several important implications. In the first place, they suggest that the vision of an heirarchical description of the environment envisaged both by de Long (1973) and Kelly (1955) does exist, at least for housing. The distinction between levels, or of concepts at one level, however, is not easy to find. Concepts are not all precisely defined and many are interrelated to a greater or lesser degree in that the use of one implies use of another. Hence, Gale's (1972b) notion of inexactness and fuzzy sets in environmental cognition is obviously also pertinent.

The identification of several levels indicates difficulties for reliable questionnaire construction and further empirical research on the one hand, and for the definition of housing attributes and choice sets in model building and testing, on the other hand. The structured questionnaires of the past probably are based on a confusion of verbal labels (i.e., master codes), and concepts from one or more levels. The related problems of omission and/or double counting are discussed in Chapter II. Future research should, and could, be based on a consistent set of concept definitions, such as those listed in Chapter VI.

The definition of specific elicited and dimensional concepts reveal distortions in our existing, somewhat stereotypic thinking about housing. In some cases the results confirm past findings. The importance ascribed to the number of bedrooms in describing dwelling size has, for example,been long recognized, (see Rossi, 1955). The lot also, appears to have its own relatively well defined connotations based on size, which are well known. Other important associations found in this study, however, between the lot and external privacy, trees and landscaping, parking facilities and general location have not been well treated. For the most part, they are not explicitly understood but are glossed over as the difference between lots in urban and suburban locations, thus discouraging the precise definition required for further empirical research, theory building or residential planning.

The notion of residential location and its various components have been the most poorly understood concepts. While the term "residential location" is widely used and intuitively understood, it would appear from this study to have no obvious coherent meaning, hence use of this expression in either structured questionnaires or incipient theory may be both simplistic and confusing. In the first place, relative location or access appears to be quite a distinct concern from all other considerations about location. Secondly, references to the nature of the location especially in terms of its perceived degree of urbanism, seem to be closely and possibly inseparably tied in meaning to the lot. Thirdly, an additional connotation or set of connotations of location is here labelled "neighbourhood". In fact, these comprise an extremely complex set of concerns which cannot be convincingly defined either individually or as a group. Finally, place names used to refer to prospective residential locations act as more important, superordinate constructs for any or all of the three previous aspects of location together with aspects of the lot. Hence, unless elaborated their specific meanings are ambiguous.

The concept of accessibility is a further example of stereotypic thinking validated by long usage. Residential access has most often been thought of as a series of concepts of which the most popularly cited is access to work. In this study, the concept appears to incorporate access to a variety of local and non-local destinations which could not be separated out as different concerns by any of the analyses. When defined as access to a multiple of destinations, accessibility is the most important of the location concepts, (Chapter VII, hypothesis 6).

There is no evidence, however, that it would be quite as important if defined only as access to work, or only as access to schools and shopping centres. Stegman (1969) and Lamanna (1964) respectively, find access in these specific terms to be relatively unimportant and in this study, access to work is traded off for improved dwelling and lot size or price level up to a travelling time of 60 minutes. These results suggest that while the definition of access relative to work or city centre in the urban land rent and population models may be operationally convenient, it is not as meaningful or important in behavioural terms as a definition relative to several destinations.

Hypotheses relating to the relative importance of the remaining main elicited housing concepts are given in Chapter VII, hypotheses 1 to 9. Financial concerns are the most important of the elicited concepts, consistent with past studies as for example, those of Rossi (1955) and Butler et al., (1970). Also among the top four are two dwelling concepts; size and occupancy, which form part of the cluster of concepts defining the dwelling dimensional concept. Age-maintenance concerns which are also a part of this cluster are not consistently ranked very highly by respondents, but are found together with dwelling size, to interpret the second most important axis in the MDS configurations of housing cognition and evaluation in Chapter VIII. Place names are among the most important concepts followed by the various other elicited concepts which contribute to their meaning, which in order of importance are; accessibilities, privacy, neighbourhood, lot size, trees and landscaping. Overall therefore, it appears that dimensional, or other more general concepts such as place names, are rated more highly than the individual elicited concepts which contribute to their meaning.

This suggests other, as yet unexplored aspects of housing choice with implications for research and modelling the relative importance of concepts. Is it meaningful for example, to rate concepts at different levels in terms of their relative importance, such as price and access to work? Are tradeoffs made only between concepts at the same level? And is there a regular order to this process?

The research on importance in Chapter VII also led to the postulate (hypothesis 2) that on each of the main concepts, people seek more actively to avoid that which they do <u>not</u> want than to obtain their various preferences. This has been a well known aspect of accessibility and price considerations but has only been implied as applicable to other concepts by use of labels such as "constraints" and "limiting factors". It has not usually been seen as the initial manner in which home searchers react to house size or other lot and location needs. It suggests that housing behaviour may be best modelled using a negative determinants approach as suggested by Stephens (1975) and discussed again in a later section of this chapter (IX.4).

The hypotheses in Chapter VIII refer to group and individual differences in choice processes. There is evidence here, as in the chapters which precede it, that our existing understanding of housing choice behaviour has only a partial basis in truth. Male and female spouses, and groups defined by socio-economic status for example, do not appear to display the differences in housing preferences which have sometimes been ascribed to them; whereas, groups defined by life cycle stage demonstrate differences related to the fact that different housing attributes (concepts) are given more or less salience at different stages in the life cycle.

The more innovative section of this chapter leads to hypotheses on the manner in which groups display differences in housing cognition and evaluation prior to choice; - an understanding of which is necessary to an understanding of group differences in housing choice. Respondents are found:

1. to weight the main housing concepts (such as price, and dwelling size and age characteristics), differently, both when comparing and evaluating residences, and therefore;
2. to perceive different choice sets when viewing the same housing market; and
3. to prefer different poles or sections of the same concept.

It is therefore not sufficient to identify the nature of groups with different housing preferences or constraints, nor to identify the subjective attributes they use in house evaluation. Also required, is an understanding of how the groups use the concepts to define their own choice sets from the same housing market and to order these. Moreover, models of housing choice in terms of choice sets, such as that of Gale (1973), must be made sufficiently flexible that the housing market can be classified and reclassified according to the perceptions of successive groups.

IX.4 Future Research

There are two general directions in which future research building on the results of this study, can most obviously lead. The first is the plethora of specific questions which appear in the form of individual hypotheses or their implications. The second, more ambitious direction, is that leading to the development of a comprehensive, general theory on housing choice behaviour.

Of the many possible specific questions, three are particularly crucial. First, while Chapters V and VI offer a wealth of new insight into the meaning and definition of housing in the terms which people think about it, there is considerable room for improvement. Major concepts are not elicited from the samples used in this study; tenure being one example. Others, notably the complex of ideas we group under the term neighbourhood, are still in need of clarification and refinement, despite this and many previous attempts to define the concept(s). The few general or dimensional concepts defined in Chapter VI must be tested further using other data sources and procedures. Without such testing, they will remain an interesting academic result and their potential for the development of a series of hierarchical descriptions of housing and housing choice sets at different levels of generality will go unrealized.

A second very pertinent problem is the need to identify the physical or objective attributes of housing related to each subjective concept. This is essential both for theoretical, and design purposes, for example, for the identification of housing choice sets and for the design of more liveable residential environments.

Knowledge of the translation of physical referents through the mind into their mental counterparts will also help researchers to answer a third critical question; the ability with which we can predict housing choice on the basis of a knowledge of population and vacancies characteristics, and the mental processes leading up to choice.

The last question is fundamental to the successful development of the conceptual frameworks into a general theory of choice behaviour. Of the many results which have implications for the development of such a theory in this thesis, that with potentially the most immediate payoff, is the suggestion to model choice behaviour using a negative determinants approach, combined with a behaviourally meaningful definition of housing concepts and choice sets.

