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COMPARING URBAN IMAGES: A MULTIVARIATE APPROACH.

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COMPARING URBAN IMAGES: A MULTIVARIATE APPROACH

by

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M.A. University of Windsor, 1975

A Dissertation
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ABSTRACT

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Subjects in 5 cities in southern Ontario were asked to describe their city on a questionnaire. The study presented only the name of the city to be described (an abstract environmental display) and used a verbal rather than a visual response format. The questionnaire included 6-point rating scales for 25 bipolar descriptive adjectives (e.g., smelly-fresh), 4-point rating scales of desirability for 11 environmental features (e.g., geographical location), a list of 10 Canadian cities to be ranked in desirability, and several open-ended questions (e.g., provide a nickname and color for the city). It was hypothesized that: (1) images of a particular city are consistent for individuals within that city, (2) urban images of particular cities vary so that comparisons of cities yield significant differences in urban images across cities, and (3) urban images correspond with environmental indicators suggested as relevant to ideal urban images by researchers.

The first hypothesis was supported by a consistent rating pattern of responses across cities and a correlation between the different portions of the questionnaire. However, there were also differences in ratings because of certain of the demographic characteristics of the samples (i.e., especially for the variables

representing whether the subject lived in the city proper and would prefer to move elsewhere). The second hypothesis was strongly supported by significant differences in urban images of the cities rated. An evaluative dimension emerged as a primary factor for the descriptive adjectives, with Hamilton and Windsor being rated more negatively than were Kitchener, London, and St. Catharines. Industrialization and geographical location apparently were the major bases for these ratings on the descriptors. Ratings on the features and rankings of the cities corresponded with the ratings on the descriptors. Those cities ranked more highly were also rated more positively on the features. The third hypothesis was not supported; environmental indicators did not correspond with the urban images which emerged in this study.

The results were discussed in terms of symbolic imagery. Images do not merely reflect the external environment but restructure it in the mind of the individual. A halo effect occurred so that certain cities were imaged more negatively or more positively than the environmental indicators suggested was appropriate. The feasibility and applicability of the experimental and analytical techniques used in this study were also discussed.

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Finally, there are my friends and family. My parents knew me, my needs, and my goals; my brothers made me laugh; Kath listened and went with me; and Brian touched my heart.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

Environmental psychologists study the relationship between man and his physical setting (Proshansky, Ittelson, & Rivlin, 1976). Saarinen (1976) has suggested that environmental psychology may be further organized into the study of man's perceptual and behavioral processes in relation to the environment. The first process--the individual's perception of the environment--is a cognitive function (Lowenthal, 1972). The second process--the behavior of the individual within the environmental setting--is defined generally as overt activity on the part of the individual, including the expression of his attitudes toward and preferences for certain environments (Barker, 1968; McInnes, 1969).

Images are a third, and inferred, aspect of the relationship between man and his environment. Although images are often equated with the individual's perceptions of the environment (Saarinen, 1976), they are not necessarily the same. For example, in his discussion of urban environments, Banz (1970) has stated that the totality of the urban environment cannot be perceived through the sensory organs alone. It must then be conceptualized in the mind. The city becomes an abstraction and, hence, an image. Carr (1967) suggested the same when he stated that it is the city of the mind which we know personally. It is subjective knowledge which forms images (Boulding, 1966) and which is the person's frame of reference for behavior (McInnes, 1969). In the present study, images will be inferred from

responses on a behavioral measure (i.e., a questionnaire).

The urban image consists of several components (i.e., identity, structure, and meaning) which are defined more fully below (Lynch, 1960). It should be noted that, in this study, image will be considered as a restructuring of the individual's perception of his environment and as a cognitive function. It is imagery which distinguishes the human being from other animals. Man uses images in a symbolic manner, with messages being filtered through a value system (Boulding, 1966); and animals do not use symbols to the same extent. Von Bertalanffy (1967, 1968) states that three criteria must be met in order for symbolic activity to occur; otherwise, it would merely be signal activity. To be a symbol, the activity must be: (a) representative of the thing symbolized (i.e., a connection must exist); (b) transmitted by tradition (i.e., language is learned rather than innate and language mediates behavior); and (c) freely created (i.e., the meaning given to a symbol is incapable of being explained merely in terms of conditioning). The image, then, is an important aspect of man's relationship with the environment because the image mediates man's behavior.

The image of a particular environment--the urban environment--will be examined more closely in the present study. First, the literature defining the nature of urban images will be reviewed; then, techniques and criteria for assessing urban images will be discussed.

Nature of urban images

Urban images serve a purpose in that, as mediators, they provide

an organizational framework (Stevens & McNulty, 1970) for the complex cognitive processes required in an urban environment (Alexander, 1973; Harrison & Howard, 1972; Simmons & Simmons, 1974). Indeed, complexity is apparently accepted as a valuable feature of urban settings, and complexity in urban imagery may even be viewed as an activity which should be encouraged. Thus, researchers (Oakley, 1970; Spyer, 1971; Webber, 1963) have suggested that complexity of social, economic, and psychological experiences should actually be enhanced to stimulate further complexity in the urban images of the individual.

The most influential work on urban images to date has been Lynch's The image of the city (1960). Lynch outlined three components of the urban image--identity, structure, and meaning. Although the methodology he suggested for determining urban images will be discussed more fully below, it is important to note that he was aware that his research concentrated primarily upon the first two components of the image--its identity (i.e., its individuality) and structure (i.e., spatial patterns). Much of the subsequent research and theory regarding urban images has also emphasized the identity and structural components of the city's image (Hosken, 1972; Mumford, 1975; Saarinen, 1976). However, Harrison and Howard (1972) have suggested that perhaps meaning plays just as important a role as the physical appearance of the city in the individual's urban images; thus, it should not be ignored.

Lynch (1960) suggested that meaning may be either practical or emotional and is capable of being separated from the identity and

structure components, at least in the initial stages of research. Osgood, Suci, and Tannenbaum (1957) more clearly defined meaning as being composed primarily of three dimensions, which are the evaluative (i.e., affect), potency (i.e., intensity), and activity (i.e., frequency) factors of human behavior. The meaning component of the urban image, then, includes emotionally-charged cognitions which are not necessarily objective appraisals of the environmental setting.

Meaning of the urban environment for the individual has been researched to some extent. Rozelle and Baxter (1972) found that the meaning of the environment (operationally defined as what the individual remembered of the city with his eyes closed) differed from what the person visualized (operationally defined as what the individual "saw" when he closed his eyes and thought of the city). Also, since the meaning of the environment changes with experience in the environment (Carr, 1967), the image of a city for an individual at a particular moment may differ from his image at another time. This notion is closely related to yet another suggestion that the usefulness and necessity to differentiate among meanings of objects in the environment varies with the individual's experiences in that environment (Harrison & Howard, 1972; Sonnenfeld, 1969). For example, the tourist in a city may be interested in knowing about fine restaurants in the city, whereas the local resident may be interested in who lives on his city block and in the occupational backgrounds of these other local residents.

In order to determine the meaning of the environment, it is important to assess the individual's needs regarding that environ-

ment (Hall, 1974). Many environments other than cities, including bathrooms (Kira, 1966), shopping malls (Becker, 1971), psychiatric hospitals (Schulberg, 1971), museums (Bonsteel, 1969), and wilderness areas (Schafer & Mietz, 1969), have been evaluated in terms of their use. However, research has generally not compared the use of the urban environment as conceptualized by the architect and urban planner with its actual use by the urban residents (Bharucha-Reid, 1975). Furthermore, urban images have not generally been compared with actual urban environments either; and it may be that environmental psychologists could be more involved in the urban planning process because of their expertise and objectivity in obtaining evaluations of the meanings of these environments for their users. De Jonge (1962) was among the first to recognize the necessity of an interdisciplinary approach in designing environments to suit man's purpose, although others (Gilbertson, 1976; Goodey & Travis, 1975; LiBrizzi, 1974; Lynn, 1974; Meier, 1974; Sommer, 1972) have also recently recognized this need.

Techniques for assessing urban images

In order to determine the nature of the urban image as it exists in the mind of the individual, the observer is presented with an environmental display of the physical environment (i.e., an object) and is asked to respond with his assessment of the object using some designated format (Craik, 1968). Presentation of the environmental display may be (a) direct, such as by walking (Lowenthal & Riel, 1972; Schafer & Mietz, 1969) or driving (Priddle, 1972) through the environment being assessed, (b) simulated visually,

such as by presenting maps, slides of scenes (Calvin, Dearinger, & Curtin, 1972; Canter, 1969; Leff, Gordon, & Ferguson, 1974) or films (Bonsteel, 1969), or (c) abstract; as by naming the environmental display (e.g., the city) to be assessed without presenting any sensory stimuli.

There are differences in the results obtained with the display varied. Distance is one aspect of displays which may be important. Mehrabian and Russell (1974) have suggested that when the spatial distance from the environment being rated is greater, the specificity of the information being elicited decreases. Gallant (1970) noted that presenting only the name of the city may allow the meaning of the city's more enduring image to emerge. Decreased specificity in the information presented allows for more stability in the images actually elicited. Lowenthal and Riel (1972) have noted that responses of individuals at the actual observation point of an environmental setting lead to different assessments than did responses about the same environmental setting but elicited at locations other than the actual observation site. They labelled the latter a "purely semantic" context (p. 204), but it may also be termed an abstract environmental display (Craik, 1968). The difference in elicited responses between the two procedures is quite plausible. Researchers may be biased in their selection of slides or of areas through which to walk so that direct observations do not lead to the same experiences as do less direct display procedures. The abstract environmental display, as the most indirect display method, may thus be the most appropriate presentation method

because it minimizes the amount of experimenter bias and allows a purely cognitive display format.

When an individual is asked to report his image of a city, that person is forced to assess the city in a static manner as if the environment were unchanging (Burnette, 1974). That is, the individual's dynamic image of the city is recorded statically (i.e., at a particular moment without consideration for the ever-changing quality of elements in the complex urban environment); and the research results must be considered within this framework. However, other considerations also become important depending upon the response format adopted to assess environmental images. Craik (1968) suggested that there are primarily four response formats which may be useful in assessing environmental images, including: (a) free descriptions, which are primarily open-ended in format and place few constraints upon the response patterns of the individual but which are not easily quantifiable; (b) adjective checklists, which allow the person to indicate which adjectives apply to the environmental display and generally are flexible and easily scored; (c) rating forms, such as the Semantic Differential (SD) (Osgood et al., 1957), which are standardized and yet more sensitive to the different levels of meaning for the appropriate adjectives than are adjective checklists, and (d) symbolic equivalents, which are metaphors of reactions to the environmental display. The techniques used to assess urban images involve various combinations of the above formats. There are primarily two techniques generally employed in urban image research; these are cognitive mapping (Lynch, 1960) and

rating scales (Lowenthal & Riel, 1974). The advantages and disadvantages of each technique will become more apparent as the research regarding each is discussed more fully.

Cognitive mapping. The cognitive mapping technique requires the individual to reconstruct his image of the city in a spatial or relational manner, oftentimes in map form on a blank sheet of paper (Appleyard, 1969, 1970; Carter, 1975; Stea, 1974; Stea & Downs, 1970). Thus, this technique appears to be rather open-ended and non-standardized. It is useful as a measure of the degree to which the urban environment allows the individual to orient himself physically by differentiating the various elements of his environment (Lynch, 1960). The well-designed city should be highly legible and is drawn on the maps with many focal points which are connected by well-defined pathways (Milgram, 1970; Milgram, Greenwald, Kassler, McKenna, & Water, 1972). In terms of the cognitive mapping technique, then, the image of the urban environment is defined by its legibility--i.e., the clarity of its image or the visibility of its elements. Urban environments which are highly imageable are highly legible.

When the individual is asked to use the cognitive mapping technique, he must rely heavily upon his experiences within the urban environment. In the classic examples of cognitive mapping research conducted by Appleyard (1969, 1970), the accuracy of the maps depended upon the extent of the person's travels throughout the city (which varied due to his socio-economic class and educational level). Rand (1969) also found the past experience of the person to be an important factor in the quality of the maps drawn.

Taxi drivers, because of their method of locating and reaching various destinations within the city, drew maps without the historically and economically important focal points (e.g., the town square or the shopping market). However, private pilots tended to include these focal points, possibly because they were more likely to have referred to the points for orientation in their flights above the city.

Legibility of the city, as defined by Lynch (1960), does not necessarily measure the economic or social usefulness of various aspects of the city environment for the individual. The person may know of the elements of that environment only because they are historically significant or architecturally distinctive. Similarly, legibility in reproduction of an image does not necessarily mean accuracy. Canter and Tagg (1975) found that distances between two points were overestimated when the path was confusing. However, the distance for a highly legible path was underestimated. In both instances, distances were inaccurately estimated. Lynch's mapping technique assesses images of the environment which are, indeed, "in the mind"; but perhaps the individual's skill in representing distances visually is not well-developed and must be investigated further before researchers rely upon it for the planning of future environments.

The cognitive mapping technique has been used to compare large-scale environments, such as urban settings (e.g., Lynch, 1960) or smaller-scale settings, such as neighborhoods (e.g., Milgram et al., 1972). In order to improve environmental settings, the

researcher could first identify the highly legible environments and then examine the characteristics of these settings which are lacking in less-legible environments. The researcher assumes that less-legible environments are less satisfactory and need to be improved.

There are several problems with research conducted using the cognitive mapping method in comparisons of environments. This technique does not allow for investigation of the meaning of urban environments other than in terms of the visual form of the city. Subtle differences in connotation of meaning of the cities for individuals are not measured. Also, when comparisons of cities are made using mapping techniques, it is difficult to standardize comparisons across cities. The maps drawn by individuals can only be compared for accuracy in representation of the number of elements drawn and the distances between points. Any other comparisons are confounded by the realization that each city's form varies from that of every other city.

Rating scales. The rating scale employed in environmental image research (Calvin et al., 1972; Downs, 1970; Sanoff, 1974) typically uses some form of the SD (Osgood et al., 1957), consisting of a list of bipolar adjectives with a certain number of points (e.g., seven or eleven) between each pair of descriptive adjectives (also referred to as descriptors in the present study). The person indicates the extent to which the environmental display is described by one or the other of the pair of adjectives by marking some point on the scale for each pair of descriptors. The SD is generally used as a measure of the meaning of environments.

Researchers have apparently been successful in using the SD in rating single environments, such as rooms (Veilhauer, 1955), and even comparing a variety of settings within the same study (Douglas, 1971; Leff et al., 1974; Mehrabian & Russell, 1974). Lowenthal (1972) pointed out that a verbal response format of any type will rely heavily upon images of the environment which have been filtered through language. This filtering was mentioned in the writings of von Bertalanffy (1967, 1968) and Boulding (1966) about symbolic imagery. However, Saarinen (1976) has doubted the validity of using verbal response formats in urban image research because of this linguistic factor. Such a suggestion appears unwarranted because it is the verbal, linguistic aspect of the urban image which is most likely to measure the meaning component of the urban image. Furthermore, the SD (an example of a verbal response format) may even be the most appropriate of the various verbal techniques because it is organized in terms of bipolar adjectives; and Tuan (1974) has suggested that individuals have a tendency to organize the perceptions of their environment in terms of linguistic poles, such as life-death, left-right, and male-female. The visual, structural aspect of the urban image may be more readily obtained from cognitive mapping techniques.