Essentially, such an approach would break from the present tendency to think in terms of utility optimisation or maximization, at least in the initial phases of choice. The objective in the house search would be seen as a need to identify the vacancy or vacancies with characteristics which fall within upper and/or lower constraints or threshold values, on all major concepts. Brown and Moore (1970) introduced the notion of thresholds in their conceptualization. However, their approach is not a negative determinants model since they retain Wolpert's notion of place utility and the stress it places on preferences; a notion which is extended into an explicitly optimizing or maximizing approach by Demko and Briggs (1970). In a negative determinants approach, the basis for choice from the set of vacancies falling within all specified constraints might then be made in terms of relative "place utility", to use Wolpert's (1966) concept. In which case, preferences may become quite significant in determining the final choice. It is more likely however, that the choice is made on the basis of timing, i.e., an offer is made on the first known vacancy which satisfies the major constraints and some form of queuing model may be appropriate within these constraints. In such an approach the relative importance of concepts is defined by the extent to which either or both thresholds <u>must</u> be met. Where no suitable vacancies are being found, or time is running out, thresholds may be changed on individual concepts, presumably on the least important concepts first.

Regardless, however, whether a negative determinants or a utility approach is taken, the definition of housing concepts in meaningful terms is crucial. All the major behavioural choice conceptualisations of the early 1970's have been handicapped by the lack of a valid and reliable description of housing attributes and of housing choice sets. This thesis provides the basis for the derivation of a list of meaningful concepts at either a detailed or more generalized level. It also gives insight into the relative importance of the various concepts, and of the manner in which they affect the choices of different population groups. A meaningful description of housing, possibly in combination with a realignment of thinking towards a negative determinants framework, offers hope of breaking the impasse which presently holds up research on residential choice behaviour.

GLOSSARY

Behaviouralistic: Philosophies of behaviour predicated on the belief that cognitive processes are a major determinant of behaviour. Behaviour is, therefore, a probabilistic rather than deterministic response to environmental conditions.

Behaviouristic: The converse approach to behaviouralism, often described as the stimulus-response (SR) model. See also Footnote 5, Chapter 1.

Cognition: In behavioural geography, cognition has been used in at least two ways. In some instances it refers to the psychological process involved in the utilization of coded information or concepts to discriminate and compare alternative choices, generally in the absence of some or all of the alternatives. This is a more limited version than the definition offered by Neisser (1967), who argues that the perception of stimuli present to the observer also involves cognition and in fact, is continuous with cognitive processes. In other instances, cognition is used in geography to refer to research problems involved with the selection, coding, storage, retrieval and use of information in thought. This use is consistent with the definition provided by Zajonc in the Encyclopaedia of Social Sciences who claims that cognition should be used to refer "not to an identifiable psychological process but to a problem area with specifiable research focuses". He continues: "The cognitive theorist may be concerned with the acquiring and processing of information with further cognitive consequences of this process, or with utilization of information". This involves the coding and use of information. "In these processes the individual utilizes information acquired in the past, codes, rules of message sequencing (e.g., syntax), and inferential heuristics. The totality of this apparatus has become known as the individual's cognitive organization".

In Zajonc's terms this thesis is a study in cognition and cognitive organization. Where the term cognition appears in the text however, it is used in the first sense in geography, i.e., as a psychological process distinct from both perception and evaluation.

Cognitive judgments: As used in the thesis, cognitive judgments are comparative, similarity or dissimilarity judgments of two stimuli. Obviously, however, the term could have a much broader meaning, covering all mental judgments.

Concepts: Following the psychological literature, concepts are defined in this thesis as the basic unit of information coding in long-term memory. For the purposes of the study, an individual's concepts are defined by and measured in terms of the verbal labels he/she uses to describe them, together with any additional connotations denoted by a demonstrated relationship between the concept and other concepts.

Contrast Pole: Also termed the non-replicative pole, this describes the polar or extreme description of a personal construct (Kelly, 1955) which is not elicited by the elicitation procedure, but is described as the contrast to the pole, which is verbalized initially.

Dissimilarity judgments:

These are also termed cognitive or comparative judgments. Dissimilarity judgments in MDS procedures are a quantitative expression of the difference between stimuli, where higher values represent greater differences, and therefore, distances in the MDS configuration. Similarity judgments are the converse form, where higher values represent greater similarity and smaller distances in the MDS space.

Domain: This is the term Kelly (1955) reserved to refer to the range of elements (stimuli) which any given construct can be used to describe. Application of a construct to elements outside its domain are meaningless. A simple example of the latter might be the description of an apple as intelligent.

Element:	The term used by Kelly (1955) for the object of thought. In his theory these might be constructs as well as stimuli, such as residential dwellings. In the thesis, the term stimulus is generally used where Kelly would use element.
Emergent Pole:	Also termed the replicative pole this is that extreme of a personal construct, (Kelly, 1955) which is elicited by the elicitation procedure.
Evaluation:	Evaluation is used to refer to the processes whereby cognitive judgments, as in comparisons of alternatives, are weighted by the individual's personal values, as in preference orderings of alternatives.
Focus of Convenience:	The set of elements or stimuli, (in this case, dwellings) for which a personal construct is most meaningful.
Laddering:	The elicitation procedure devised by Hinkle (1965) to explore the subordinate and/or superordinate constructs related to a given construct which is described in the initial elicitation process.
Perception:	Perception is used in the thesis to denote the act of perceiving and the mental manifestation of this act as percepts. Perception involves a response to an immediate stimulus. Information about the stimulus is received through the senses and is stored in short-term memory. This definition is consistent with that used by the encoding theorists and cognitive psychologists such as Ulric Neisser. Neisser (1967, 1970, 1972) argues that perception involves active constructive processes of "cognitive synthesis". Sensory stimulation is not the passive intake of information, but instead becomes the "raw material" for the active construction of perceptual images. In Neisser's terms perception, cognition, thinking, and imagining are all continuous related processes. Perception differs from the latter processes primarily in the degree to which it involves sensory input as an immediate basis for cognitive synthesis.

Percepts: The basic unit of information coding in short-term memory. Percepts are intermediate between, and related to, sensations on the one hand, and concepts in long-term memory on the other.

Personal constructs: The terms devised by Kelly (1955) to describe the codes, concepts or information used by an individual to organize his/her experience of the world, in the mind. Personal constructs are bipolar referents with contrasting descriptions of the same abstracted idea at each pole. In this study, constructs are assumed to be analagous to concepts, although it is not necessarily accepted that all concepts fit the bipolar definition of constructs.

Preference judgments: Such judgments involve an ordering of two or more stimuli (in this case, dwellings) according to how each is evaluated by the respondent. The evaluation depends upon the how much of each attribute (concept) recognized by the individual, each dwelling has, the value ascribed to the attributes, and the way they are combined into an overall score.

Range of Convenience: The set of elements or stimuli (in this case, dwellings) for which a personal construct has <u>any</u> meaning.

Repertory Grid: This is an essential aspect of the measurement procedure designed by Kelly (1955) to measure construct relations and to provide some insight into the possible nature of superordinate constructs. The repertory grid consists of binary judgments, ratings, or rankings of a limited number of stimuli on each of a set of elicited constructs. Kelly used the grid as the matrix input to a factor analysis.

<u>Example Using 7 Point Rating Scale:</u>

	A	B	C	D	E	F	G	H	I	Houses
Construct 1	1	2	3	3	4	2	1	7	7	
2	7	7	5	4	3	2	1	4	4	
3	7	6	4	3	3	2	1	5	5	

Similarity judgments: As in dissimilarity judgments except that the focus is on "sameness" rather than "difference". In the MDS literature, similarity judgments indicate that the <u>larger</u> numerical values given in the comparison of two stimuli represent similarity, while smaller values indicate difference. Hence, in the derivation of the configuration, the input values are first subtracted from one before their estimation as distances in a multidimensional space is attempted.

Source space: The term used to describe one of the three configurations produced by INDSCAL. The source space represents differences between the judgments in each input matrix, in terms of the weighting given to each dimension and the fit of the solution to the data in the individual matrices. The points in the space are generally located in the upper right quadrant and often represent individual respondents.

Stimulus, stimuli: These are the phenomena in the environment which are the object of thinking or behaving; also called elements by Kelly (1955). In this case they are residential dwellings, specifically the nine homes in the display photographs, together with the residences about to be vacated by the respondents.

Stimulus Space: The term used to describe a configuration produced by a multidimensional scaling algorithm which locates <u>stimuli</u> (in this case, vacancies) as points in a space of given dimensionality.

Subordinate Constructs: Introduced as a part of Kelly's Theory these are constructs which form parts of the meaning of higher level, none generalized or abstracted constructs in an individual's mental organization. In practice, they are often those described in the initial elicitation of constructs. However, the laddering of some constructs seems to produce others which are still more subordinate. Hence the term is a relative measure of the location of a construct in the mental schema but is not at all exact.

Superordinate construct: As the converse to subordinate constructs, this term indicates those constructs which are relatively more generalized and of a higher level in the construct hierarchy. The meaning of each pole of a superordinate construct can be derived from the set of subordinate constructs to which it is linked.

Triad procedure: This is the method devised by Kelly (1955) to elicit personal constructs in a given domain. It involves judging which two of three stimuli are alike and which are different, and explaining the reasons for the judgments.

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APPENDIX A

Interview Schedules

APPENDIX A

Interview Schedules

There are two main questionnaires labelled Format A: Personal Construct Data and Format B: Similarities and Preference Judgments. Format A was completed by 62 respondents representing 40 households in the process of search at the time of the interview. Format B was completed by 40 respondents who had recently decided on a new home but not yet moved in. Both schedules require use of a map of the Hamilton Metropolitan area on which coloured photographs of nine different residences are located. The procedures for eliciting constructs in Format A and for making similarities judgments in Format B are not immediately evident in the schedules. Explanatory comments on these and other aspects of the questionnaire appear below.

Eliciting Personal Constructs: Format A, (pages A3,A4,A5,A6).

1. The respondent is made familiar with the map and accompanying photographs. Care is taken to ensure that he/she recognizes the east-west orientation, important landmarks such as the CBD and escarpment, and identifying letters on the nine dwellings.
2. Successive triads of dwellings are introduced to the respondent. One of the three residences is always the place the respondent intends to move out of. It was hoped this

would lead respondents to produce constructs important in their evaluation of housing since most voluntary moves are motivated by a dissatisfaction with the current dwelling. The use of this in the triads is not unlike Hinkle's (1965) use of the respondent in all triads when trying to elicit personality traits the respondent viewed as desirable.

3. The respondent is instructed: "Compare each of these three dwellings. Think what they are, or would be like for you to live in. For example, imagine what they are like inside, the type of neighbourhoods they are in and their locations. Now, can you put two of these together as being similar in some way, and one which is different." The interviewer records the triad, and circles the two homes considered similar.
4. The respondent is asked why the two are similar. This is listed as the construct or emergent pole. Following Epting <u>et al</u>. (1971), the <u>opposite</u> of the construct is listed as the contrast, not the reason why the third residence is different.
5. The interviewer identifies the respondent's preference on this construct, describing the preference further under the column for comments if it does not coincide with either pole.
6. All constructs for which the respondent expresses a preference are numbered successively from 1. Constructs to

which the respondent is indifferent are not numbered.

7. The respondent rates the nine residences on the map, plus his/her own on each numbered construct as it is elicited, on a scale of 1 to 7. The value 1 means the residence is considered to have whatever attribute is listed as <u>preferred</u>, and the value 7, what is not wanted. It is important to note that by aligning the scale values with preference judgments, the repertory grid measures variation in evaluation not simply cognition. In Kelly's original procedure, the value 1 is given on the basis of which of the two poles of the construct the element is judged to be at or near. In the present application, the value 1 may be given to neither pole since both may be seen as undesirable, while a midpoint on the construct dimension is valuable. This occurs in constructs, like number of rooms and relative location, where a lot or a little may be both unsatisfactory states, but an intermediary point is highly acceptable.

8. The procedure is repeated until either the respondent cannot supply further constructs <u>or</u> until twenty constructs are elicited <u>or</u> until 1 hour has been spent on this section of the questionnaire. (No respondent could supply twenty, and very few spent an hour attempting to.)

9. All constructs the interviewer judges to relate to location are asterisked for later elaboration or "laddering". Interviewers are instructed to look for key words, (e.g. distance,

place names or discussions of neighbourhood attributes). In the actual survey, this procedure was in fact approximate since the author was unsure what would be elicited prior to the interviews, and the conceptualization of what are location factors broadened as the results emerged.

10. If no location construct is elicited after the third, construct, the respondent is reminded that he/she can use all the information available in the map and photographs including location. This risks inflating the number of location constructs slightly, but is necessary to avoid some respondents' limiting their attention to the photographs only. If no location construct is still elicited, the point is not pressed.

11. The preferred pole or section is laddered by investigating its perceived advantages and the advantage of the advantages. This follows Hinkle (1965), and is designed to elicit superordinate constructs, as distinct from other procedures used, for example by Honkiman (1972), to identify subordinate constructs.

12. The ordering of constructs and other factors in terms of importance is simply accomplished by use of 4" square cards. Each construct is written on one of these cards by the interviewer. The respondent then shuffles the cards until he/she is satisfied with the order.

Similarity Judgments: Format B (page B3)

1. As for Format A, the respondent is made familiar with the map and residences and instructed to imagine what it would be like to live in each.
2. The respondent is asked to consider successive pairs of residences and to make a judgment on their relative similarity or difference on any, or as many factors as he/she considers important in a house.
3. The judgment of similarity or difference is expressed as a value between 0 and 100 where 0 means the two dwellings are seen as alike, and 100 as quite unalike. The same number is not allowed twice to facilitate analysis by INDSCAL. The programme does not handle tied data.

Preference Orders for Display Dwellings (A to I)

These are collected in both formats (pages A6 and B3). The exercise was again facilitated by allowing the respondent to manipulate nine cards labelled successively A to I. Care is taken to impress on the respondent that their preferences must be realistic, i.e., take into account their financial constraints. Data on the location of specific destinations noted on page B5 are collected by writing with a felt tipped pen on the display map. These were erased after each interview, once the locations had been transposed to one of several maps which act as permanent files.

APPENDIX A1

Format A: Personal Constructs

DEPARTMENT OF GEOGRAPHY

McMASTER UNIVERSITY

PERSONAL INTERVIEW

CONFIDENTIAL

FORMAT A: PERSONAL CONSTRUCTS.

SAMPLE NO. ____________ OTHER SAMPLES IN SAME HOUSE

#'s ____________

REAL ESTATE CONTACT:

1. Name of agent: ____________
2. Name of agency: ____________

RESPONDENT'S NAME: Mr.
Ms.
Miss ____________
Mrs.

STREET ADDRESS: ____________

INTERVIEW APPOINTMENT: APPOINTMENT CHANGES:

1. Time ____________ ____________
2. Date ____________ ____________
3. Name of interviewer ____________

INTERVIEW OUTCOME:

1. Successful ☐
2. Refused ☐
3. Not at home - first appointment ☐
   second appointment ☐

GENERAL:

First, I would like to ask you some general questions about your search for a new home.

As far as you can remember, when did you decide it was time to move? That is, when did someone in the household actively begin to search, (answering advertisements, or seeing an agent for example)? How many weeks, months, or years ago?