In one of the major urban image studies using the SD, Lowenthal and Riel (1972) compared the ratings of carefully selected bipolar descriptors for four metropolitan areas (i.e., Boston, Cambridge, Columbus, and New York). Individuals participating in the study (a sample of 300 boy scouts, housewives,

secretaries, and architects) took half-mile walks along specified paths and then, using 25 bipolar descriptors, rated the city as they experienced it during their walks. In a factor analysis of the ratings, ten bipolar descriptors loaded together, including beautiful, ordered, fresh, smooth, rich, vivid, pleasant, clean, likable, and light. The researchers suggested that these descriptors provide the basic structure for personal experiences within the urban environment, regardless of individual characteristics of the cities.

In comparison with the work of Lowenthal and Riel (1972), other verbal image researchers used smaller samples of individuals and even greater numbers of bipolar descriptors (Canter, 1969; Golant & Burton, 1970). They then used the sample means rather than the raw scores in their factor analyses. This statistical procedure may have resulted in unstable factors; and findings obtained in such studies should be reviewed with caution, especially when the results do not support previously-conducted research. When adequate numbers of individuals are sampled, as in Lowenthal and Riel's research (1972), it appears that more stable and meaningful responses may be elicited. Comparisons of responses for individuals of different socio-economic and educational backgrounds may even be made without much difficulty.

Rating scale techniques other than the SD have also been used to elicit more general kinds of information, such as satisfaction with urban environments (Clark, 1975; Zehner, 1972). The cognitive mapping technique alone may not have elicited this information.

Wilson (1962) presented photographs of neighborhoods to individuals and asked them to rate the importance of qualities such as spaciousness, beauty, and cleanliness for the environmental settings portrayed in these photographs. When Wilson ranked the qualities in their order of importance, different characteristics emerged as important in one city in comparison with the other city. Since photographs were the display format chosen, the difference in results for each city may have been due to an experimenter bias. Unless an effort was made to select scenes on a statistically random basis, differences in scenes selected as representative of each city may have reflected images of the cities exhibited by the researchers. Also, perhaps satisfaction was closely related to the individual's previous experience with, and expectations of, open spaces in his environment. The verbal response format may have indirectly measured the lack of user satisfaction with the environment because those individuals who perceive a different level of openness than their previous experiences suggested was appropriate may have rated that environment as less satisfactory and ranked spaciousness as an important characteristic in this decision.

Users of particular environments do not necessarily indicate as satisfactory the same elements as do designers (Lansing & Marans, 1969) on open-ended formats. The maintenance level of a neighborhood was important to residents (Lansing & Marans, 1969; Zehner, 1972), whereas openness of the landscape was important to the designers (Lansing & Marans, 1969). The cognitive mapping technique

could have elicited images of spatial patterning for these environments but the insignificance of spatial openness to the users of the environment would not have emerged. The use of both techniques would have been advisable if cognitive mapping was to be used at all; and the results of both methods would have to be coordinated.

As with the cognitive mapping technique, the rating scale technique has been used in comparisons of environments. Lowenthal and Riel (1972) discussed the factors which emerged as unique to each of the cities rated in their study, in addition to having examined possible universal descriptor factors. They found, for example, that in Cambridge, the descriptive adjective contrast was linked with the descriptors rich, fresh, and pleasant. New Yorkers and Bostonians did not associate suburban with clean, pleasant, likable, and interesting; however, residents of Cambridge and Columbus did. Also, vertical was linked with beautiful in New York but was associated with ugly, drab, and artificial in Boston. Thus, there are certain differences in the factors which emerged for descriptors depending upon the city being rated, even though there were certain descriptive adjectives which also appeared to be universally linked (at least for the cities researched).

In Lowenthal and Riel's study (1972) the factor structures of responses in each city were compared in order to examine the differences in urban images for each city. Lowenthal and Riel's research suggested that responses on the SD are amenable to factor analysis and also that the rating scale response format is able to be standardized for comparisons of the same scales. Calvin et al. (1972)

also used factor analysis to examine SD ratings of the natural rather than urban environments. In yet another comparison study Leff et al. (1974) used the SD to compare the effects of different instructions to the raters of environmental settings. The respondents reported increases in their levels of awareness of their environmental surroundings when they were asked to imagine how the settings could be made more pleasant, suggesting to the authors that this was an educational process in addition to being a survey. These observers also rated their task as more interesting and enjoyable when they were asked to imagine changes rather than merely viewing the slides without being given specific instructions or being instructed to concentrate upon the shapes, lines, textures, and colors on the slides. As in Lowenthal and Riel's study (1972), the results of the study conducted by Leff et al. were analyzed statistically, rather than merely being discussed informally.

Relevant to the intended geographical focus of the present study, several studies have been conducted in which comparisons have been made of cities in southern Ontario (Demko, 1974; Hansvick & Minton, 1976; Norcliffe, 1974). Norcliffe used the SD to obtain images of cities held by individuals living in the twin cities of Kitchener and Waterloo, both for the individual's own city of residence and also for the other city in which he did not reside. Residents of Kitchener did not rate Waterloo as industrialized nor as friendly as did the residents of Waterloo; Waterloo respondents rated Kitchener as less clean but also as having better shopping facilities than residents of Kitchener rated their own city. The

differences in ratings were interpreted as resistance to unification on the part of the individuals in each city. They wanted to maintain territorial distinctions between the two cities at a time when there was political pressure to combine the governments of each into one city organization.

In informal comparisons of the factor structures, analyses of the ratings of Waterloo by its residents yielded primarily two factors -- economic activity and pleasant environment, whereas analysis of responses of the Kitchener residents' ratings of Waterloo yielded the factors level of public service provided and aspects of a small town. The two factors which emerged for the city of Kitchener as rated by its residents were, first, one of industrial, commercial, and recreational activities, and secondly, that of a well-planned modern city. Responses of the Waterloo residents with respect to Kitchener, on the other hand, yielded two other factors -- residential aspects of a large town and a good downtown. Individual t tests were then conducted for the individual questionnaire items. However, no overall tests were formally conducted to examine whether there would be statistically significant differences on the city variable across the entire list of descriptors.

Hansvick and Minton (1976) also used a SD format to compare the images of residents of London and Windsor. They tested for overall significance across the entire list of descriptive adjectives using a multivariate analysis of variance procedure. They found differences in the images of the two cities to be highly significant ($p < .001$). A closer examination of the means for the descriptors

showed that London, in comparison with Windsor, was rated more positively and strongly on most of the descriptors (e.g., natural, open, interesting, pleasant, liked). Windsor, on the other hand, was rated negatively when it was more strongly rated than London (e.g., more ugly, smelly, poor, and dirty). If clarity of the image on verbal questionnaires may be defined in terms of the extremity of the ratings of the cities, one might suggest that a clearer image emerged of London than of Windsor. This type of clarity, conceivably, would be similar to legibility as it was introduced for cognitive maps. However, the advantages of verbal image assessments include being able to conduct a greater variety of statistical tests and elicit different types of information from the raters. Similarly, comparisons could be made of verbal ratings of the cities with objective data such as pollution levels, in order to determine whether images correspond to information planners may have from different sources.

Demko (1974) used multidimensional scaling of rankings of cities rather than SD items to assess urban images in his study. He asked persons in 16 communities in an area bounded by Peterborough and St. Thomas, Ontario, to rank the similarity of each of 28 pairs of cities. Individuals were then grouped according to their similarity in ranking the cities, and similarity maps for each group were derived on the city rankings. Demko suggested that a two-dimensional space was appropriate for most of the groups so he presented the similarity maps in two-dimensional space. For most of the groups, Kitchener and London appeared to be similar; and

Toronto and Hamilton were more likely to be grouped together than any of the other cities. Although Demko did not report exactly what dimensions were used by participants to rank the cities, he did suggest that such factors as geographical location and the economic bases for employment in the various cities may be meaningful factors determining similarities in images of individuals for these cities.

It appears, then, that cognitive mapping techniques may be important when there is an advantage in determining the visual form of an image (i.e., identity and structure). One such use may be in cross-cultural studies since mapping involves the representation of spatial relationships in visual form. Hall (1966) found that linguistic factors are distinguishable from nonverbal behaviors, such as interpersonal distances. Cross-cultural comparisons of nonverbal behaviors may be possible regardless of language barriers. Similarly, cross-cultural comparisons of city images may be possible when the goal is to determine the spatial aspects of the image of the city. When more subtle and complex questions are asked within a specific culture, such as the meaning of the urban image to the person, more information may be gleaned using a variety of procedures, including the rating scale technique.

The ideal urban image

As was noted earlier, Lynch (1960) has suggested that the ideal city is one with a clear image. He said that, whereas the highly imageable city is satisfying and outstanding, the city with low imageability generates dissatisfaction and poor orientation. Other researchers have also implied that the image of the city is

related to the quality of life for the urban residents (Stevens & McNulty, 1970; Wilson, 1962). Descriptions of ideal urban environments have even been made which define more precisely the nature of ideal urban settings (Edinborough, 1975; Haworth, 1962; McHarg, 1967).

Perhaps the most singular attribute which an ideal city is supposed to possess is complexity (McHarg, 1967; Rapoport & Hawkes, 1970; Rapoport & Kantor, 1967). Complexity implies the availability to the individual of a diversity of cultural, economic, and social experiences (Webber, 1963) which may lead to stress and subsequent growth and learning (Lin, 1970; McHarg, 1967). Distress, however, may also occur due to common correlates of this complexity (e.g., size, density, and social disorganization). Commonly cited symptoms of this distress are increased crime rates and marital problems (Greenbie, 1974; Kasl & Harburg, 1972; Khan, 1974; Michelson, 1970; Urban Environmental Indicators, 1975). Indeed, Contini (1974) has suggested that urban problems are quite complex and require an interactive approach to their solution. Similarly, it may be that with increased size and complexity it becomes increasingly difficult to determine the person's image of his environment because of the increased diversity of the environmental setting.

Many other attributes of an ideal urban image have been suggested. For example, cities should be person-oriented (Alexander, 1973; Haworth, 1963; Michelson, 1970), rich and open (Haworth, 1963), safe (Michelson, 1970), and vibrant (Edinborough, 1975). Michelson also suggested that the characteristics of people are reflected by their environment. Thus, he says that the extent to which a

community is cosmopolitan rather than local, and friendly rather than unfriendly, will indicate the quality of the urban environment as it is experienced by its users.

Ideal cities by definition should be associated with positive images in the minds of their users, and desirable urban environments should be characterized by a high quality of life for their residents (e.g., Cassidy, 1974; Havens, 1974). Thus, it is conceivable that actual urban environmental indicators of a higher quality of life (as defined by planners and designers) should be associated with urban images which supposedly are ideal.

Environmental indicators of quality in larger cities in southern Ontario have been discussed by several researchers (Bruce & Stall, 1975; Kappler, 1976; Stewart, Belgue, Bond, L'Anglais, & Turcotte, 1976). Although this data is correlational, it may suggest ways of enhancing the quality of life and thus the positive meaningfulness of a city for its users. This procedure was used in at least one city, Minneapolis, Minnesota (Lu, 1974). Here, the urban attitudes of the residents in addition to the economic restructuring of the environmental setting were the target of change in order to achieve a more desirable urban image on the part of the general public. Satisfaction with the urban environment may then be compared across cities using a verbal response format. Zehner (1972) compared planned with unplanned cities by asking residents to rate their own city according to their satisfaction with it. Since the residents were of the middle-class and were assumed to have some freedom in the choice of their residential community, Zehner also asked them what

was important when they decided to move to that city. Positive feelings about their cities related to the extent of planning of the community and its nearness to work, shopping, entertainment and outdoor recreational facilities. Zehner's study suggested that it is possible to compare indices of satisfaction across cities and to identify to an extent what causes this satisfaction.

Research regarding ideal urban images, then, has included, to some extent, measuring user satisfaction on rating scales. These findings could be compared with environmental indicators of quality of life in order to define more completely the nature of the urban image, especially its meaning for the residents in that setting. However, research has generally not incorporated rating scale techniques for assessing the meaning of urban images into investigations of ideal urban images and relationships with actual environmental indicators.

Purpose of the study

Urban image research has primarily concentrated upon assessing the nature of the visual (i.e., structural and identity) components of the image. The verbal (i.e., meaning) component of the urban image, on the other hand, has not been very thoroughly examined. Based upon the above review of the literature, several assumptions for further research appear warranted and are implicit in the design of the present study. First, it is assumed that the city name (an abstract environmental display) evokes an urban image which is meaningful for the individual. Secondly, it is assumed that the rating scale response format elicits a meaningful urban image.

The present study is methodologically oriented, examining the usefulness of a variety of statistical techniques for future urban image research, especially with respect to the meaning component. The following hypotheses, then, are made in this study: (1) images of a particular city are consistent for individuals within that city; (2) images of particular cities vary, to a certain extent, so that comparisons of cities yield significant differences in urban images across the cities; (3) urban images as they are elicited in this study correspond with environmental indicators suggested as relevant to ideal urban images by researchers.

CHAPTER II

METHOD

Subjects

The participants in the study were 530 persons from primarily first- and second-year psychology classes at universities in five cities. Of these people, 325 were extension students, and 205 were non-extension students. An attempt was made to test classes at each university which contained a majority of extension students in order to obtain a sample of individuals who were more likely to have at least some experience with aspects of the urban environment other than the university campus. Also, these people were more likely to consider themselves as permanent residents of the city or area in which the research was being carried out.

Subjects were tested at the end of June and during July of 1976, from intersession and summer session classes at the various universities. There was more than a proportionate number of educators and teachers returning for classes during this time period, so the sample was predominantly female (females, $n = 398$; males, $n = 132$). However, it was felt that the difference in numbers of male and female students more than compensated for by the advantage of being able to test extension students, who were expected to be less sophisticated in their test-taking abilities, were older ($\bar{X} = 27.3$ years of age), and also had lived longer in or near the city in which the study was being conducted ($\bar{X} = 15.0$ years) than would normally be expected of the typical university student. Also, approximately half the subjects

identified themselves as married (n = 262), rather than as single (n = 233) or as neither (n = 35). In addition to the large sample of teachers and educators (n = 210), the other significant occupational sample was of full-time students (n = 208).

Comparison of the background information of the subject samples obtained in each city (see Table 1) yielded discrepant information for only one city subject sample in relation to the other city samples. The sample of subjects from the Kitchener area appears to be slightly younger, to have lived fewer years in or near Kitchener, and to be non-extension rather than extension students. This may have been due primarily to the fact that the University of Waterloo, where over half this city sample was obtained, has a large co-operative program in which students alternate school and work terms. Thus, full-time students were expected to be in attendance during intersession and summer session.