________ WEEKS ________ MONTHS ________ YEARS

How many houses have you visited so far? ________

Tell me briefly the things you hope to find and the things you do not want in the home you are now looking for?

WANT	DON'T WANT

What price range are you considering?

(a) What is the maximum amount you think you can afford at this time?

$\$$________

(b) Would you pay more if you were offered a house with what you considered to be a very reasonable deposit and rates?

1. No ☐
2. Yes ☐ If yes, how much more? $\$$________

(c) What is the minimum amount you are likely to pay to get what you want as you see it now?

$\$$________

A3

CONSTRUCT, CONTRAST, PREFERRED POLE

TRIADS			CONSTRUCT	PRE	CONTRAST	PRE	No.	INTERVIEWERS COMMENTS
Own	#	#						

REPETORY GRID

N.B. 1 = closest to preferred pole
7 = closest to non-preferred pole

Const. No.	own	A	B	C	D	E	F	G	H	I
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

ORDER OF TRIADS

1. OWN B C
2. " E F
3. " G H
" C D
" A B
" D E
" F G
" H I
" F H
" C E
" A C
" G I
" B G
" B D
" D F
" A D
" D G
18. " C F

19. OWN F I
" B E
" E H
" D H
" C G
" E I
" A E
" B F
" A F
" B G
" C H
" D I
" C I
" B H
" A G
" A I
" A H
36. " B I

A3

CONSTRUCT, CONTRAST, PREFERRED POLE

TRIADS			CONSTRUCT	PREF	CONTRAST	PREF	No.	INTERVIEWERS COMMENTS
Own	#	#						

LADDERING OF CONSTRUCTS RELATED TO ACCESSIBILITY ONLY

Const. No.	PHASE 1		PHASE 2	
	ADVANTAGES	DISADVANTAGES	ADVANTAGES	DISADVANTAGES

CONTINUE OVER PAGE IF NECESSARY

ORDER OF IMPORTANCE OF CONSTRUCTS

Now consider each of the ideas about homes that you have given me. There are _______ of them. Can you tell me which one is most important to you when choosing a new place to live? Can you order them all, from the one which is most important to the one which is least important?

RANK ORDER

___ 1	___ 2	___ 3	___ 4	___ 5	___ 6	___ 7	___ 8	___ 9
___ 10	___ 11	___ 12	___ 13	___ 14	___ 15	___ 16	___ 17	___ 18
___ 19	___ 20							

Are there any other factors you would consider that we have not talked about when you are looking for your new house? (Interviewer to label with letters, A, B, C, etc.)

How important is each of these? That is, where do they fit into the order of factors you gave me before? (Interviewer to insert in appropriate place using ^).

PREFERENCE RANKING

Now consider how much you like each of the residences. The letter for each one is written on one side of the cards. Arrange the cards in order from the one you prefer most to the one you prefer least.

MOST PREFERRED LEAST PREFERRED

___ 1	___ 2	___ 3	___ 4	___ 5	___ 6	___ 7	___ 8	___ 9

PROFILE

In terms of the categories on this card, tell me how long you have lived in Hamilton?

1. Most of life
2. Over 10 years
3. 5 - 10 years
4. 4 - 5 years
5. 3 - 4 years
6. 2 - 3 years
7. 1 - 2 years
8. Less than one year

Do you own or rent your present dwelling? (1) Own ____ (2) Rent ____
If other please give details. ________________________________

In terms of the categories on this card, which of the following age groups do you fit into?

1. 10-19
2. 20-29
3. 30-39
4. 40-49
5. 50-59
6. 60-69
7. Over 70

Tell me the number on this card beside the category which describes the highest level of school or university you attended.

1. 1-8 years elementary
2. 1-4 years vocational or secondary, but no diploma
3. 4-5 years secondary diploma
4. Professional or technical training beyond secondary
5. Some university but no degree
6. University degree or beyond
7. Other - please specify ________________________________
8. never attended

Marital status:

1. Single
2. Married
3. Widowed
4. Separated
5. Divorced

Do you have any children? (1) No ____ (2) Yes ____

If yes, what are the ages of your children?

_____, _____, _____, _____, _____, _____, _____, _____

Do any of these not go to school or university? *Interviewer to circle ages of those who do not attend school or university.*

(a) Are you presently employed? (1) No ☐ (2) Yes ☐

(b) What is your occupation?

____

Interviewer to probe for a specific response to this question.

In terms of the categories on this card, what is your main(own) source of income? Tell me the appropriate number.

1. Inheritance
2. Profits or fees
3. Commission
4. Salary (monthly/yearly)
5. Wages (hourly)
6. Unemployed, family/welfare benefits
7. Family or relatives
8. Other (please specify) ______________________

On the basis of your last gross annual earnings please state in which gross income category you fit, as listed on this card. First your own personal income if you have one. Now, the combined income of the household if you know it.

		PERSONAL	COMBINED
1.	less than $2000	1.	1.
2.	$2000 - $2999	2.	2.
3.	$3000 - $3999	3.	3.
4.	$4000 - $4999	4.	4.
5.	$5000 - $5999	5.	5.
6.	$6000 - $7999	6.	6.
7.	$8000 - $9999	7.	7.
8.	$10,000 - $12,999	8.	8.
9.	$13,000 - $15,999	9.	9.
10.	$16,000 - $19,999	10.	10.
11.	$20,000 - $24,999	11.	11.
12.	Over $25,000	12.	12.

Have you bought a house yet, or placed a bid you hope will be successful?

(1) No __ (2) Yes __

If yes, how many days ago was this? __________ days __________ weeks.

How many homes have you owned in the past? __________ .

TO BE COMPLETED AFTER INTERVIEW

I. Total length of interview __________ mins.

II. Sex of respondent: Male (0) Female (1)

III. Was anyone else present during any part of the interview? Yes (0) No (1)

If YES, give details ____

IV. In general, what was the respondent's attitude toward the interview?

Friendly and eager _____

Cooperative but not particularly eager _____

Indifferent and bored _____

Hostile _____

V. Type of housing unit. Circle the appropriate grade of housing.

1. Excellent Housing Unit:
Includes inly single family dwellings in excellent repair, in which both the house and the lot are of a large size, and the house is uniquely styled. Alternatively, refers to penthouses of modern high rise apartment buildings.

2. Very Good Housing Unit:
Includes again single family units with moderate lot size, approximately 3 bedrooms, post-1950 construction, and some distinctive styling. Alternatively refers to large apartment units with 3 bedrooms (i.e., a good deal of internal space) and also extra amenities within the building itself (e.g., "posh" lobby, swimming pool, etc.)

3. Good Housing Unit:
Generally identified by a standard suburban style of detached house with a more conventional and less pretentious appearance on a smaller lot than (2) above; also may include new (post-1960) town and row-houses. For apartments, this grade is identified by smaller units (2 bedrooms) in post-1960 high rise buildings with a less pretentious external and internal appearance.

4. Average Housing Unit:
Standard 2 bedroom house on a small lot, usually without a detached garage, in generally good repair. Also less stylistic, older (pre-1960), town and row houses. Finally, smaller apartment buildings of post-1950 origin.

5. Fair Housing Unit:
Older detached housing (pre-1950) generally of wood-frame or stucco construction in generally good repair. Includes older duplex and triplex apartment buildings without elevators and other modern amenities.

6. Poor Housing Unit:
Evidence of deterioration in terms of foundation (cracking), roof (sagging), chimney (cracking), and paint (peeling and wearing away) identifies this grade for both houses and apartments.

7. Very Poor Housing Unit:
Housing units in this class are beyond repair (roof uneven, foundation crumbling, walls out of plumb) and are considered unhealthy and unsafe.

VI. Occupancy:
Circle the appropriate sub-category of housing unit.

a. Single-family single-detached house
b. Multiple-occupancy single-detached house
c. Single-family row house
d. Multiple-occupancy row house
e. Low-rise apartment building
f. High-rise apartment building

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APPENDIX A2

Format B: Similarities and
Preference Judgments

DEPARTMENT OF GEOGRAPHY

McMASTER UNIVERSITY

PERSONAL INTERVIEW

CONFIDENTIAL

FORMAT B: SIMILARITIES AND PREFERENCE JUDGEMENTS.

SAMPLE NO. ______________ OTHER SAMPLES IN SAME HOUSE

REFER TO MAP TRANSFER # ______________ #'s ______________

REAL ESTATE CONTACT:

1. Name of agent: ______________

2. Name of agency: ______________

RESPONDENT'S NAME: Mr.
Ms.
Miss ______________
Mrs.

STREET ADDRESS: ______________

INTERVIEW APPOINTMENT: APPOINTMENT CHANGES:

1. Time ______________ ______________

2. Date ______________ ______________

3. Name of interviewer ______________

INTERVIEW OUTCOME:

1. Successful ☐

2. Refused ☐

3. Not at home - first appointment ☐

second appointment ☐

GENERAL:

First, I would like to ask you some general questions about your search for a new home.

As far as you can remember, when did you decide it was time to move? That is, when did someone in the household actively begin to search, (answering advertisements, or seeing an agent for example)? How many weeks, months, or years ago?

__________ WEEKS __________ MONTHS __________ YEARS

How many houses have you visited so far? __________

Tell me briefly the things you hope to find and the things you do not want in the home you are now looking for?

WANT	DON'T WANT

What price range are you considering?

(a) What is the maximum amount you think you can afford at this time?

$__________

(b) Would you pay more if you were offered a house with what you considered to be a very reasonable deposit and rates?

1. No ☐
2. Yes ☐ If yes, how much more? $__________

(c) What is the minimum amount you are likely to pay to get what you want as you see it now?

$__________

SIMILARITIES

(N.B.: This exercise excludes houses A and E to avoid making this section too time-consuming or arduous for the respondent).

	B	C	D	F	G	H
C						
D						
F						
G						
H						
I						

PREFERENCE RANKINGS

(a) Now consider how much you like each of the residences. The letter for each one is written on one of these cards. arrange the cards in order from the one you prefer most fo the one you prefer least.

MOST PREFERRED LEAST PREFERRED

____ 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ 6 ____ 7 ____ 8

(b) Are you employed? (1) No ____ (2) Yes ____

If yes, consider each of the homes in relation to where you work. Arrange the cards in order from the one which is <u>most accessible</u> to your place of work to the one which is <u>least accessible</u>.

MOST ACCESSIBLE TO WORK — LEAST ACCESSIBLE

____	____	____	____	____	____	____	____	____
1	2	3	4	5	6	7	8	9

(c) i. Do you have any children? (1) No ____ (2) Yes ____

ii. If yes, what are the ages of your children?

____, ____, ____, ____, ____, ____, ____, ____, ____, ____,

iii. Do any of these <u>not</u> go to school or university?
Interviewer to circle ages of those who do <u>not</u> go to school of university.

iv. Now order the cards from the one which is on the whole <u>most accessible</u> to your children's schools to the one which is <u>least accessible</u>.

MOST ACCESSIBLE TO SCHOOLS — LEAST ACCESSIBLE

____	____	____	____	____	____	____	____	____
1	2	3	4	5	6	7	8	9

(d) Does your husband work? (1) No ____ (2) Yes ____

If yes arrange the cards in order from the one *most accessible* to his place of work to the one which is *least accessible*.

MOST ACCESSIBLE TO WORK — LEAST ACCESSIBLE

____	____	____	____	____	____	____	____	____
1	2	3	4	5	6	7	8	9

<u>TRANSPORT TIME</u> (where applicable)

How long does it take to travel to work from the house you are moving out of?
To your place of work? ____________
To your husband's? ____________
(Confirmed by him? ________)

How long do you expect it to take from the new house?
To your place of work? ____________
To your husband's? ____________
(Confirmed by him? ________)

ACTIVITIES

To understand some of the factors that may influence where you decide to live in the Hamilton area, we need to know something about your activities.

First, I would like you to locate the following places on the map of Hamilton with this

☐ Black pen
☐ Red
☐ Green
☐ Blue

	N.A.	Not Located	
(a)	☐	______	Your place(s) of work, (indicate with AW on map).
	☐	______	Your husgand's place of work, (indicate with AH).
(b)	☐	______	Locate the homes of three friends or relatives you visit most often (B).
(c)	☐	______	The locations of three social organizations or clubs you belong to and visit most frequently, (C). Please name these organizations: ______ ______ ______
(d)	☐	______	The shopping area or place you do your weekly shopping at (D).
(e)	☐	______	The church you attend if you attend church on a regular basis (E).
(f)	☐	______	The elementary high schools and universities attended by any of your children (F).
(g)	☐	______	The location of this house (G).
(h)	☐	______	The location of the new house (H).
(i)	☐	______	The location of any other residences you have lived in, in or near Hamilton (*only* the last two) (I).

CHANGES (where applicable)

When you move into the new house, are you likely to change

- where you go to church? (1) No ____ (2) Yes ____
- where you do your weekly shopping? (1) No ____ (2) Yes ____
- where any of your children go to school? (1) No ____ (2) Yes ____
- where either of you work? (1) No____ (2) Yes____

PROFILE

In terms of the categories on this card, tell me how long you have lived in Hamilton?

1. Most of life
2. Over 10 years
3. 5 - 10 years
4. 4 - 5 years
5. 3 - 4 years
6. 2 - 3 years
7. 1 - 2 years
8. Less than one year

Do you own or rent your present dwelling? (1) Own ____ (2) Rent ____
If other please give details. ______________________________

In terms of the categories on this card, which of the following age groups do you fit into?

1. 10-19
2. 20-29
3. 30-39
4. 40-49
5. 50-59
6. 60-69
7. Over 70

Tell me the number on this card beside the category which describes the highest level of school or university you attended.

1. 1-8 years elementary
2. 1-4 years vocational or secondary, but no diploma
3. 4-5 years secondary diploma
4. Professional or technical training beyond secondary
5. Some university but no degree
6. University degree or beyond
7. Other - please specify ______________________________
8. never attended

Marital status:

1. Single
2. Married
3. Widowed
4. Separated
5. Divorced

(Where applicable)

(a) What is your occupation? (b) Your husband's?

____

Interviewer to probe for a specific response to this question.

In terms of the categories on this card, what is your main(own) source of income? Tell me the appropriate number.

1. Inheritance
2. Profits or fees
3. Commission
4. Salary (monthly/yearly)
5. Wages (hourly)
6. Unemployed, family/welfare benefits
7. Family or relatives
8. Other (please specify) ____________________

On the basis of your last gross annual earnings please state in which gross income category you fit, as listed on this card. First your own personal income if you have one. Now, the combined income of the household if you know it.

		PERSONAL	COMBINED
1.	less than $2000	1.	1.
2.	$2000 - $2999	2.	2.
3.	$3000 - $3999	3.	3.
4.	$4000 - $4999	4.	4.
5.	$5000 - $5999	5.	5.
6.	$6000 - $7999	6.	6.
7.	$8000 - $9999	7.	7.
8.	$10,000 - $12,999	8.	8.
9.	$13,000 - $15,999	9.	9.
10.	$16,000 - $19,999	10.	10.
11.	$20,000 - $24,999	11.	11.
12.	Over $25,000	12.	12.