Environmental setting

Southern Ontario was the geographical setting for this study. This area is highly urbanized and becoming even more heavily populated (Jackson, 1973; Russwurm, 1975; Yeates, 1975). It is noted for its high concentration of industry (Maxwell, 1965; Yeates, 1975) and excellent agricultural lands (Spelt, 1968; Yeates, 1975). The cities chosen for study within this region are all intermediate in population size (defined as greater than 100,000 but less than 500,000 people) and are important economic and communication centers for the surrounding rural areas (Carol, 1975; Marshall, 1972; Simmons, 1976). Studying these cities is advantageous, in part, due to the

Table 1

Demographic Information on Subject Variables by Sample and City

Variable	Statistic	City					
		Total	HAMLTN	KITCHNR	LONDON	STCATH	WINDSR
Sex							
Female	n	398(75)	63(67)	92(75)	86(73)	67(77)	90(83)
Male	n	132(25)	31(33)	31(25)	31(27)	20(23)	19(17)
Extension							
Yes	n	325(61)	57(61)	66(54)	81(69)	58(67)	63(58)
No	n	205(39)	37(39)	57(46)	36(31)	29(33)	46(42)
Marital							
Single	n	233(44)	34(36)	68(55)	52(44)	35(40)	44(40)
Married	n	262(49)	54(57)	48(39)	54(46)	49(56)	57(52)
Other	n	35(7)	6(6)	7(6)	11(9)	3(3)	8(7)
Age	$\bar{X}$	27.3	27.0	25.9	28.5	29.0	26.7
	SD	7.06	6.72	5.96	8.07	7.07	7.03
	n	527	94	123	114	87	109
YRSNEAR	$\bar{X}$	15.0	14.8	9.9	15.0	16.9	18.9
	SD	11.18	10.53	8.84	12.13	11.88	10.38
	n	476	86	101	105	84	100
CTSLVD	$\bar{X}$	2.4	2.5	2.4	2.6	2.3	2.2
	SD	1.56	1.41	1.34	1.88	1.40	1.63
	n	530	94	123	117	87	109
PREFMOVE							
Yes	n	289(55)	55(59)	63(51)	59(50)	38(44)	74(68)
No	n	227(43)	37(39)	55(45)	55(47)	46(53)	34(31)
No answer	n	14(3)	2(2)	5(4)	3(3)	3(3)	1(1)
LIVEIN							
Yes	n	295(56)	49(52)	77(63)	69(59)	39(45)	61(56)
No	n	235(44)	45(48)	46(37)	48(41)	48(55)	48(44)
Total	n	530	94	123	117	87	109

Note. Figures in parentheses denote percentages of the city's population made up of individuals from this particular demographic sample. Abbreviations in this and all the following tables are explained more fully in Appendix E.

differences in primary occupations and, thus, the economic characteristics of each city. Table 2 presents both the population figures and the percentage of population involved in selected occupations within each city. Simmons and Simmons (1974) have mentioned London's concentration of administrative occupations, but a greater percentage of people in London are also employed in clerical and the medicine and health occupations than in the other cities. Hamilton is important for its iron and steel processing (Gentilcore, 1972; Spelt, 1968); whereas secondary industries, such as product fabrication and repair, machining, and processing, have helped Kitchener become a market and service center (Nixon & Campbell, 1971).

The cities were also chosen, in part, because of the differences in their location within this region. As Figure 1 shows, Windsor is the farthest of the five cities from the center of communications among Canadian cities (Gentilcore, 1972). However, both St. Catharines and Windsor are important as border cities for trade and traffic to the United States (Jackson, 1973; Ray, 1972; Simmons & Simmons, 1974; Yeates, 1975). Hamilton is closest to Toronto and has more reciprocal communications with the larger commercial center than the other four cities, which are about the same in terms of their dependence on Toronto (Marshall, 1972; Ray, 1972).

Questionnaire

A sample of the questionnaire used in this study is included in Appendix A. The questionnaire was designed to be answered easily within 10 to 15 minutes and also so that the name of the city appeared only on the front page of the questionnaire. The second,

Table 2

Census Population and Occupational Statistics by City

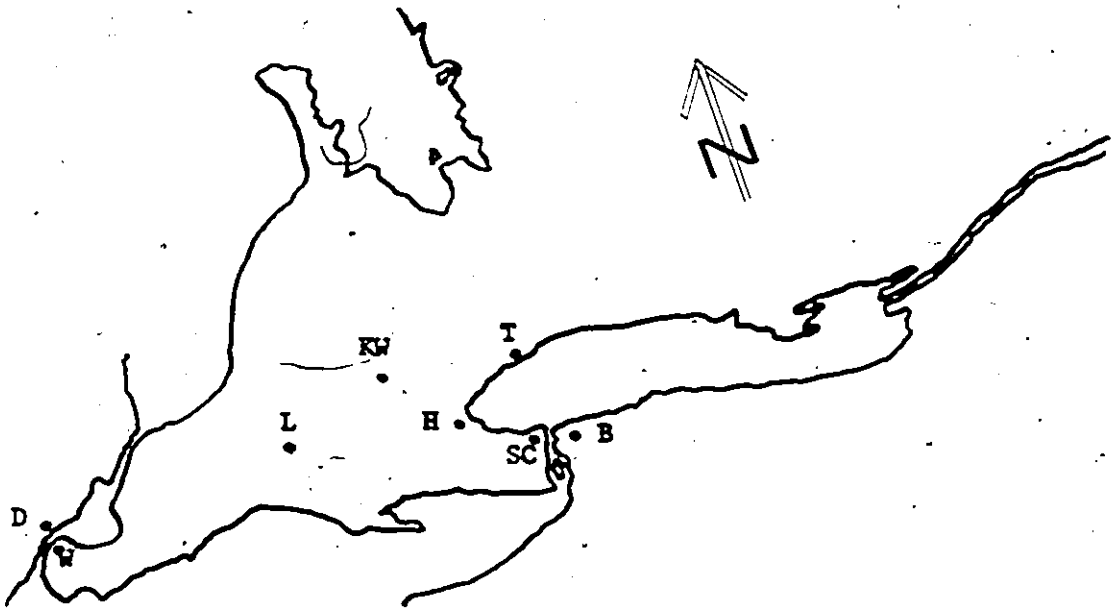
	City				
Population[a]	HAMLTN	KTCHNR[b]	LONDON	STCATH	WINDSR
Total[c]	498,523	226,846	286,011	303,429	258,643
Rank in size in Canada	6	13	11	10	12
% growth from 1966 to 1971 census	9.0	18.0	12.7	6.3	8.5
Occupation[d]					
Clerical	16	16	18	14	16
Farming and horticulture	2	1	3	3	2
Machining	5	7	3	7	7
Managerial and administration	4	4	5	3	4
Materials handling	4	3	3	6	3
Medicine and health	4	3	6	3	4
Processing	6	6	2	6	3
Product fabrication and repair	9	13	8	9	13
Sales	10	10	11	9	10
Service	10	9	12	12	12

[a]From Statistics Canada, 1974. Catalogue 92-708, Vol:1-Part:1 (Bulletin 1.1-8).

[b]Figures reported below for Kitchener-Waterloo and in all the following tables are for the entire Kitchener-Waterloo urban area.

[c]The total urban population is comprised of both the urbanized core and the urban fringe areas. Rank is from the greatest in population ("1") to the smallest.

[d]Derived from Statistics Canada, 1974. Catalogue 94-719, Vol:111-Part:2 Table 4 (Bulletin 3.2-5). Only those occupations with a discrepancy of at least two percentage points among the selected cities are included in this table. Figures represent percentage of the total population of the city employed in the specified occupation.



0 40 80 miles

B: Buffalo
D: Detroit
H: Hamilton
KW: Kitchener-Waterloo
L: London
SC: St. Catharines
T: Toronto
W: Windsor

Figure 1. Geographical location of cities in southern Ontario.

third, and fourth pages of the questionnaire were identical for subjects in all cities. It was felt that, since the city was referred to several times on the front page and since no other cities were mentioned until the subject turned to the last page of the questionnaire, there would be no confusion regarding which city the subject was to be describing. This assumption apparently was justified since no questions arose during the testing sessions regarding which city was the object of the questionnaire. When subjects reached the Semantic Differential (SD) rating scales, there were several who asked for further clarification regarding exactly what aspect of the city should be evaluated. However, once the instructions were repeated verbally with the comment to consider the city as whatever "comes to mind," there appeared to be no further question on the part of the subjects; and they proceeded to answer the rest of the questionnaire without further problems.

There had also been some concern regarding identification on the questionnaire of the twin cities of Kitchener-Waterloo. Rather than using the name of Kitchener alone (the larger of the two urban centers) or that of Waterloo alone (the location of the universities at which samples were tested), the names were hyphenated on the questionnaire, as they had been in Demko's research (1974). No questions arose which were peculiar to this subject sample. Indeed, it appeared that subjects could generalize their descriptions so that they described the entire urban area rather than either of the cities separately when called upon to do so. The name of Kitchener only will be used in reporting this study in order to simplify the

handling of the research results. This city name should be considered as representing the entire Kitchener-Waterloo area whenever it is mentioned in the study below.

The first page of the questionnaire was used primarily to obtain demographic information regarding the individual. Included at the end of this page was a short definition of the nature of the study (i.e., to find out how the subject would describe the city in which the study was being conducted). Then, subjects were asked to suggest a nickname and an appropriate color for the city. Both questions appeared to be relevant to the examination of urban images and had been suggested as possible expressions of the meaning of the city by various researchers (Hosken, 1972; Lynch, 1960; Tuan, 1974). However, these questions also were intended to help the subject establish in his mind how he would describe the city in the major portions of the questionnaire.

The second page of the questionnaire consisted of 6-point scales for each of the 25 descriptive adjective pairs. Table 3 contains the instructions and a complete listing of the bipolar adjectives included in this portion of the questionnaire. This list of SD descriptors was derived, in part, from the work of Lowenthal and Riel (1972) but was also based upon adjectives suggested as relevant to ideal urban images (e.g., McHarg, 1967; Michelson, 1970) and also mentioned in personal interviews with faculty and graduate students not currently involved at any depth in urban image research. Thus, it was felt that a more appropriate list than had initially been suggested by Lowenthal and Riel was derived. A

Table 3

Instructions for Rating and a Listing

of Descriptive Adjective Pairs

Instructions
Listed below are pairs of descriptive adjectives which are opposite or nearly opposite in meaning. Now think of the city in terms of each pair. Circle one letter for each adjective pair. The letter you circle should reflect your description of the city in relation to some point on the scale between the pair of descriptions.

Descriptive Adjective Pairs	
NATURAL-artificial	URBAN-suburban
CONTRASTING-uniform	OLD-new
PERSONAL-impersonal	TENSE-relaxed
UGLY-beautiful	QUIET-noisy
OPEN-bounded	VIVID-drab
SMELLY-fresh	VERTICAL-horizontal
DYNAMIC-static	CENTRALIZED-decentralized
CROWDED-uncrowded	INDUSTRIAL-commercial
APATHETIC-spirited	CLEAN-dirty
POOR-rich	WORLDLY-local
FRIENDLY-unfriendly	UNDESIRABLE-desirable
BORING-interesting	SAFE-unsafe
ROUGH-smooth	

6-point rating scale was decided upon because it was felt that this would allow subjects to sufficiently distinguish between the adjectives but would not force them to make minute and time-consuming distinctions. The descriptive adjective pairs will be represented by the first of the descriptors in each pair in all tables which are presented below; however, discussion and results may refer to either of the descriptors in the pair.

The third page of the questionnaire consisted of a list of 11 aspects of urban living (referred to as environmental features or merely as features in the present study) which appeared to be important for user satisfaction or quality of life while residing in or near a particular city. Table 4 contains the instructions and a complete listing of the features included in this portion of the questionnaire. Each feature was followed by a 4-point rating scale of the city's desirability as a place providing for these activities or facilities. Feature headings have been abbreviated in the following presentation to the label indicated by capital letters in the table. Several open-ended questions then followed regarding why the subject lived in or near this particular city, whether he would prefer to live elsewhere, and if so, where and why. These questions were included in order to allow subjects the opportunity to express themselves in a more flexible manner than in the rating scale portion of the questionnaire but also because several authors have suggested that these open-ended questions are related to ideal urban environments (Wilson, 1962; Zehner, 1972). Although one of these open-ended questions--the

Table 4

Instructions for Rating and a Listing of Environmental Features

Instructions
Now evaluate the city in terms of the various aspects of city life listed in the following group of features. Think of the city in terms of its desirability for you as a place in which you can participate in the following activities or in which you can use its various facilities, as described below.

Environmental Features
ARTS and education (concerts, exhibitions, libraries, universities)
EMPLOYMENT (commercial, industrial, professional)
ETHNIC and cultural diversity (religion, language, nationalities)
GEOGRAPHICAL location (nearness to other cities, scenic and historical surroundings, climate)
HEALTH concerns (air and water pollution, police and medical services)
HOMELIFE activities (residential areas, nearness to schools and playgrounds)
MEDIA (television, radio, newspapers)
RECREATIONAL activities (bikeways, playgrounds, skating rinks, parks)
SHOPPING (downtown, malls, farmer markets)
SOCIAL amusements (restaurants, bars, discotheques, movies)
TRANSPORTATION: public and private (parking, mass transit, railway and air service, traffic routes)

subject's preference for moving elsewhere -- was not actually a demographic variable, it was included as such in this study in order to determine, to some extent, the importance of preferences for urban images.

The final page of the questionnaire included a list of ten Canadian cities. Subjects were asked to rank these cities in their order of desirability as places in which to live and to indicate which of these cities and any others they had resided in for at least a year. It was felt that this question would provide information regarding corporate images not only of the cities included in this study but also of other larger cities which might be familiar to Canadians. These questions also provided some measure of the subject's experiences living in a number of different cities before moving to their present location.

Procedure

The study was introduced to the subjects as being concerned with finding out how the subjects felt about their particular city. Questionnaires were then administered to classes at McMaster University in Hamilton, the University of Waterloo and Wilfred Laurier University in Waterloo, the University of Western Ontario in London, Brock University in St. Catharines, and the University of Windsor in Windsor. Classes tested included introductory and upper levels courses of developmental, social, personality, and abnormal psychology. After administration of the questionnaire, any students interested in finding out the nature of the study were told that the study involved comparisons of several other cities with the

city in which the subjects were participating.

Experimental analyses

This study is mainly methodological and dependent upon complex statistical analyses. Thus, a rationale and description of the more complex statistical techniques used in this study follows. Because of the large sample sizes, a higher level of significance ($p < .01$) was selected as the decision level in the analyses.

First, in order to determine whether there was a correspondence between the ratings on the list of features with those on the list of descriptors, a canonical correlation (CANCORR) analysis was conducted. This analysis provides an overall correlation coefficient for two sets of data, here comprised of ratings on the lists of descriptive adjectives and environmental features. This analysis was done across all cities to determine whether there was a consistency in ratings between the descriptors (e.g., smelly-fresh) and features (e.g., health concerns).

Separate one-way multivariate analyses of variance (MANOVA) were conducted by demographic variables across cities. These MANOVA helped determine more precisely consistencies in urban images based upon the demographic characteristics of the population. The independent variables analyzed included the subject's age, marital status, extension student status, the number of cities in which the subject had previously lived (CTSLVD), the number of years the subject had lived in or near the city (YRSNEAR), whether the subject lived in the city proper (LIVEIN) and would prefer to move elsewhere (PREFMOVE). In addition to the one-way MANOVA for these

variables, the sex of the subject was included with the MANOVA by city. This was done in order to determine whether there was an interaction for sex with city, since sex serves as a major source of variation in most psychological studies--either as a main effect or as an interacting variable with other independent variables.

Following the MANOVA, several analyses were conducted to determine more precisely the nature of the inter-city differences which the MANOVA might elicit. The cities were differentiated from each other using discriminant function (DISCRIM) analyses. In this procedure the ratings on the descriptors and features are weighted and linearly combined to form functions which maximize the separation of the cities. Useful statistics from this analysis include the eigenvalues, which measure the relative ability of the functions to separate the cities, and the city mean discriminant scores on each of the functions. The city centroids summarize the city locations for the functions and may be presented in graphical form. Thus, the location of each city may be examined with respect to the location of the other cities on the same functions. Then, hierarchical clustering (HICLUR) of the data combined the cities into groups step by step, starting with those cities which were rated the most similarly on the lists of descriptors and features separately. Distances between the cities resulting from this analysis suggested the optimal number of clusters which would be appropriate. This information was then used in conjunction with that of the DISCRIM procedure to illustrate the nature of the differences among the cities.

Analyses were conducted which compared the structures of the various urban images. In order to accomplish this, principal components analyses (PCA) were first conducted on the ratings of descriptors and features in each city separately. In this procedure mathematical transformations were made of the correlations for the ratings in order to reduce the data so that there were a minimum number of independent dimensions accounted for by a maximum amount of the variance. Composite scale values for each factor were then built based upon the factor score coefficient matrices and the standardized values for the descriptors and features. Then, in order to determine, in part, whether subjects patterned their responses similarly in the various cities, inter-city factor comparisons (FCOMP) were conducted on the resulting composite values for the descriptors and features representing each city. Varimax rotations of the PCA factors were also conducted in order to examine more closely the structure of item responses on the questionnaire.

The final analytical step involved comparing the results of this study with data obtained from outside sources in order to determine whether the urban image as it is assessed corresponds with external indices of its image. Here, a less statistically-oriented approach was used, concentrating primarily upon the rankings of the cities on both sets of data.

CHAPTER III

RESULTS

The hypotheses of this study are that: (1) images of a particular city are consistent for individuals within that city, (2) images of particular cities vary and, thus, comparisons of cities yield significant differences in urban images across the cities, and (3) urban images as they are elicited in this study correspond with environmental indicators suggested as relevant to ideal urban images by researchers. The results given below are organized according to these hypotheses. The first section includes multivariate analyses of variance (MANOVA) by demographic variables, canonical correlation (CANCORR) analysis to assess consistency in subject responses on different portions of the questionnaire and factor comparisons (FCOMP) to examine rating patterns across cities. These analyses relate to the first hypothesis. The next section reports analyses examining the second hypothesis and comparing the ratings of individual cities. Overall differences in ratings by city are compared using MANOVA, discriminant function (DISCRIM) analyses and hierarchical clustering (HICLSTR). More detailed analyses of the univariate statistics for individual dependent variables and results of the varimax factor rotations are then reported. The final section includes descriptive comparisons made of the urban image data from this study with environmental indicators from other sources. This section provides for certain measures of external validity and examines the third hypothesis.

Image consistency

For demographic variables. In order to determine whether images of a particular city are consistent for individuals within that particular urban environment (the first hypothesis), several one-way MANOVA (Barr, Goodnight, & Service, 1972) of ratings of descriptors and features were conducted. Tests for significant differences in ratings compared the images of cities elicited from subjects grouped according to their different demographic characteristics (e.g., age, marital and extension student status). Descriptive statistics for the demographic variables were previously presented in Table 1. Median values were used as the basis for categorizing subjects for the variables age, number of cities lived in (CTSLVD), and number of years lived in or near the city (YRSNEAR). Separate one-way MANOVA by each of these and the other variables--marital and extension student status, whether the subject lived in the city proper (LIVEIN), and whether the subject would prefer to live elsewhere (PREFMOVE)--were then conducted; these analyses provided information regarding whether subjects from any particular group rated the cities differently. Table 5 summarizes the one-way MANOVA by these demographic variables. Significant in the MANOVA of the descriptive adjectives were the variables age ($p < .01$), LIVEIN ($p < .001$), PREFMOVE ($p < .001$), and YRSNEAR ($p < .001$). All but three of the demographic variables were also highly significant ($p < .001$) in the MANOVA of environmental features. For the marital status variable, separate MANOVA comparing each level of the variable with each of the other two levels

Table 5

Summary Table for One-way MANOVA

by Each Demographic Variable

Variable	Descriptive adjectives		Environmental features	
	df	F	df	F
Age	25, 460	1.94 *	11, 496	4.51 **
CTSLVD	25, 460	1.09	11, 496	2.09
Extension	25, 460	1.63	11, 496	5.92 **
LIVEIN	25, 460	3.38 **	11, 496	4.62 **
Marital	50, 916	1.37	22, 988	2.27 **
Single vs. married	25, 432	1.66	11, 462	3.37 **
Single vs. other	25, 219	.90	11, 244	1.78
Married vs. other	25, 243	1.24	11, 274	.83
PREPMOVE	50, 916	2.70 **	22, 988	3.97 **
YRSNEAR	25, 460	2.56 **	11, 496	3.17 **

*$p < .01$
**$p < .001$

indicated that the significant differences in ratings occurred primarily between married and single subjects. This procedure is the multivariate equivalent of a simple effects analysis between each pair of marital status levels.

The cell means and univariate F values for the significant analyses of the descriptive adjectives are provided in Table 6. Subjects who were 25 years of age or younger rated their city as more static; those who were over 25 years of age rated their city as more interesting. Subjects who actually lived in the city rated their city more personal, suburban, relaxed, and horizontal; whereas those who did not live in the city rated it more spirited and interesting. Subjects living in the city also differed from those not living in the city on ratings of several other descriptors; subjects who lived outside the city rated the city as dynamic and crowded in comparison with subjects living in the city, whose ratings were in the opposite direction. With respect to YRSNEAR, subjects who had lived in or near the city for less than 15.6 years rated the city as more personal, uncrowded, spirited, and older than did subjects living there longer. The most significant differences obviously occurred for the variable PREFMOVE. Of the 25 Semantic Differential (SD) pairs, 16 were rated significantly different. For all but one of these pairs (i.e., quiet-noisy), subjects who wanted to move rated the city more neutrally, suggesting that they were not necessarily negative in their ratings but merely restless and unsatisfied in terms of that particular city.

Whereas only four of the demographic variables had been

Table 6

Cell Means and Univariate F Values for Descriptive Adjectives by Demographic Variables Significant in MANOVA

	Age			LIVEIN		
Description	F	≤25	>25	F	Yes	No
Natural	4.79	3.0	2.7	.04	2.8	2.8
Contrasting	1.59	3.2	3.1	1.79	3.2	3.1
Personal	.02	3.3	3.3	8.62*	3.2	3.5
Ugly	3.48	4.0	4.3	1.24	4.3	4.1
Open	.00	3.1	3.1	1.86	3.1	3.2
Smelly	.38	3.6	3.7	.69	3.7	3.6
Dynamic	17.34**	3.8	3.3	14.87**	3.7	3.3
Crowded	1.60	3.6	3.5	13.80**	3.7	3.3
Apathetic	4.42	3.4	3.7	9.98*	3.4	3.8
Poor	.05	4.3	4.4	.01	4.3	4.3
Friendly	3.44	2.9	3.1	.79	2.9	3.1
Boring	8.91	3.6	4.0	13.67**	3.7	4.0
Urban	.20	3.6	3.6	10.46*	3.7	3.4
Old	.50	3.4	3.4	.12	3.4	3.4
Tense	.83	4.0	4.1	9.26*	4.1	3.9
Quiet	.03	3.5	3.4	4.89	3.4	3.6
Vivid	5.36	3.5	3.2	3.08	3.4	3.3
Vertical	.05	4.0	4.1	10.20*	4.2	3.9
Centralized	.00	3.3	3.4	1.06	3.4	3.3
Industrial	2.74	2.9	2.8	1.82	2.8	3.0
Clean	2.33	3.1	2.8	1.14	2.9	3.1
Worldly	1.03	4.5	4.3	6.41	4.5	4.2
Undesirable	6.09	4.0	4.4	3.10	4.3	4.1
Safe	.99	2.7	2.6	2.52	2.6	2.7
Rough	.45	3.9	4.0	2.01	4.0	3.9

Table 6 (cont'd)

Cell Means and Univariate F Values for Descriptive Adjectives by Demographic Variables Significant in MANOVA

	PREFMOVE				YRSNEAR		
Description	F	Yes	No	No answer	F	<15.6	≥15.6
Natural	21.05**	3.2	2.4	2.9	.05	2.8	2.8
Contrasting	1.80	3.2	3.0	2.8	.46	3.1	3.2
Personal	9.63**	3.6	3.0	3.0	8.36*	3.2	3.5
Ugly	26.54**	3.8	4.7	4.0	.41	4.2	4.1
Open	8.93**	3.4	2.8	3.1	1.99	3.1	3.2
Smelly	14.40**	3.3	4.1	3.9	4.82	3.8	3.5
Dynamic	13.87**	3.8	3.2	3.4	.55	3.5	3.6
Crowded	2.31	3.5	3.6	3.1	6.77*	3.7	3.4
Apathetic	14.82**	3.3	4.0	3.6	8.65*	3.7	3.4
Poor	7.73**	4.2	4.6	4.4	.00	4.3	4.3
Friendly	3.39	3.1	2.8	2.9	1.05	2.9	3.1
Boring	30.36**	3.4	4.4	3.8	1.96	3.9	3.7
Urban	.46	3.5	3.6	3.4	5.77	3.4	3.7
Old	1.09	3.3	3.5	3.4	11.76**	3.3	3.6
Tense	6.38*	3.8	4.3	3.8	3.24	4.1	3.9
Quiet	7.20**	3.7	3.2	3.6	1.16	3.4	3.6
Vivid	36.18**	3.8	2.9	3.3	1.43	3.3	3.5
Vertical	3.17	4.1	3.9	3.6	.17	4.0	4.0
Centralized	1.67	3.3	3.5	3.1	1.13	3.3	3.4
Industrial	2.96	2.7	3.0	3.0	4.33	3.0	2.7
Clean	16.53**	3.3	2.5	2.9	2.64	2.8	3.1
Worldly	9.46**	4.6	4.1	4.0	.01	4.4	4.4
Undesirable	24.47**	3.8	4.7	4.3	.02	4.2	4.2
Safe	.98	2.7	2.6	2.6	1.08	2.7	2.6
Rough	6.57*	3.7	4.2	3.8	.02	3.9	3.9

Note. See Table 1 for the n of each group. Means are for ratings on a scale of 1 to 6, with 1 representing the rating closest to the descriptor given above.

*$p < .01$
**$p < .001$

significant in the MANOVA of the descriptive adjectives, six of the seven demographic variables were significant in the MANOVA of the environmental features (see Table 5). The cell means and univariate F values for the significant variables on the MANOVA of features are provided in Table 7. Here again, PREFMOVE yielded the greatest number of significant univariate F values, with ten of the eleven features being significant (all except ethnic and cultural diversity). Subjects who preferred to move rated the city as less desirable on all ten features, suggesting that their ratings on the list of features were not quite the same as they had been on the list of descriptors with respect to the other subjects. Of the features, employment was most often rated significantly different according to the subject's age ($p < .001$), extension ($p < .001$) and marital ($p < .001$) status, YRSNEAR ($p < .01$), and PREFMOVE ($p < .001$). Subjects living in the city in comparison with those living outside the city differed significantly ($p < .001$) in their ratings of home-life activities, social amusements, and transportation..

One final demographic variable, the sex of the subject, was also analyzed using the MANOVA procedure. It was included as another independent variable when the MANOVA by city was conducted because of its potential importance in interaction with the city variable. Sex was significant only in the MANOVA of the descriptive adjectives ($p < .01$). The F values for this analysis are reported with the results of the MANOVA by city. In the univariate analysis of the descriptors, it was found that the significant sex effect was primarily due to significant differences in ratings of

Table 7

Cell Means and Univariate F Values for Environmental Features by Demographic Variables Significant in MANOVA

Feature	Age			Extension		
	F	≤25	>25	F	Yes	No
Arts	6.62*	2.1	2.0	5.38	2.0	2.1
Employment	33.55**	2.7	2.3	48.80 **	2.3	2.8
Ethnic	.08	2.1	2.1	.14	2.1	2.1
Geographical	.96	2.0	1.9	.02	1.9	1.9
Health	1.05	2.5	2.4	1.38	2.4	2.5
Homelife	.72	2.2	2.1	.76	2.1	2.2
Media	.18	2.3	2.3	2.08	2.3	2.4
Recreational	.13	2.4	2.4	.26	2.4	2.4
Shopping	.57	1.9	1.9	5.65	1.8	2.0
Social	.47	2.5	2.6	.00	2.5	2.6
Transportation	1.01	2.7	2.6	2.40	2.6	2.8

	LIVEIN			MARITAL			
	F	Yes	No	F	Single	Married	Other
Arts	.85	2.1	2.0	.06	2.1	2.0	2.0
Employment	4.50	2.5	2.4	13.63**	2.7	2.3	2.2
Ethnic	.01	2.1	2.1	.36	2.1	2.1	2.1
Geographical	.07	1.9	1.9	1.45	1.9	1.9	2.1
Health	.03	2.5	2.5	1.34	2.4	2.5	2.6
Homelife	12.37**	2.1	2.3	.27	2.1	2.2	2.2
Media	1.85	2.4	2.3	1.15	2.4	2.3	2.5
Recreational	.00	2.4	2.4	.16	2.4	2.4	2.3
Shopping	1.43	1.9	1.9	1.10	1.9	1.9	2.1
Social	16.74**	2.7	2.4	1.02	2.6	2.5	2.7
Transportation	12.30**	2.8	2.5	.40	2.7	2.6	2.8

Table 7 (cont'd)

Cell Means and Univariate F Values for Environmental Features by Demographic Variables Significant in MANOVA

	PREFMOVE				YRSNEAR		
	F	Yes	No	No answer	F	<15.6	≥15.6
Arts	9.27**	2.2	1.9	1.8	4.09	2.0	2.1
Employment	9.62**	2.6	2.3	2.5	6.69 *	2.5	2.4
Ethnic	3.51	2.2	2.0	2.2	6.48	2.2	2.0
Geographical	16.16**	2.1	1.7	1.7	.38	1.9	1.9
Health	19.76**	2.7	2.3	2.1	1.41	2.4	2.5
Homelife	14.54**	2.3	2.0	1.9	.49	2.2	2.1
Media	5.42*	2.5	2.2	2.2	1.01	2.4	2.3
Recreational	22.09**	2.6	2.1	2.1	3.18	2.3	2.3
Shopping	13.39**	2.0	1.7	1.6	.76	1.9	1.9
Social	8.59**	2.7	2.4	2.4	2.96	2.6	2.6
Transportation	9.33**	2.8	2.55	2.6	.40	2.7	2.7

Note. See Table 1 for the n of each group. Ratings are on a scale of 1 to 4, with 1 representing an excellent rating for the city on the feature.