How many days ago did you put the bid in for your new house? __________ days

How many homes have you owned in the past? __________

TO BE COMPLETED AFTER INTERVIEW

I. Total length of interview ________ mins.

II. Sex of respondent: Male (0) Female (1)

III. Was anyone else present during any part of the interview? Yes (0) No (1)

If YES, give details ______________________________

IV. In general, what was the respondent's attitude toward the interview?

Friendly and eager ____

Cooperative but not particularly eager ____

Indifferent and bored ____

Hostile ____

V. Type of housing unit. Circle the appropriate grade of housing.

1. Excellent Housing Unit:
Includes inly single family dwellings in excellent repair, in which both the house and the lot are of a large size, and the house is uniquely styled. Alternatively, refers to penthouses of modern high rise apartment buildings.

2. Very Good Housing Unit:
Includes again single family units with moderate lot size, approximately 3 bedrooms, post-1950 construction, and some distinctive styling. Alternatively refers to large apartment units with 3 bedrooms (i.e., a good deal of internal space) and also extra amenities within the building itself (e.g., "posh" lobby, swimming pool, etc.)

3. Good Housing Unit:
Generally identified by a standard suburban style of detached house with a more conventional and less pretentious appearance on a smaller lot than (2) above; also may include new (post-1960) town and row-houses. For apartments, this grade is identified by smaller units (2 bedrooms) in post-1960 high rise buildings with a less pretentious external and internal appearance.

4. Average Housing Unit:
Standard 2 bedroom house on a small lot, usually without a detached garage, in generally good repair. Also less stylistic, older (pre-1960), town and row-houses. Finally, smaller apartment buildings of post-1950 origin.

5. Fair Housing Unit:
Older detached housing (pre-1950) generally of wood-frame or stucco construction in generally good repair. Includes older duplex and triplex apartment buildings without elevators and other modern amenities.

6. Poor Housing Unit:
Evidence of deterioration in terms of foundation (cracking), roof (sagging), chimney (cracking), and paint (peeling and wearing away) identifies this grade for both houses and apartments.

7. Very Poor Housing Unit:
Housing units in this class are beyond repair (roof uneven, foundation crumbling, walls out of plumb) and are considered unhealthy and unsafe.

VI. Occupancy:
Circle the appropriate sub-category of housing unit.

a. Single-family single-detached house
b. Multiple-occupancy single-detached house
c. Single-family row house
d. Multiple-occupancy row house
e. Low-rise apartment building
f. High-rise apartment building

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APPENDIX A3

Tradeoff Data

SPACE, LOCATION, AND PRICE TRADE-OFFS

The exercise I would like you to do now will tell me how important aspects like price, location and space are to you. First I need to know

- What is the maximum time you would be prepared to spend travelling to work from home? ______________________

- How far do you prefer to be? ______________________

- Could you be too close? How close is this? ______________________

- How many bedrooms do you prefer to have? (or need) ______________________

- How large a lot do you like? ______________________

NUMBER OF BEDROOMS AND DISTANCE FROM WORK

The 16 cells of the square below represent 16 choices of homes each with a different number of bedrooms, and at different distances from work. The houses are otherwise identical to your own. Please order the 16 choices from the one you like the best, (mark as 1) to the one you like the least (mark as 16).

Bedrooms	5	15	30	60 - minutes from work
2				
3				
4				
5				

SIZE OF LOT AND DISTANCE FROM WORK

Again the 16 cells represent 16 choices of homes. In this case, they vary in distance from work and the size of the lot preferred. Order the choices from the most preferred to the least preferred.

Size of Lot	5	15	30	60 - minutes from work
Small lot (30 x 100) no trees, close to neighbors				
Average lot (60 x 100) some trees and landscaping				
Large lot (125 x 200) trees and landscaping, spaced from neighbors				
Very large lot (3 acres) well landscaped				

PRICE AND DISTANCE FROM WORK

	5	15	30	60 -minutes from work
The price you paid				
$1000 more than you paid				
$3000 more than you paid				
$5000 more than you paid				

PRICE AND NUMBER OF BEDROOMS

	2	3	4	5 - bedrooms
The price you paid				
$1000 more than you paid				
$3000 more than you paid				
$5000 more than you paid				

PRICE AND SIZE OF LOT

	Sale Price	$1000 More	$3000 More	$5000 More
Small lot (30 x 100) no trees, close to neighbors				
Average lot (60 x 100) some trees and land-scaping				
Large lot (125 x 200) trees and landscaping spaced from neighbors				
Very large lot (3 acres) well landscaped				

NUMBER OF BEDROOMS AND SIZE OF LOT

	2	3	4	5 - number of bedrooms
Small lot (30 x 100) no trees, close to neighbors				
Average lot (60 x 100) some trees and land-scaping				
Large lot (125 x 200) trees and landscaping spaced from neighbors				
Very large lot (3 acres) well landscaped				

APPENDIX B

Master Code, Orientation Code and Source Master Code

APPENDIX B

Master Code, Orientation Code and Source

Master Code

The master code listed in Table B1 is a six digit numeric classification system designed to code all verbal statements relating to housing recorded in the questionnaires used in this survey. The code has been tested with the survey data only and is therefore provisional. Tables 4, 5 & 7 specify as far as the 3rd digit only. The code proved capable of coding most, if not all data, provided by the sample respondents in their free descriptions of housing preferences, elicited constructs and constructs listed as other factors. The master codes can be systematically grouped to provide descriptions of the housing preferences of an individual respondent or the sample at any level from a specific description to a generalized view.

Procedure for Development of the Master Code

The code is based on a similar system to that used by Michelson, (pers. comm.) in a survey of the housing preferences in Toronto. It has been found impossible to apply Michelson's code directly to the Hamilton data without considerable re-interpretation of the expressions used by the respondents. This may be related to differences in the interview formats and the nature and size of samples used in the two surveys. As a consequence, it is believed that the imposition of Michelson's and perhaps of any externally derived code on the Hamilton data would risk the difficulties of value transference and may negate the whole purpose of eliciting personal constructs. This is not to say that once the cognitive nature of housing dimensions is better established, standardised codes cannot be developed. In fact, they should be developed.

The present Master Code was constructed by:

1. separating all verbal descriptions contained in questionnaire format A into a set of distinct ideas;
2. recording each idea as a potential code description on a 2" x 4" index code to facilitate their continual re-examination and sorting. A count is kept of how many times each idea is specified throughout the sample on the same card;
3. the ideas are re-sorted to minimise the number of codes used very infrequently, especially where obviously similar ideas are already recorded;
4. a six digit numbering system is used to identify each idea. The first digit indicates which major group of housing attributes the idea relates to, i.e., dwelling interior (1) other features of the dwelling, (2) the lot, (3) location (4,5 or 6), financial concerns, (7) and other miscellaneous ideas (8). Each successive digit identifies the attribute in greater detail.

It is important to note that the ideas designated by master codes are not personal constructs. They are separate and meaningful concepts used by respondents to describe their personal constructs. In Kelly's terminology they are "Construct labels". A single construct may be described at either pole or at any preferred section along the dimension, by several different ideas all specified by their own master codes.

Orientation Code

Each master code is preceded by one of the orientation code numbers listed in Table B2. This code denotes the attitude of the respondent to the coded idea. That is, whether it is considered a desirable, undesirable or indifferent feature of housing.

Source

All master codes are further designated by source i.e.) section of the questionnaire, construct number and sample number.

TABLE B1

Master Code

100 DWELLING INTERIOR

110 general description: small, too small, no space / satisfactory/large, has space.

* 121 number of rooms: few, too few/ enough/ many, too many/ separate/ full (as in basement)/ specific number (specified in 5th digit of the code)

* 122 Size of rooms: small, limited, no space/ average , satisfactory, large enough/ very large, too large.

* 123 shape of rooms: usual/unusual.

* 124 location of rooms: usual/ unusual/ convenient/ inconvenient.