*p <.01
**p <.001

three descriptors -- apathetic, friendly, and boring. Statistics for these significant adjectives are presented in Table 8. Females tended to rate the city, independent of which city was being rated, as more friendly and interesting; males rated it as more apathetic.

The MANOVA by demographic variables, then, suggests that differences in urban images depend upon certain characteristics of the population. Major variables which were related to differences in ratings across cities included sex (significant only in the MANOVA of descriptors), age (significant in both the MANOVA of descriptors and features), and marital status (significant only in the MANOVA of features). However, other variables not always investigated in urban image research but which were significant in this study included LIVEIN, PREFMOVE, and YRSNEAR. Thus, the MANOVA by demographic variables did not support the first hypothesis in that there was little consistency in ratings of the cities across the various demographic variables. Individuals differed in their urban images based upon their demographic characteristics.

Correlation of features with descriptors. Similarity in ratings of features with descriptors across cities was investigated using the CANCORR (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975) procedure. Table 9 summarizes the results of this analysis, which yielded fairly high correlations on the first two canonical variables (r = .74 and r = .61). Three of the nine other possible canonical variables were also significant ($p < .001$). The canonical variates -- when squared -- yield eigenvalues, which represent the proportion of the rating variance between descriptors and features accounted for by

Table 8

Statistics for Significant Descriptive Adjectives by Sex

Descriptor	Statistic	Females	Males
Apathetic	$\bar{X}$	3.6	3.3
	SD	1.38	1.41
	n	435	142
Friendly	$\bar{X}$	2.9	3.2
	SD	1.29	1.41
	n	435	143
Boring	$\bar{X}$	3.8	3.5
	SD	1.48	1.57
	n	435	143

Note. Ratings are on a scale of 1 to 6, with 1 representing the rating closest to the descriptor given above.

Table 9

Summary Table for CANCORR Relating Features with Descriptors Across all Cities

Canonical variable	df	Canonical correlation	Chi-square
1	275	.74 *	981.32
2	240	.61 *	617.77
3	207	.46 *	410.51
4	176	.42 *	304.20
5	147	.35 *	216.38

*$p < .001$

that particular canonical variate. Here, the first two variates account for 55 and 37 per cent of the variation in ratings between the descriptors and features. This suggests that there is a correspondence in patterns of responses between ratings of features and descriptors within the same city; and thus, there is a similarity in images for that city with respect to the two sets of ratings. If this is so, the first hypothesis is supported by the results of CANCORR.

Response patterns across cities. Next, comparisons of subject responses were conducted to determine whether there was a consistency in the pattern of responses depending upon the city being rated. The first step was to perform principal components analyses (PCA) (Nie et al., 1975) on the subjects' responses in each city. The unrotated factor matrices for descriptors and features by city are presented in Appendices B and C, respectively. Next, the FCOMP program (Inter-University Consortium, 1971) was used to compare the composite values for each factor in the unrotated factor matrices of the descriptors and features. The resulting correlation coefficients for FCOMP by city are presented in Table 10. The correlation coefficients appear to be fairly large, suggesting a high correspondence in the weightings of both descriptors and features among the cities. This similarity in weightings implies that the same descriptors or features were associated with each other, at either end of the bipolar rating scale. Results of the FCOMP, then, suggest that there is a consistency in ratings of urban environments in general, such that certain descriptors and

Table 10

Correlation Coefficients for FCOMP by City

Problem matrix	f[a]	Target Matrix				
		HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Descriptive adjectives						
HAMLTN	8	1.00	.82	.79	.79	.85
KTCHNR	8	.82	1.00	.78	.80	.83
LONDON	8	.82	.80	1.00	.80	.82
STCATH	8	.81	.82	.80	1.00	.82
WINDSR	7	.83	.81	.77	.77	1.00
Environmental features						
HAMLTN	3	1.00	.89	.86	.81	.86
KTCHNR	2	.78	1.00	.79	.80	.76
LONDON	3	.86	.88	1.00	.87	.79
STCATH	3	.82	.94	.88	1.00	.79
WINDSR	3	.85	.85	.78	.74	1.00

Note. The problem matrix was rotated to a solution of best fit with the target matrix.

[a] f = the number of factors significant in the factor analysis and, thus, included in FCOMP. Product moment correlation coefficients for matrices of unequal size are more valid when the problem matrix is larger than the target matrix. The most valid comparisons are between matrices of equal size.

features are associated with each other regardless of the specific urban setting. These findings appear to support the first hypothesis in that there appear to be similarities in the patterns of responses and, thus, in urban images in general, regardless of the individual characteristics of a particular city.

Comparison of images by city

The second hypothesis suggests that comparisons of the images of cities yield significant differences in their urban images. Tables 11 and 12 present cell means by city for all the descriptive adjectives and environmental features. City sample sizes (n) and standard deviations for each descriptor and feature are provided in Appendix D.

Examination of the cell means for the descriptors suggested a pattern of responses such that Hamilton and Windsor were rated similarly; residents of Kitchener, London, and St. Catharines also appeared to rate their cities in a similar manner. Several interesting ratings are worth noting. First, the most extreme ratings occurred for the descriptor industrial. Both Hamilton ($\bar{X}$ = 1.5) and Windsor ($\bar{X}$ = 1.8) were rated as highly industrialized cities, whereas London was rated the most commercial ($\bar{X}$ = 4.2). London received several other ratings which were quite extreme, including being rated more beautiful ($\bar{X}$ = 5.0) and rich ($\bar{X}$ = 5.0) than any of the other cities. Again, Kitchener and St. Catharines were rated more closely to London on these descriptors than were Hamilton and Windsor. On several other descriptors the cities of Kitchener, London, and St. Catharines were rated more positively

Table 11

Cell Means for Descriptive Adjectives by City

Descriptor	Total	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Natural	2.8	3.7	2.5	2.3	2.6	3.3
Contrasting	3.1	3.0	3.0	3.4	2.8	3.5
Personal	3.3	3.8	2.8	3.3	3.0	3.8
Ugly	4.2	3.5	4.5	5.0	4.6	3.3
Open	3.1	3.7	2.8	2.7	2.9	3.7
Smelly	3.7	2.2	4.3	4.8	4.3	2.5
Dynamic	3.5	3.6	3.3	3.4	3.4	4.0
Crowded	3.5	3.1	3.7	3.7	3.9	3.3
Apathetic	3.6	3.4	4.2	3.5	3.8	3.0
Poor	4.3	3.8	4.5	5.0	4.6	3.8
Friendly	3.0	3.2	2.5	3.1	3.0	3.2
Boring	3.8	3.5	4.2	4.4	3.9	3.0
Urban	3.6	2.9	3.5	3.9	4.0	3.5
Old	3.4	3.1	3.6	3.4	3.5	3.3
Tense	4.0	3.6	4.4	4.1	4.4	3.6
Quiet	3.5	4.4	3.1	2.9	2.9	4.1
Vivid	3.4	3.8	3.0	2.8	3.1	4.2
Vertical	4.0	3.7	4.0	4.0	3.9	4.5
Centralized	3.4	2.9	3.5	3.4	3.6	3.4
Industrial	2.8	1.5	3.4	4.2	3.1	1.8
Clean	3.0	4.3	2.2	2.0	2.5	4.0
Worldly	4.4	4.2	4.7	4.2	4.5	4.4
Undesirable	4.2	3.6	4.6	4.9	4.7	3.3
Safe	2.7	2.8	2.5	2.5	2.6	2.9
Rough	3.9	3.1	4.3	4.4	4.3	3.4

Note. The sample sizes (n) and standard deviations for each cell are provided in Appendix B. Ratings are on a scale from 1 to 6, with 1 representing the rating closest to the descriptor given above.

Table 12

Cell Means for Environmental Features by City

Feature	Total	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Arts	2.1	2.1	1.7	1.8	2.2	2.5
Employment	2.5	2.3	2.3	2.5	2.6	2.6
Ethnic	2.1	2.1	1.9	2.5	2.0	2.1
Geographical	1.9	1.8	1.7	2.1	1.5	2.5
Health	2.5	3.1	2.1	2.1	2.2	3.1
Homelife	2.2	2.4	1.9	2.1	2.1	2.3
Media	2.3	2.4	2.4	2.4	2.3	2.2
Recreational	2.4	2.7	2.1	2.1	2.5	2.6
Shopping	1.9	2.0	1.7	1.8	1.9	2.2
Social	2.6	2.7	2.6	2.3	2.6	2.6
Transportation	2.7	2.5	2.7	2.6	2.6	2.9
Index[a]	2.3	2.4	2.1	2.2	2.2	2.5

Note. The sample sizes (n) and standard deviations for each cell are provided in Appendix B. Ratings are on a scale of 1 to 4, with 1 representing an excellent rating for the city on the feature.

[a]The index figure was calculated by deriving the mean of the cell means for each city across the list of environmental features.

(i.e., natural, personal, open, interesting, relaxed, clean, desirable, and smooth). Hamilton and Windsor, on the other hand, were rated more smelly, static, and noisy. In terms of the remaining descriptors, Kitchener was singularly rated as being friendly ($\bar{X}$ = 2.5) and Hamilton was rated as being the most urban ($\bar{X}$ = 2.9).

The pattern of cell means for the cities on the list of environmental features is not as clear as that of descriptors, although there does appear to be some correspondence in the ratings such that Hamilton and Windsor were rated similarly for health concerns and homelife activities. In terms of extreme ratings, St. Catharines was rated as excellent for its geographic location ($\bar{X}$ = 1.5); the worst ratings were given to Hamilton and Windsor with respect to health concerns (both $\bar{X}$ = 3.1). As a rough index of general desirability, cell means were averaged across the list of features for each city individually. The index values indicated that the image of Windsor was the least desirable, followed closely by that of Hamilton; Kitchener's image appears to be the most desirable of the five cities.

Overall city comparisons. In order to determine whether there was a statistically significant difference in ratings of the cities, MANOVA (Barr et al., 1972) by city and sex were conducted on the lists of descriptors and features separately. Table 13 presents a summary of the MANOVA for both descriptors and features. The city variable was highly significant in both analyses ($p < .001$), whereas sex was significant only in the analysis of descriptors ($p < .01$), as noted earlier. However, the City x Sex interaction

Table 13

Summary Table for Overall MANOVA

by City and Sex

	Descriptive adjectives		Environmental features	
Source	df	F	df	F
City	100, 1802	7.78**	44, 1946	10.30**
Sex	25, 452	2.17*	11, 488	.75
City x Sex	100, 1802	1.12	44, 1946	1.37

Note. F tests based upon Hotelling-Lawley's trace.

*p < .01
**p < .001

was not significant for either descriptors or features.

DISCRIM analyses (Nie et al., 1975) were then conducted on the separate lists of descriptors and features. The first two discriminant functions accounted for 90.8 per cent of the variance for the list of descriptors and 82.9 per cent of the variance for the features. Thus, the city centroids for only these two functions are reported in Table 14. Closer examination of the functions suggests that the major proportion (81 per cent) of the variance for the descriptors is accounted for by the first DISCRIM function, whereas for the features the second function is still contributing a major proportion (26 per cent) to the variance. Thus, the DISCRIM analysis of descriptors appears to be more unidimensional than that of features, which is most likely to be two-dimensional.

In order to determine more closely the possible grouping of cities, HICLSTR of the cities--first for the descriptive adjectives and then for the environmental features--were performed using the CLUSTER program (Barr, Goodnight, Sall, & Helwig, 1976). Tables 15 and 16, respectively, summarize these analyses. In terms of the descriptors (see Table 15), the optimal number of clusters appears to be two, with Hamilton and Windsor being grouped together and Kitchener, St. Catharines, and London also being linked. London remained an isolate until the second to last step, perhaps due to its singular and high ratings on several of the questionnaire items (i.e., beautiful and rich). Examination of the distances between cities derived by HICLSTR further supports the conclusion that there were essentially two distinct clusters of cities for the

Table 14

City Centroids for DISCRIM Analyses

City	Function 1	Function 2
Descriptive adjectives		
HAMLTN	1.1	-.1
KTCHNR	-.5	.6
LONDON	-.9	-.6
STCATH	-.4	.2
WINDSR	.8	-.1
Eigenvalue	1.73	.22
% variance accounted for	81.4	10.4
Environmental features		
HAMLTN	-.6	.6
KTCHNR	.5	.2
LONDON	.7	-.5
STCATH	.3	.5
WINDSR	-.9	-.5
Eigenvalue	.67	.31
% variance accounted for	56.9	26.0

Note. The results reported above are from direct regression. Results were comparable to those from stepwise regression, with the first DISCRIM function in the analysis of descriptors accounting for approximately the same amount of variance as the first two DISCRIM functions in the analysis of the features.