* 125 versatility of rooms and use: versatile/ not versatile.

* 126 possibilities or necessities for improvement, redecoration, conversion, maintenance: possible, could convert etc./ impossible, could not, have to maintain.

* 127 room design.

* The final digit specified the type of room(s) under discussion i.e.:

1) rooms in general
2) kitchen
3) dining room
4) living room
5) family room
6) basement
7) bedrooms
8) bathrooms
9) others.

131 storage: small, no space, not enough/lots of space, satisfactory.

132 windows: small, dark/ large, light/modern/storms.

133 doors: solid/ screen.

134 systems: air conditioning present or absent/ wiring good or bad/type of heating--electricity, gas, oil, other/state of plumbin good or bad.

135 fireplaces: number present or absent.

136 additional miscellaneous feature of the house interior.

200 DWELLING TYPE, EXTERIOR AND OTHER CHARACTERISTICS

210 external appearance: unattractive, unacceptable, ugly/attractive has character, interesting.

221 degree of separation of units: single family/ multiple family, condominiums/row/highrise.

2221 number of floors---one, split level, two..

2222 house design or plan: favoured, acceptable/ not acceptable/

223 cleanliness and upkeep, (internal and/or external): in good shape, clean/not in good shape, dirty

224 age: new, newer, modern/old, older.

225 soundness of structure: sound structure, foundations solid/not sound construction, foundations.

226 building materials: brick/ aluminum/wood frame/ sticco/other---insul brick, angel stone, slate.

227 possibility or necessity for maintenance, redecoration: possible or necessary/not possible or necessary.

230 lot-dwelling relationship: style suits lot/does not suit lot/ well situated on lot/ not well situated on lot.

240 roof: quality poor, leaking/good, sturdy/gabled/cottage style, four-sided/other.

250 ownership: own/rent.

300 LOT

310 lot size: specified size/small, too small/average, adequate/ large, too large/ frontage large-small.

320 lot shape: usual/unusual.

330 site relations: corner house/not corner/close proximity to neighbours, adjacent houses/not too close, distant

341 trees and landscaping: garden possible or present/ not possible or present/ trees and landscaping developed, mature/not developed, mature.

342 garage: own/ share/ absent/ two or/ one car.

343 driveway: private/shared.

344 miscellaneous features.

345 pool: absent, not possible/ present, possible.

346 topography of lot: ravine/not ravine.

350 space on or around lot: spacious, sense of space/ not spacious/ backyard allowance/ no backyard.

360 privacy of lot: private/not private.

370 services: sewerage/hydro, water/ septic tanks /wells.

380 ownership: private, own house and lot/public, shared lot and amenities as in condominiums and apartments.

391 possibility of expanding buildings: possible/ not possible.

392 possibility of landscaping: possible/ not possible.

400 LOCATION IN HAMILTON

410 south, south-west, south-east, Mount Hope.

420 north, north end, north-east, north-west

430 east end, Stoney Creek, Grimsby.

440 west, west end, Westdale, Dundas, Ancaster.

450 Mountain, above, below, east of mountain, west of mountain.

460 Burlington, Waterdown, Carlisle.

470 rural, in the country, not too city.

480 urban, in the city, downtown, urban-industrial, urban-residential.

490 suburban, residential, "in-between", suburban in Hamilton/ suburban, out of Hamilton.

500 GENERAL LOCATION

510 general: good, favourable/ bad, poor, unfavourable location/ sense of isolation/ no sense of isolation/ sense of community/ survey type area.

520 housing in the area: old, poorly kept/ new, well maintained, clean, neat/styles unattractive, no character, ugly/ attractive/ interesting, pleasing/ prices ---cheap, low/ reasonable /high.

530 people in the area, class, lifestyle, standards of living --- same as us/different from us (lower or higher)/ variety of/ too many children/ too few children/ no children/ people close/ people distant, not too close/ can associate with, get to know/ unlikely to associate with, tend to avoid.

540 streets in the area: busy, main thoroughfare/ not busy, quiet, residential/ paved/ unpaved/ with sidewalks/ without sidewalks/ parking available.

550 access:

*6th digit specifies whether access is desired in terms of (1) unspecified, (2) distance, (3) time for leisure and relaxation, (4) cost, (5) comfort (6) pleasure.

551-access to highways

552-to public transport

553-to destinations
5531 to work
5532 to schools
5533 to shopping and general services
5534 to outdoor recreational opportunities, open space, nature, parks
5535 to friends and relatives
5536 to downtown
5537 to cultural centres

559-do not want access to any of the above destinations.

560 services in the area: sewerage, water, hydro, street cleaning and maintenance, emergency services (police police, fire, ambulance)

570 other qualities of the area: area clean/dirty, sordid/air clean/ polluted/quiet/noisy/safe for children/not safe/parklike atmosphere, trees, open space/no trees etc./ miscellaneous.

580 amenities of the area: recreation available/not available/ quality of schools, good, acceptable/bad, unacceptable/ by-laws good/ bad.

600 GENERAL LOCATION*

*largely obtained by laddering location constructs and expressed as a complex set of things, not as a single phrase.

610 location allowing for pursuit of a given life-style and activities outdoors: e.g. relaxation, gardening, raising animals, sunbathing, picnics, walking, running, climbing ----for health, pleasure, relaxation, teaching children appreciation of nature, responsibility, independence.

620 location which avoids undesirable aspects of environments e.g. stresses of urban environment, pollution, noise, heat, crowding, worry about children, undesirable people and children or undesirable aspects of suburban environment e.g. distance from work and the pressure to keep up.

700 FISCAL CONSIDERATIONS

71 price: low value for money/reasonable/can afford/ too expensive, not worth it, can't afford/high, can afford.

72 rates: manageable rates and means of payment/ unmanageable

73 taxes: low, manageable/high, unmanageable.

74 cost of maintenance of house and lot: manageable/ unmanageable.

79 other: e.g. resale value, cost of metered water

800 MISCELLANEOUS

e.g. approval of parents, date of occupancy.

TABLE B2

Orientation Code

CODE	DESCRIPTION
1.	Desirable - express in free response action of questionnaire A and B
2.	Desirable - expressed as preferred pole of section of a construct
3.	Undesirable - expressed in free response
4.	Undesirable - expressed as non-preferred pole or section of a construct
5.	Indifferent or no preference
6.	Originally desired but no longer wanted.

APPENDIX C

Classification of Construct Types

APPENDIX C

Classification of Construct Types

Procedure for Developing the Taxonomy

All constructs are classified into the types specified in Table C1. This is a general classification of the constructs comprised of 25 classes. The classes are defined subjectively by grouping master codes into sets referencing housing attributes with similar or related meanings. The decision on what are related master codes is made first on the basis of the association of codes occuring within individual constructs, and second by the author's judgment, to minimize the number of classes in the taxonomy. An example of the first instance is the allocation of all references to the age of the dwelling, building materials, structure and maintenance concerns into a single type (12). An example of the second is the specification of all neighbourhood place names in the Hamilton area to Type 23.

Procedure for Classifying Constructs

For the purposes of the classification by type, there are "simple" and "complex" constructs. Simple constructs are coded with a single master code, or with several master codes all allocated to the same construct type. Complex constructs are those involving several master codes, where the codes are considered to belong to different type groupings. In such cases, an attempt is made to identify the dominant meaning intended by the respondent and to classify the construct accordingly.

Inexactness of the Classes

Consistent with most typologies in behavioural research (Gale, 1972b) the construct types are not exactly defined, well bounded or even mutually exclusive. They are general labels for apparently similar parts of the systems of interrelated concepts elicited from the personal construct systems of different respondents. An example of this inexactness are the references to proximity of neighbouring houses, (master code 332). These border between the notion of external privacy (Type 15), and references to density of housing, listed under neighbourhood concerns (Type 19).