Table 15

Summary Table for HICLSTR of Cities by

Descriptive Adjectives

Number of clusters	Maximum distance within a cluster	Cluster map of cities				
		HAMLTN	WINDSR	KTCHNR	STCATH	LONDON
5	0.00	X	X	X	X	X
4	1.08	X	X	XXXXXXX		X
3	2.80	XXXXXXX		XXXXXXX		X
2	3.36	XXXXXXX		XXXXXXXXXXXXX		
1	35.28	XXXXXXXXXXXXXXXXXXXXXXXXXXX				

City	Distance between cities				
	HAMLTN	WINDSR	KTCHNR	STCATH	LONDON
HAMLTN	0.00				
WINDSR	2.80	0.00			
KTCHNR	25.88	21.58	0.00		
STCATH	23.27	18.65	1.08	0.00	
LONDON	35.28	29.58	3.36	3.31	0.00

Table 16

Summary Table for HICLSTR of Cities by Environmental Features

Number of clusters	Maximum distance within a cluster	Cluster map of cities				
		HAMLTN	WINDSR	KTCHNR	STCATH	LONDON
5	0.00	X	X	X	X	X
4	0.70	X	X	XXXXXXX		X
3	1.12	X	X	XXXXXXXXXXXXX		
2	1.14	XXXXXXX		XXXXXXXXXXXXX		
1	3.13	XXXXXXXXXXXXXXXXXXXXXXXXXX				

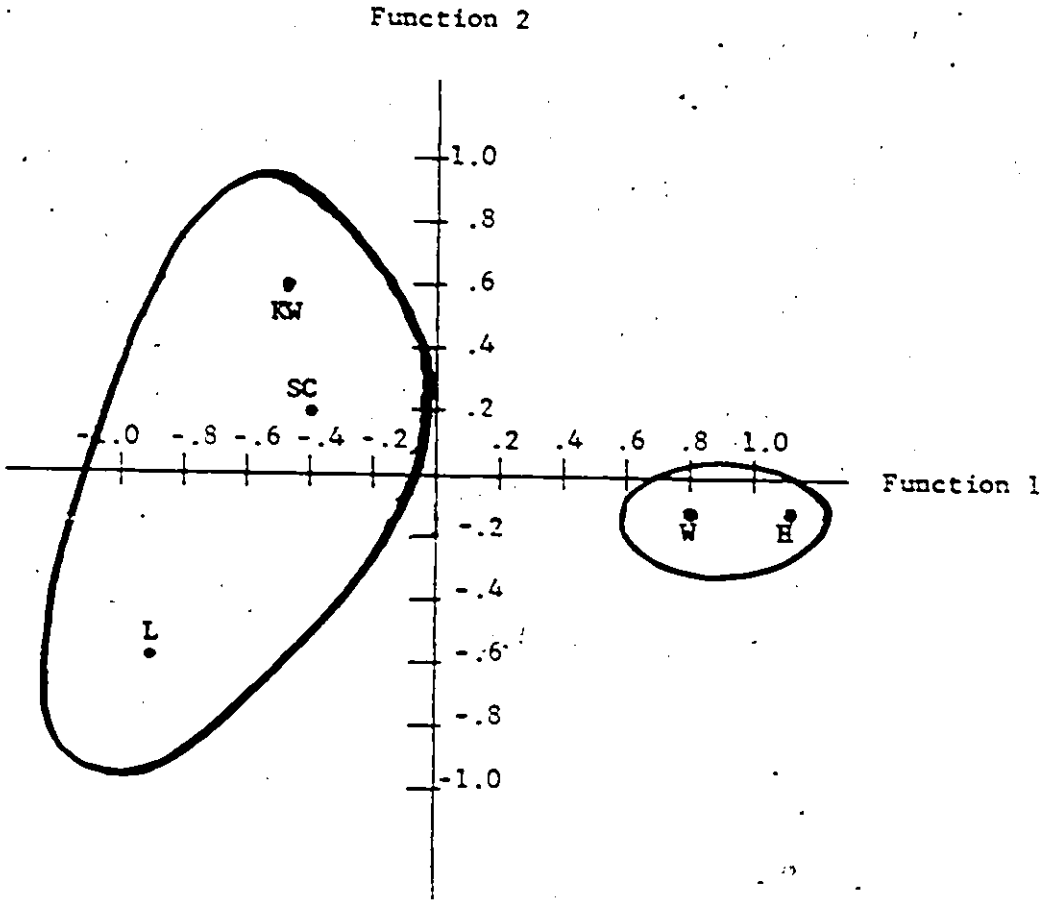
Distances between cities

City	HAMLTN	WINDSR	KTCHNR	STCATH	LONDON
HAMLTN	0.00				
WINDSR	1.14	0.00			
KTCHNR	1.83	3.13	0.00		
STCATH	1.06	2.20	.70	0.00	
LONDON	1.92	2.63	.74	1.12	0.00

descriptors. HICLSTR of cities by environmental features yielded essentially the same groups when the number of clusters was two (see Table 16), suggesting that the HICLSTR of descriptors and features both measured the same images. However, Hamilton and Windsor were not rated as similarly on the features as they had been on the descriptors. They clustered together only at the second to last step. Windsor was the farthest from the other cities in the clustering, while Kitchener and St. Catharines were the first cities to cluster. There appeared to be a fairly high correspondence between the ratings on the lists of descriptors and features for the cities of Kitchener and St. Catharines.

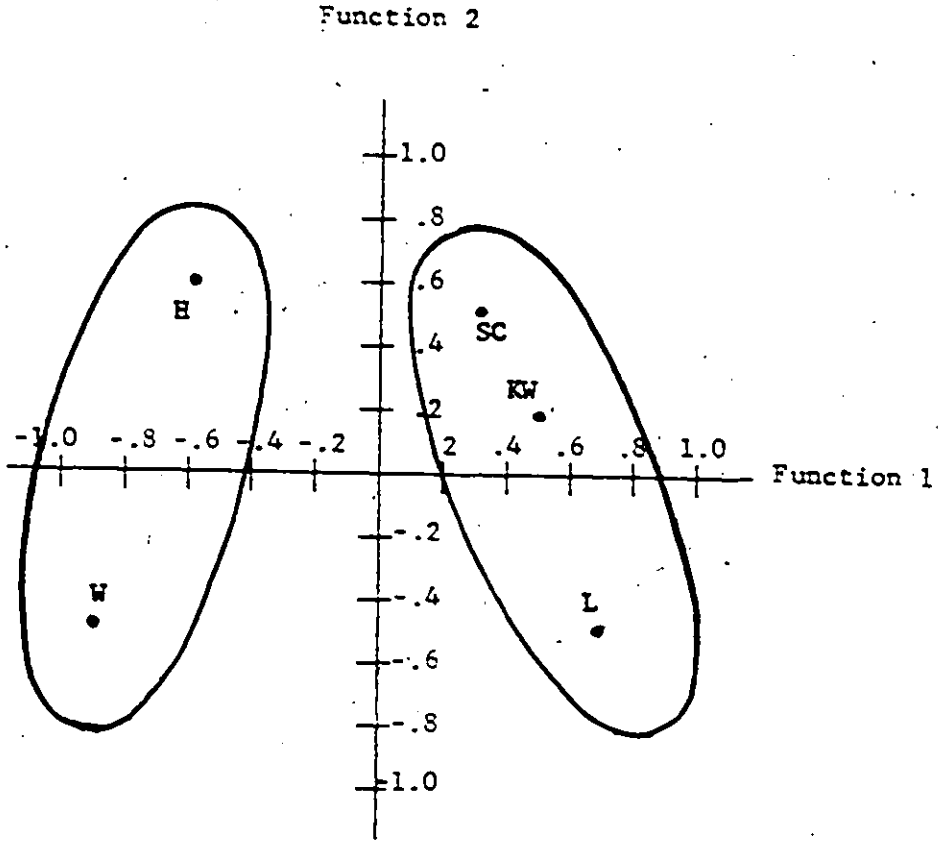
The results of both the DISCRIM and the HICLSTR analyses may be represented visually within a two-dimensional space. The city centroids (based upon city mean discriminant scores) for the first two functions of the DISCRIM analysis of ratings on the list of descriptors are plotted in Figure 2; and those for the features are presented in Figure 3. The clusterings suggested by HICLSTR are interposed on the figures. Thus, the two major clusters in both figures are Hamilton with Windsor, and London with Kitchener and St. Catharines. However, as Figures 2 and 3 show, Windsor was not as closely associated with Hamilton on ratings of features as on those for descriptors. Also, both London and Windsor are in the lower quadrants in Figure 3, perhaps due to their geographical location.

Both HICLSTR and DISCRIM, then, suggest that distinctive images exist for the cities studied. In some respects, certain of the



H: Hamilton
KW: Kitchener-Waterloo
L: London
SC: St. Catharines
W: Windsor

Figure 2. Clusterings from HICLSTR interposed upon city centroids from DISCRIM analysis of descriptive adjectives.



H: Hamilton
KW: Kitchener-Waterloo
L: London
SC: St. Catharines
W: Windsor

Figure 3. Clusterings from HICLSTR interposed upon city centroids from DISCRIM analysis of environmental features.

cities may be similar to certain of the other cities but these similarities do not completely override individual differences in images of the cities. Thus, it appears that the second hypothesis is supported and comparisons of the images of several urban environments yield significant differences in their images.

Univariate analyses of individual dependent variables. In order to examine more closely the differences which arose in the MANOVA of descriptors and features, comparison of the ratings on individual items on the questionnaire was necessary. The univariate analyses of the ratings of descriptors and features are provided in Tables 17 and 18, respectively. These analyses showed that 20 of the 25 descriptors and 9 of the 11 features significantly discriminated among cities ($p < .01$). Descriptors not significant for city included contrasting, old, vertical, worldly, and safe. Features which were not significant were employment and media. Lack of significance for these ratings of both features and descriptors may have been due, in part, to the cities being of similar size (over 100,000 but less than 500,000 population).

Factor rotations. Another set of analyses was also conducted which provided information regarding the nature of the response patterns for the descriptors and features separately. The factors resulting from the PCA were rotated using the varimax solution method (Nie et al., 1975). This analysis simplifies the structure of response, so that not only is the weighting of the items on each factor important, but also the overall response pattern emerges more readily.

Table 17

Summary Table for Univariate Analyses of Descriptive Adjectives by City and Sex

Descriptor	Statistic	Regression[a]	Effects			Error[d]	R^2
			City[b]	Sex[c]	City x Sex[b]		
Natural	SS	133.55	92.95	4.91	2.63	645.78	.17
	F	10.94**	17.13**	3.62	.48		
Contrasting	SS	40.28	11.28	.03	10.18	957.76	.04
	F	2.22	1.40	.01	1.27		
Personal	SS	104.94	80.38	1.76	28.60	929.06	.10
	F	5.97**	10.30**	.90	3.66*		
Ugly	SS	193.09	137.50	.00	1.52	614.24	.24
	F	16.63**	26.64**	.00	.29		
Open	SS	90.54	78.08	1.61	6.36	867.04	.09
	F	5.52**	10.72**	.88	.87		
Smelly	SS	533.00	423.19	.16	3.53	649.58	.45
	F	43.40**	77.53**	.12	.65		
Dynamic	SS	35.08	24.34	1.91	5.73	838.17	.04
	F	2.21	3.46*	1.08	.81		
Crowded	SS	35.33	24.61	1.29	2.51	737.71	.05
	F	2.53*	3.97*	.83	.40		
Apathetic	SS	107.96	69.07	17.35	8.22	807.19	.12
	F	7.07**	10.18**	10.23*	1.21		
Poor	SS	113.19	85.92	2.52	4.32	367.79	.24
	F	16.28**	27.80**	3.26	1.40		
Friendly	SS	47.61	34.35	11.61	4.35	804.38	.06
	F	3.13*	5.08**	6.87*	.64		
Boring	SS	138.47	89.83	15.98	9.84	913.96	.13
	F	8.01**	11.70**	8.32*	1.28		
Urban	SS	74.76	55.55	.03	15.65	851.29	.08
	F	4.64**	7.77**	.01	2.19		
Old	SS	24.32	16.16	5.54	7.67	675.62	.03
	F	1.90	2.85	3.90	1.35		
Tense	SS	67.00	56.58	2.93	8.23	620.71	.10
	F	5.71**	10.85**	2.25	1.58		
Quiet	SS	188.10	139.92	.26	.72	623.35	.23
	F	15.96**	26.71**	.20	.14		
Vivid	SS	134.49	99.23	.69	2.16	617.10	.18
	F	11.53**	19.14**	.53	.42		
Vertical	SS	33.75	23.83	5.40	.50	861.15	.04
	F	2.07	3.29	2.99	.07		
Centralized	SS	31.74	26.72	1.41	5.71	864.11	.04
	F	1.94	3.68*	.78	.79		
Industrial	SS	488.15	376.72	1.93	3.13	617.33	.44
	F	41.82**	72.62**	1.49	.60		

Table 17 (cont'd)

Summary Table for Univariate Analyses of Descriptive Adjectives by City and Sex

Descriptor	Statistic	Regression[a]	Effects			Error[d]	R^2
			City[b]	Sex[c]	City×Sex[b]		
Clean	SS	446.61	348.44	6.98	8.76	618.99	.42
	F	38.16 **	66.99**	5.36	1.68		
Worldly	SS	17.27	12.10	.00	2.56	712.94	.02
	F	1.28	2.02	.00	.43		
Undesirable	SS	188.20	119.95	8.47	5.14	709.44	.21
	F	14.03 **	20.12**	5.68	.86		
Safe	SS	28.07	9.61	5.89	8.15	699.35	.04
	F	2.12	1.64	4.01	1.39		
Rough	SS	133.76	100.29	.01	6.80	534.43	.20
	F	13.24 **	22.33**	.01	1.51		

[a] $\underline{df} = 9$.

[b] $\underline{df} = 4$.

[c] $\underline{df} = 1$.

[d] $\underline{df} = 476$.

*$p < .01$
**$p < .001$

Table 18

Summary Table for Univariate Analyses of Environmental Features by City and Sex

Feature	Statistic	Regression[a]	Effects: City[b]	Effects: Sex[c]	Effects: City x Sex[b]	Error[d]	R^2
Arts	SS	50.99	31.43	2.21	4.45	308.06	.14
	F	9.16 **	12.70**	3.58	1.80		
Employment	SS	12.42	7.18	.17	3.10	313.45	.04
	F	2.19	2.85	.27	1.23		
Ethnic	SS	31.19	21.50	2.13	3.22	319.89	.09
	F	5.39 **	8.37**	3.32	1.25		
Geographical	SS	62.41	34.61	.35	1.09	312.12	.17
	F	11.06 **	13.81**	.55	.43		
Health	SS	122.94	98.65	.35	4.66	243.67	.34
	F	27.92 **	50.41**	.71	2.38		
Homelife	SS	13.99	12.48	.27	1.76	286.52	.05
	F	2.70 *	5.42**	.47	.77		
Media	SS	8.35	2.17	.58	4.43	434.43	.02
	F	1.06	.62	.67	1.27		
Recreational	SS	36.54	29.12	.02	5.64	299.10	.11
	F	6.76 **	12.12**	.03	2.35		
Shopping	SS	16.09	9.74	.18	2.39	270.99	.06
	F	3.29 **	4.48*	.33	1.10		
Social	SS	16.55	10.07	.82	3.24	354.43	.04
	F	2.58 *	3.54*	1.15	1.14		
Transportation	SS	21.03	14.22	.42	11.22	347.44	.06
	F	3.35 **	5.10**	.61	4.02*		

[a] $\underline{df} = 9$.

[b] $\underline{df} = 4$.

[c] $\underline{df} = 1$.

[d] $\underline{df} = 498$.

*$\underline{p} < .01$

**$\underline{p} < .001$

The eigenvalues for those factors which were significant based upon the commonly accepted standard of Kaiser's criterion for significance (eigenvalues greater than 1.0) are presented in Table 19. It appears that there is a levelling off after the first two factors in the proportion of the variance generally accounted for. Thus, only the factor matrices of the first two factors are reported in Tables 20 and 21, which present the loadings of these factors by city for descriptors and features, respectively. For the descriptive adjectives, the first factor was a desirability one-- being comprised to a great extent of the descriptors boring, drab, dirty, and undesirable. For the features, the first factor was made up of activities-- including arts, recreational activities, shopping, social amusements, and transportation. The second feature factor was primarily that of geographical location but also included the features health concerns and homelife activities.