Use of the Typology

The ultimate exploration of any individual's construct system in the housing domain should show all constructs linked together by direct and indirect implications. It follows that it may also be possible to identify types of constructs common to the construct system of different individuals in a given domain and the common associations between them. The Typology is the first attempt to identify common constructs from Sample A and is utilized in Chapter V as the starting point for identifying common associations between constructs.

TABLE C1

Classification of Construct Types: Detailed Descriptions

Reference Number	CONSTRUCT TYPE Description	ASSOCIATED MASTER CODES
1.	Dwelling size and Internal Space Number of rooms and bedrooms Dimensions of rooms and bedrooms	111, 112, 113, 121, 122 ending in 1 or 7
2.	Basement Either having one or having a full one	121 ending in 6
3.	Dining room Having one or a separate one	121 ending in 3
4.	Other rooms Large Kitchen, family room, More than one bathroom	121 ending in 5, 8, 9 122 ending in 2
5.	Room shape, location, versatility redecoration and maintenance	123, 124, 125, 126
6.	Windows	132
7	Fireplace (s)	135
8.	Other aspects of dwelling interior Space for storage, systems, doors, miscellaneous	131, 133, 134, 136
9.	General appearance of dwelling, cleanliness and upkeep	21, 223
10	Occupancy of dwelling Single or multiple family, attached or detached. Owned or rented	221, 251 38 in some cases
11.	Number of floors	2221
12.	Age of dwelling and related concerns Building materials, maintenance concerns. Soundness of structure	224, 225, 226, 227

13.	Other aspects of house design.	24, 2222
14.	Lot size and shape. Situation of the house on the lot	23 31, 32, 350
15.	Privacy of lot and dwelling Site relations with respect to neighbours and others in vicinity. Space and privacy to conduct a desired way of life free from intrusion. Preference for non-shared external facilities.	33,36 5141, 61, 533 38 in some cases
16.	Trees, landscaping, topography	341, 346
17.	Parking, garage, driveway	342, 343
18.	Other features of the lot	3411, 344, 345, 37
19.	Neighbourhood considerations Presence of children, quietness safety, cleanliness, pollution levels, streets, recreation and parks, landscaping, quality of schools, opportunities for social contact, "people same as us", sense of community. General appearance and quality.	51 52, 5311, 532, 534 533
20.	Accessibilities.	55, 620 in some cases
21.	Urban Downtown, "in Hamilton"	48
22.	Rural Suburban, "out of Hamilton"	470, 490
23.	Specific places in Hamilton area. Neighbourhoods, townships, in or near Hamilton - south, north, east west parts of Hamilton, Westdale, Ancaster, Mt. Hope, Stoney Creek, Dundas, Burlington, Mountain.	41, 42, 43, 44, 45, 46
24.	Financial Considerations price, monthly payments, taxes.	71, 72, 73, 79
25.	Uncoded.	

APPENDIX D

Frequency of
The Grouping of Constructs by Type in the Optimal Groupings - Ward's Hierarchical Groupings Analysis

APPENDIX D

Frequency of
The Grouping of Constructs by Type in the
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Groupings Analysis

Neg. signs includes

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	9^{9}	1	1		2	4		2	3		6	14	1	5	2	2	6		3		2	1	3		
2	1									1		2		2	1		3					1			
3	1																								
4																									
5	2					1																			
6	4				1	^{1}	1	2	1	1		1	1	1	4		2					1			
7						1			1	1															
8	2										2						2								
9	2					1	1			1	1	5				1	1			1		1	1		
10		1				1	1		1				1	1	1		1					1			
11	6							1	1			7	1				2		2			1		1	
12	15	2				1		1	3		6	4^{4}	1	4	2	2	6		2	2		1	2	1	2
13	1					2				1		1							1						
14	3	2								1		5		1^{1}	8	5	10		4	2	1	9	3		
15	2	2				4				1		2		11	4^{3}	3	6		5			6			
16	3								1			3	1	6	3		2		5	1	5	4	1		
17	9	3						1		1		7		11	6	3	2^{2}	1	4	1	1	1	3	1	
18	1																				1	1			
19	4											2	1	4	4	7	4		1^{1}	6	1	4		2	
20												1		1		1			5	5^{5}	1	3		1	
21	2													1			1	1	1	1					
22	2	2				1			1	1		4		11	7	5	1	1	5	1		1^{1}			
23									1			2		3		4	2								
24	1											2					1							1^{1}	
25												2													

Negative signs excluded.

APPENDIX E

Tradeoff Analysis

APPENDIX E

Trade-Off Analysis

For the analysis of the data obtained from the exercise described in Appendix A3, a simple preference model is adopted for which it is necessary to estimate sixteen parameters for the four attributes and their respective levels. All other attributes are held constant for each respondent. The following description of the model and tradeoff algorithm is primarily based on the description by Knight and Menchik (1975).

The model assumes a utility or preference function of the form:

$$U = U(q_1, q_2, q_3, q_4) \qquad (1)$$

where U is the ordinal utility level for a residence and q_1 to q_4 are variables indicating the level on each of the four variables. Total utility can then be written as the product of four "part-utility" functions U_i, each defined on one attribute i. This can be done if, first, we assume that the total utility function is "multiplicative-separable" in form such that it can be written,

$$U = \prod_{i=1}^{4} U_i\,(qi) \qquad (2)$$

and second, that the part-utility of one attribute is independent of the levels of all other attributes. In other words, this requires that the tradeoff made between any two attributes is independent of any other attributes and is called the assumption of "want-independence".

It is likely that this assumption is seriously violated in both this study and others using Tradeoff Analysis (e.g., those by Fiedler,1972,and by Knight and Menchik, 1975). In particular, the price variable intervenes between the tradeoff of other variables. In this study, respondents found it unreasonable to assume that price will remain constant while the size of the lot or dwelling increases significantly.

Since the utility function is ordinal, it is unchanged by taking monotonic transformations of (2),(such as taking logarithms) and hence can be converted to an equivalent additive - separable form. In addition, since attribute levels are discrete, the function $U_i(q)$ can be set equal to the constant P_{ij} when attribute i assumes level J, (j = 1 to 4). If we interpret P_{ij} as the preference for level j of attribute i, the preference for a given residence is specified by the functions;

$$U = \prod_{i=1}^{4} P_{ij} \quad \text{or} \quad U = \sum_{i=1}^{4} P_{ij} \qquad (3)$$

In this study, there are 16 parameters to this model which can be estimated using the conjoint scaling procedure known as Tradeoff Analysis (Johnson,1972).

Input data for the algorithm in the study are the rankings from 1 to 16 for the cells of each of six tradeoff matrices which appear in Appendix A3.

The algorithm takes the input data and computes parameters P_{ij} for each level of each attribute. The procedure is basically that employed in the monotonic multi-dimensional scaling techniques. At the first iteration, provisional P_{ij} values are estimated and multiplied together for each level on each pair of attributes. The rankings of the predicted values are compared with the actual rankings using a measure of fit $\emptyset$ (phi). A gradient search procedure produces improved estimates of P_{ij} at each successive iteration until a pre-specified maximum number of iterations or measure of fit is reached. The correspondence between input rankings and final utility values for each level is demonstrated not only by phi but by tau, Kendall's rank order correlation coefficient.

The goodness of fit between the actual and predicted rankings using tau for each respondent is listed in Table E1.

TABLE E1

Correlation between Actual and Predicted Rankings in the Tradeoff Analysis

Respondent	Tau
1	.69
2	.94
3	.85
4	.64
5	.75
6	.83
7	.91
8	.90
9	.86
10	.92
11	.58
12	.92
13	.75
14	.88
15	.88
16	.86
17	.89
18	.76
19	.86
20	.88