External validation

Environmental indicators were sought which would suggest the extent to which the urban images researched in this study corresponded with external indicators of ideal urban images. Many indicators were available from research reported by Stewart et al. (1976) and Bruce and Stall (1975). Table 22 lists the indicators and city rankings. An overall index of quality of life was calculated by adding each city's rankings on the indicators. In order to achieve a uniform ranking scale so that higher rankings conceivably represented more satisfactory environmental settings, rankings were reversed on those indicators which were in the opposite direction than

Table 19

Eigenvalues for Significant Factors by City

Factor	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
			Descriptive adjectives		
I	6.54(26)	5.95(24)	4.87(20)	5.37(22)	5.89(24)
II	2.57(10)	2.64(11)	2.77(11)	2.36(9)	2.81(11)
III	1.87(8)	1.74(7)	1.72(7)	1.94(8)	1.64(7)
IV	1.45(6)	1.38(6)	1.49(6)	1.76(7)	1.49(6)
V	1.33(5)	1.29(5)	1.41(6)	1.38(6)	1.28(5)
VI	1.19(5)	1.21(5)	1.27(5)	1.26(5)	1.19(5)
VII	1.16(5)	1.12(5)	1.22(5)	1.16(5)	1.04(4)
VIII	1.05(4)	1.01(4)	1.15(5)	1.03(4)	
			Environmental features		
II	3.83(35)	4.29(39)	4.06(37)	3.26(30)	4.02(37)
II	1.52(14)	1.21(11)	1.44(13)	1.46(13)	1.14(10)
III	1.15(11)		1.04(9)	1.32(12)	1.05(10)

Note. Figures in parentheses denote percentages of the variance accounted for by each factor.

Table 20

Varimax Rotated Factor Matrix for the First Two Descriptive Factors by City

Descriptor	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
			Factor I		
Natural	-.48	-.61	-.48	-.54	-.46
Contrasting	.01	-.18	-.30	-.40	-.21
Personal	-.58	-.61	-.60	-.16	-.22
Ugly	.71	.68	.19	.48	.67
Open	-.56	-.44	-.25	.01	-.43
Smelly	.61	.56	.15	.38	-.49
Dynamic	-.22	-.37	-.77	-.67	-.61
Crowded	.68	.36	-.14	-.09	-.03
Apathetic	.08	.44	.74	.69	.72
Poor	.25	.25	-.09	.45	.53
Friendly	-.50	-.40	-.57	-.45	-.17
Boring	.47	.59	.70	.61	.73
Urban	.12	.26	-.17	-.03	.17
Old	.53	.21	.11	-.04	.42
Tense	.56	.77	.26	.18	.04
Quiet	-.72	-.42	.11	.22	-.14
Vivid	-.55	-.67	-.62	-.71	-.78
Vertical	-.12	.19	-.32	-.23	-.53
Centralized	.09	.02	-.24	-.23	-.06
Industrial	.39	.16	-.20	-.11	.26
Clean	-.75	-.73	-.36	-.56	-.65
Worldly	-.07	-.02	-.49	-.36	-.54
Undesirable	.55	.81	-.55	.67	.56
Safe	-.30	-.35	-.13	-.08	-.27
Rough	.55	.53	.07	.37	.35

Table 20 (cont'd)

Varimax Rotated Factor Matrix for the First Two Descriptive Factors by City

Descriptor	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
			Factor II		
Natural	.11	-.18	.33	.42	.31
Contrasting	.26	.05	-.34	-.28	-.42
Personal	.10	-.03	.37	.34	.54
Ugly	-.27	-.24	-.64	-.47	-.14
Open	.22	-.10	.15	.47	.19
Smelly	-.20	-.01	-.50	-.53	-.32
Dynamic	.74	.69	-.22	-.02	-.27
Crowded	.16	.48	-.53	-.50	-.44
Apathetic	-.67	-.63	.05	.01	-.17
Poor	-.31	-.41	-.20	-.01	-.15
Friendly	.19	.12	.11	.39	.57
Boring	-.69	-.61	-.03	.17	-.01
Urban	.55	.49	-.16	-.10	-.35
Old	-.13	.03	.44	.11	-.06
Tense	-.13	.08	-.57	-.65	-.79
Quiet	-.25	-.42	.53	.66	.70
Vivid	.54	.39	.23	.24	.08
Vertical	.36	.17	-.12	-.43	-.29
Centralized	.39	.36	.25	-.07	-.22
Industrial	.06	-.01	-.16	.01	.19
Clean	.08	.01	.59	.54	.27
Worldly	.62	.44	-.07	.15	-.23
Undesirable	-.40	-.07	-.46	-.39	-.40
Safe	.02	-.28	.55	.37	.45
Rough	.06	-.01	-.44	-.43	-.33

Table 21

Varimax Rotated Factor Matrix for the First

Two Environmental Features by City

Feature	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
			Factor I		
Arts	.55	.54	.64	.40	.63
Employment	.13	.54	.09	.31	.01
Ethnic	.19	.48	.49	-.12	.25
Geographical	.28	.07	.16	-.00	.12
Health	-.12	.15	.09	.23	.78
Homelife	.29	.25	.11	.35	.62
Media	.56	.62	.71	.62	.24
Recreational	.62	.47	.50	.51	.70
Shopping	.65	.80	.42	.61	.55
Social	.83	.77	.78	.53	.46
Transportation	.72	.65	.81	.80	.64
			Factor II		
Arts	.37	.10	.27	.43	.21
Employment	.68	.30	.68	.26	.70
Ethnic	.74	.37	.09	.71	.32
Geographical	.57	.77	.65	.68	.66
Health	.70	.68	.70	.62	-.07
Homelife	.51	.77	.72	.59	.19
Media	.39	.34	.11	-.10	.65
Recreational	.12	.54	.51	.30	.27
Shopping	.27	.09	.55	.44	.49
Social	.01	.09	.22	.24	.57
Transportation	.02	.21	.03	-.13	.24

Table 22

Rankings of Cities Based upon Quality of Life

Indicators from External Sources

Indicator	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Juveniles charged[a] (#/10,000 population)	1	4	2	3	5
Criminal code offenses[a] (%/10,000 population)	2	5	4	3	1
Missing persons[a] (#/10,000 population)	5	3	1	4	2
Illegitimacy[a] (#/1,000 births)	5	2	1	4	3
Cinemas[b] (total/area)	1	4	2	5	3
Cultural facilities (sq. ft./100 population)	5	3	2	1	4
Social opportunities (sq. ft./100 population)	5	1	4	2	3
Foreign origin (dominant proportion not English- nor French-speaking)	3	1	5	2	4
Ethnic groups (# of major groups)	1	4.5	4.5	2.5	2.5
Population density[b] (#/sq. mile)	5	4	1	2	3
Green spaces[b] (acres/1,000 population in urban core)	4	1	3	2	5
Population turnover[a] (% chg. in population)	3	1	2	5	4

Table 22 (cont'd)

Rankings of Cities Based upon Quality of Life Indicators from External Sources

Indicator	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Hospital beds (#/1,000 population)	3	4	1	5	2
Voter turnout (% voting)	3	5	2	4	1
Female labor force (% working)	3	1	2	5	4
Average income (Mean $)	2	5	3	4	1
Unemployment[a] (% not working)	4	5	3	2	1
Public transportation (availability & use)	2	4	1	5	3
Fire and automobile hazard[a] (index of incidence)	4	1	2	3	5
Overall index[c]	55	58.5	57.5	57.5	56.5

Note. Statistics were not available for air quality indicators. Rankings (except for the overall index and others where indicated) were derived from statistical data reported by Stewart et al. (1976). Rankings are from 1 (highest) to 5 (lowest), with the highest rank being given to the city with the greatest amount of the indicator as defined in parentheses.

[a]Rankings on this indicator were reversed from those reported here before being included in the overall index.

[b]Derived from data reported by Bruce and Stall (1975).

[c]Calculated by adding the ranks of the cities (with the reversals noted) for all the indicators.

that required for uniformity (e.g., juveniles charged, population turnover, unemployment). As the table shows, there does not appear to be any overall consistency in the rankings; similarly, the overall index does not indicate any significant difference in the cities according to the rankings. It should be noted that several important indicators were not included in this study because statistics were not available for all the cities (e.g., the air quality indicators); and these indicators may be some of the primary ones affecting the image and quality of life in the cities.

Bruce and Stall (1975) also developed an index for ranking numerous cities, including those in this study. However, their index was not as inclusive as that of Stewart et al. (1976), since they only awarded points for the top six of the 22 cities being ranked. However, their point system indicated that the order of cities, from most desirable to least desirable, was London, Kitchener, St. Catharines, Hamilton, and Windsor. Interestingly, the order of the rankings derived by Bruce and Stall corresponded with the clusterings and desirability ratings obtained in the present study. Perhaps the authors selected a point system and indicators which allowed them to obtain results corresponding with their own image of the cities; and these images corresponded with those of the subjects in this study.

Rankings of desirability of the five cities included in the present study were also obtained from the subjects' rankings of the ten Canadian cities listed on the last page of the questionnaire. Table 23 presents these rankings according to each city sample.

Table 23

Mean City Rankings by City

City ranked	Total	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Hamilton	6.7(9)	4.2(1)	7.5(10)	7.4(9)	6.9(9)	6.9(10)
Kitchener-Waterloo	4.4(1)	5.4(3)	3.1(1)	4.4(2)	4.5(1)	5.0(5)
London	3.6(1)	4.4(3)	4.0(2)	2.5(1)	4.3(4)	3.2(1)
Montreal	6.8(10)	7.1(10)	6.8(10)	6.9(10)	6.7(10)	6.4(10)
Ottawa	4.0(2)	4.3(3)	3.9(2)	3.7(3)	4.1(2)	4.2(4)
St. Catherines	5.5(8)	5.4(4)	6.1(8)	5.6(5)	3.6(1)	6.4(7)
Toronto	5.9(9)	5.4(2)	5.4(2)	6.3(10)	6.2(9)	6.0(10)
Vancouver	4.4(3)	4.9(5)	3.9(1)	4.4(4)	4.2(3)	4.6(2)
Windsor	7.5(10)	7.5(10)	8.3(9)	7.9(10)	7.7(9)	6.1(10)
Winnipeg	6.2(6)	6.4(6)	6.1(6)	5.9(6)	6.7(8)	6.1(9)

Note. Figures in parentheses denote modal responses. A higher ("1") value indicates a ranking of greater desirability.

Both mean and modal responses for the cities are reported, due to an interesting pattern which was noted with respect to the modal responses. Subjects in all the cities except Windsor reported most often a ranking of 1 when they were ranking their own city; however, in Windsor the modal response was 10. The rankings of all the cities also indicated that the total subject sample ranked the five cities in the following order, from most to least desirable: London, Kitchener, St. Catharines, Hamilton, and Windsor. Interestingly, this was the same order of desirability as that suggested by Bruce and Stall (1975). Finally, it is interesting to note that, regardless of the desirability of the city ranked in relation to the other cities, the subjects in each city ranked their own city higher in desirability than did the subjects from the other cities, even the subjects in Windsor.

The environmental indicators, then, obtained from outside sources appeared not to correspond with the urban images derived in the present study. Although there was slight support for a correspondence of the outside data with that of the present study in the results reported by Bruce and Stall (1975), none was evident when an independent index was calculated in this study. It appears that images of cities were the result of certain outstanding characteristics in the urban environment rather than being a composite of unweighted indicators such as those used in the present study. Thus, the third hypothesis appears to remain equivocal.

CHAPTER IV

DISCUSSION

This study examined the meaning of the urban image for the individual. The meaning component was operationally defined as the subject's ratings on questionnaire items, including lists of bipolar descriptive adjectives and environmental features, several open-ended questions (e.g., would the subject prefer to live elsewhere), and a listing of ten Canadian cities which subjects were asked to rank in desirability as places to live. It was assumed that the individual's image of a particular city would be elicited by presenting the individual with the city's name and then by asking the individual to respond on the questionnaire provided. Both of these assumptions will be explored in greater detail once the results have been discussed in terms of this study's hypotheses. The hypotheses will be discussed in the order in which they were presented.

Consistency in urban images

The first hypothesis stated that urban images are consistent for individuals within that city. This hypothesis was investigated first by comparing the ratings of individuals of differing demographic backgrounds and then by examining the relationship between the lists of descriptors and features.

Comparisons by demographic variables. The results of the multivariate analyses of variance (MANOVA) by demographic variables suggested that there were differences in the ratings--and thus, in urban images--depending upon the group to which the individual

belonged. These findings, then, did not support the first hypothesis. This lack of support was two-fold.

First, ratings on a majority of the demographic variables were significantly different for both the lists of descriptive adjectives and environmental features. The univariate analyses (Tables 6 and 7) indicated that the greatest number of significant differences on individual questionnaire items were for the variables representing whether the subject considered himself as living in the city proper (LIVEIN) and whether the subject would prefer to live elsewhere (PREFMOVE). The entire subject sample (n = 530) was fairly large, which may be why there were so many significant differences for the demographic characteristics, even when differences were considered significant only at the .01 level. It should be noted that, for most of the demographic variables, only a small number of descriptors and features accounted for the significance in the univariate analyses. Caution should be exercised concerning the significance of these differences for the demographic variables age, marital status, extension student status, and years lived in or near the city (YRSNEAR). Perhaps the most interesting findings are those for the demographic variables which were not significant in the MANOVA of descriptors and features. The sex of the subject and number of cities in which the subject had previously lived (CTSLVD) were both not significant in the MANOVA of descriptors; and conceivably both may have affected the subject's perceptions and cognitive structuring of environmental images.

There was another way in which the results of the MANOVA did

not support the first hypothesis. The MANOVA of features yielded an even greater number of significant differences than did the MANOVA of descriptors. Perhaps this discrepancy in ratings was due to the type of rating instructions which were given on the different portions of the questionnaire. Subjects were asked to rate the city's desirability on various features but were asked merely to indicate the degree to which the city possessed some level of the bipolar descriptors. The descriptors represented not only the evaluative dimension but also the activity and potency dimensions of meaning. Individuals may have had different standards for satisfaction with a city and varied in their evaluations of the city while they rated the city's potency or activity similarly. This seems to be possible based upon the results of the present study and suggests that future researchers should examine more closely the nature of the instructions on questionnaires, especially when comparisons are made of images of several cities. Another interesting area for further research may be in investigating a possible relationship between activity or potency factors of the urban image and the size of the city being rated. Finally, future researchers could cluster responses for subsamples of subjects to examine more closely the subsets of individuals who exhibit consistent images.

The occupation of the subject was not used in statistical analyses conducted in the present study, but it was examined as a potential source of variance for differences in ratings of the cities. The samples obtained in each city in this study appeared

to be generally equivalent with respect to this variable, so this variable was used merely as a controlled factor while examining the feasibility of using a verbal response format to elicit and measure urban images. Since this study was primarily exploratory, future researchers may wish to control more precisely variables such as the socio-economic class and educational level of the subjects by using stratified samples, so that more representative samples of the actual resident populations are obtained.

Comparison of features with descriptors. The results of analyses in which both the lists of features and descriptors were analyzed using the same techniques suggested that there was a general correspondence between ratings of descriptors and features. These findings support the first hypothesis in several ways.

First, the hierarchical clustering (HICLSTR) and discriminative function (DISCRIM) analyses of descriptors and features independently suggested that the optimal number of clusters for both should be two, with Hamilton and Windsor being grouped together and Kitchener, London, and St. Catharines being similarly grouped. There was a consistent rating pattern across both portions of the questionnaire.

Secondly, factor comparisons (FCOMP) by city of the rating patterns on both the lists of descriptors and of features also supported the first hypothesis (Table 18). These results indicated that there was a fairly high correlation of response patterns when ratings of each city were compared with those of every other city on both portions of the questionnaire. Although this correspondence would not be strong enough if used without any other evidence supporting the first hypothesis, it does provide additional support when used

with the other analyses conducted in the present study.

Perhaps the strongest support for the first hypothesis is in the canonical correlation (CANCORR) analyses (Table 8). The ratings on the features for a particular city corresponded fairly well with the ratings on the descriptors for the same city. Especially high were the correlations between the first two canonical variables. Although other canonical variates also emerged as mildly significant, it is interesting to note that the data appeared to be explained quite well in terms of two dimensions. This two-dimensional framework was consistent with the factor analyses in that a major portion of the variance was explained in terms of two rather than more factors. Thus, the results of CANCORR supported the results of other analyses in addition to supporting the first hypothesis.

Ratings of features used in conjunction with those of descriptors, then, apparently was a useful procedure and supported the hypothesis that urban images can be consistently measured using a variety of techniques. The results for each portion of the questionnaire supplemented information from other portions of the questionnaire. Furthermore, when both descriptors and features were used in the same study, the results suggested that subjects based their ratings of the city upon certain characteristics of the environmental setting--either the features themselves or some other aspect of the setting which was reflected by both the features and the descriptors. Future studies could examine this relationship more fully and attempt to identify more precisely which features were not only the most desirable but also the most important in the subject's

ratings of the city.

Comparisons of response patterns. The results of FCOMP by city provided yet another basis of support for the hypothesis regarding image consistency. Even if there were differences in the desirability ratings of a city on the features or descriptors, there nevertheless was a consistency in response patterns such that the same questionnaire items were weighted similarly across the cities. Correlations by city for the descriptor and feature factor matrices were fairly consistent, especially when the sizes of the factor matrices being compared were the same.

The results of the FCOMP, then, suggested that there were certain features or descriptors which clustered together consistently when ratings were compared by city. These findings supported statistically the suggestion that certain adjectives were ordinarily associated with each other. Lowenthal and Riel (1972) did not examine environmental features nor did they include the same bipolar descriptive adjectives as those used in the present study; however, the results of the present study apparently corresponded in general with their suggestion that there was some consistency in urban images; similar weights were given to the questionnaire items in all the cities.

It appears that the results of the present study supported the first hypothesis, at least for consistency in ratings on the questionnaire. It is interesting to note that MANOVA does not examine weighting of responses but differences in ratings for the various levels of the independent variable. Since images involve a

cognitive restructuring of an environmental setting, perhaps a consistency in image structure rather than in specific ratings for various demographic variables is actually the most appropriate. The results of the present study supported this suggestion in that there was a similarity in response patterns across cities and a general correspondence in ratings between descriptors and features, while more subtle differences in rating patterns occurred because of the characteristics of the individual rating the urban setting.

City comparison of urban images

The second hypothesis suggested that comparisons of the images of several cities yielded significant differences in the urban images. The results of the MANOVA strongly supported this hypothesis. Although such findings appear to be common sense and may not be particularly surprising, it is reassuring to note that differences in urban images emerged in the present study. Not only were the MANOVA by city and sex highly significant for city, the univariate analyses of a majority of the descriptors and features were also significant for the city variables.

The differences in urban images were more evident when the results of the HICLSTR and DISCRIM analyses were examined. Both aided in visualizing the comparability of the cities (as in Figures 2 and 3) and summarized the data well. When the cell means were examined in conjunction with both DISCRIM and HICLSTR, similarity between Hamilton and Windsor and between Kitchener and St. Catharines emerged. London appeared to be the most distinct, perhaps due to its extremely positive ratings on such adjectives as beautiful and

rich. If Function 1 on the descriptive adjectives represented an evaluative function, the most undesirable (and the most negatively rated) cities would be Hamilton and Windsor. The results of these analyses corresponded with the results of the principal components analyses (PCA) in suggesting the importance of desirability as a factor in verbal urban images. For the environmental features, it appears that the clusterings were most easily interpreted in terms of Function 2, which represented geographical location. Both London and Windsor were located farther from Toronto than the other cities and Windsor was rated the worst with respect to geographical location. Another factor affecting Windsor's undesirability because of its location may have been its proximity to Detroit; Detroit's negative image has been cited often (Havens, 1974; McNulty, 1974). On the features, as on the descriptors, it appears that Function 1 may have been a positive-negative factor.

It is interesting to note the correspondence between the open-ended and the rating portions of the questionnaire. Responses on the separate portions yielded similar groupings, with Hamilton and Windsor not being portrayed positively on either of the portions. When subjects were asked to provide a color for their city they used green for Kitchener, London, and St. Catharines, whereas gray was a typical response for Hamilton and Windsor. Gray appeared to be a more negative response; and it was used for both cities. With respect to the nicknames, certain cities were given a greater variety of nicknames than others. London and St. Catharines were clearly forest and garden cities, respectively, followed by Hamilton

and then by Windsor as lunchbucket cities. (Both Hamilton and Windsor were rated as the most industrialized on the questionnaire.) Kitchener was the most disparate as far as nicknames were concerned, with nicknames almost equally divided among the names twin cities, Germantown, and Oktoberfest capital. Interestingly, Kitchener was rated the most desirable on the questionnaire for its ethnic diversity; and its German ethnicity has been documented elsewhere (Priddle, 1975).

Desirability of a city appears to be one of the main factors emerging in the analyses of descriptors, which also included items reflecting the potency and activity dimensions of Osgood et al. (1957). Indeed, desirability of a city was a consistent finding resulting from similar ratings of cities on both descriptors and features but also on the rankings. London subjects distinguished themselves by ranking their own city higher than any other city was ranked by any group. Residents of Windsor ranked their city last in terms of desirability and London first, whereas residents of the other four cities ranked their own city the most desirable. Although subjects in Hamilton ranked their own city higher than they did other cities, they did not rank it as highly as subjects in Kitchener, London, or St. Catharines ranked their own cities. Hamilton's rank was higher than that of Windsor but it was still fairly low. Interestingly, the lowest mean rank across all subjects was that for Windsor; and this was followed by that for Hamilton, with St. Catharines, Kitchener, and London being ranked more desirable. When city rankings were compared with the index values for the environmental features, a similar pattern emerged. Hamilton and Windsor were the most un-

desirable on both sets of data. Even on the demographic variable PREFMOVE, the greatest percentage of subjects preferring to move were from Windsor (68 per cent), with the percentage in Hamilton the next highest (59 per cent).

It appears that the city comparisons in the present study strongly indicated different urban images for the cities, with certain cities being rated more similarly than others. Thus, the second hypothesis was supported. Interestingly, results of the present study also supported the suggestion that one of the most pervasive qualities of the urban image was the degree to which the city was desirable.

Comparisons with environmental indicators

The third hypothesis states that urban images corresponded with environmental indicators suggested as relevant to ideal images by other researchers. This hypothesis was not supported in the present study. Urban images emerging in this study did not correspond with the indicators of ideal urban settings suggested by researchers (Bruce & Stall, 1975; Stewart et al., 1976). There are several reasons why this lack of support may have occurred.

First, urban images might be based upon differentially-weighted variables while the environmental indicators used in this study were evenly weighted. Future researchers could ask individuals to suggest levels of importance or use regression analyses to explore more fully the nature of these weightings.

Secondly, the environmental indicators may not reflect the range of information available to the subjects and used by them

when their images of a particular city were elicited. This is quite possible, since pollution indicators are not available for all the cities studied; and pollution may be one of the major variables determining urban images. Other potentially important features may be noise levels throughout the city, the city's degree of industrialization, and geographical location. If commercialization is a desirable feature of a city, London (the most commercially-oriented of the five cities) may be rated more favorably than the other cities. Windsor may receive more undesirable ratings based upon its industrialization and its location.

Finally, there actually may be differences between images of environmental settings and the actual characteristics of that setting. The results of the image research indicated that there were consistently negative responses for two cities in particular (i.e., Hamilton and Windsor) and very positive ratings for another (i.e., London). Positive ratings for Windsor on the features and descriptors were virtually nonexistent, while they were extremely common for London respondents. As several of the nicknames indicated, London was a snobtown while Windsor was the city with an inferiority complex; which may have been the result of a halo effect (either positive or negative but not necessarily accurate) in ratings for these cities. Such an effect was also found in previous research conducted in both London and Windsor (Hansvick & Minton, 1976).

Perhaps this discrepancy between environmental indicators and urban images is actually the most significant finding of this study

in terms of the nature of urban images. The individual's image of the city may change more slowly than do the actual aspects of the setting. Thus, the images may change only when there is a substantial shift in events within the urban setting, forcing the person to perceive details of the setting which he may have previously ignored. Such a suggestion is implicit in the justifications given for major downtown redevelopment, such as in Detroit (Havens, 1974; McNulty, 1977). Images of Detroit should change drastically when the Renaissance Center proves to be a successful business venture. Changes in urban images have also been a primary goal of the planners in Minneapolis (Lu, 1974).

The discrepancy between environmental indicators and urban images supports the suggestion that images are more than mere signals of the environmental setting which correspond directly with the actual aspects of the environment (von Bertalanffy, 1967, 1968; Boulding, 1966). Images are symbols and restructure urban settings within the mind of the perceiver, so that one-to-one correspondence does not exist between urban images and environmental indicators. As radical as such a suggestion is, further research investigating this possibility appears warranted. The individual has a different urban image than do the planners and makes different assumptions about his environment. He may assume that change in an undesirable urban setting is actually not occurring, whereas the planner may assume that small improvements are constantly being made in the settings and are noticeable to the public. Research could investigate both the magnitude of change required in order to ensure

changes in urban images and the effects upon subsequent behavior. Another major area for further research is that examining the effect when information is provided without actually manipulating environmental indicators. Studies such as these require inter-disciplinary cooperation, with advertising agencies designing the image-changing campaigns and social science researchers measuring the changes in attitudes. Participation of planners and businessmen would be required in order to actually change environmental settings.

The present study provides a methodology which may be useful when images change or urban images of different cities are compared. Perhaps changes in images occur because of differing weather patterns, or only after a major promotional program has been conducted. Such a program may be worthwhile, since urban settings are becoming increasingly predominant--especially in southern Ontario (Jackson, 1973; Yeates, 1975). As the likelihood of living within the urban setting increases, the responses of the individual to that setting may change. The urban image reflects this change and still serves as a coping mechanism by organizing and perhaps even eliminating information requiring constant revision of the person's cognitions.

Conclusions and implications

It appears likely that the response format adopted for use in this study measures urban images of some kind. Significant differences in ratings of the cities were based upon similar weightings of the questionnaire items in each city. Thus, certain aspects of the city emerged as important characteristics of all cities and provided a measure of consistency in response patterns (measurement

reliability).

It appears that both the environment display (i.e., abstract) and response (i.e., rating scale) formats used in the present study measure urban images. It also appears that these images correspond to some extent with the meaning component suggested by Lynch (1960). Certainly, the questionnaire used in this study elicited a different aspect of the image than that assessed using the cognitive mapping technique. Future studies appear to be warranted based upon the present study, and several suggestions may be made.

First, it may be necessary to redefine environmental indicators of satisfactory urban environments to reflect the images of the everyday users of those settings. Planners may have different images of ideal cities than do the daily users of those settings, so urban image research should be conducted on as varied a population as possible. The techniques used in the present study--both analytical and experimental--are valuable tools for analysis of the collected data. Certainly, research data from both spatial (cognitive mapping) and verbal (rating scales) techniques could be used in a supplementary manner.

Secondly, future researchers might request that residents suggest particular areas of the city which do or do not satisfy their criteria for desirable urban settings. The present study had used a general list of environmental features and asked the subjects to rate the entire city in terms of these functions. The ratings on a list of environment features such as that used in the present study could be used for each of the particular urban

areas. The present study does suggest that there is reliability in ratings on features as compared with descriptors and in comparisons across cities. Such methods may be helpful, as in deciding what type of zoning is most appropriate for an urban area or pinpointing urban areas of cities which are not satisfactory.

Next, images of cities in other geographical areas of the country or more variant in size could also be studied; five cities in southern Ontario had served as the basis for the comparisons in the present study. The desirability of cities evidenced in their urban images has widespread implications. Highly desirable cities may be preferred over other cities as locations for new businesses. Also, once comparisons are made of various cities--both larger and smaller than those used in the present study--certain characteristics of the cities may emerge as consistently desirable whereas other characteristics are not. Perhaps individuals perceive smaller or much larger cities than those used in this study as being undesirable merely because of their size. Businessmen in cities which are noted only for their industrialization may want to attract or emphasize other more commercial enterprises in order to change urban images which consistently associate negative or unhealthy features with their heavily industrialized cities. Similarly, planners in cities receiving less desirable ratings will have information about the unsatisfactory aspects of their city's image and concentrate upon changing this image.

Future studies may also attempt to examine other cities or even specific areas within cities for long-range effects. Thus,

planners may gather information regarding the results of any change they make in their cities once the initial research studies have been conducted and may also have measures of the stability of urban images.

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APPENDICES

APPENDIX A

Sample Questionnaire

Please answer the following questions in the spaces provided.

Sex _____

Age _____

Extension student? _____ Yes _____ No

Do you live in the city of Windsor? _____ Yes _____ No

How long have you lived in or near Windsor? _____

Permanent city of residence (if other than Windsor)

_____

Country of birth _____

Single _____ Married _____ Other _____

Your primary occupation (e.g., student, homemaker, teacher, factory worker, etc.)

_____

Primary occupation of spouse (if married)

_____

This study concerns how you would describe the city of Windsor. Answer each item as honestly as you can. Answer every item but do not spend too much time on any one item.

Quite often a city can be described by some catch phrase or nickname. For example, Toronto has been called Hog Town, the Queen City, and Toronto the Good. Please give Windsor a nickname according to what you think would most accurately describe it.

_____

What color comes to mind when you think of Windsor?

_____

Listed below are pairs of descriptive adjectives which are opposite or nearly opposite in meaning. Now think of the city in terms of each pair. Circle one letter for each adjective pair. The letter you circle should reflect your description of the city in relation to some point on the scale between the pair of descriptions.

	Extremely	Moderately	Slightly	Slightly	Moderately	Extremely	
natural	a	b	c	d	e	f	artificial
contrasting	a	b	c	d	e	f	uniform
personal	a	b	c	c	e	f	impersonal
ugly	a	b	c	d	e	f	beautiful
open	a	b	c	d	e	f	bounded
smelly	a	b	c	d	e	f	fresh
dynamic	a	b	c	d	e	f	static
crowded	a	b	c	d	e	f	uncrowded
apathetic	a	b	c	d	e	f	spirited
poor	a	b	c	d	e	f	rich
friendly	a	b	c	d	e	f	unfriendly
boring	a	b	c	d	e	f	interesting
urban	a	b	c	d	e	f	suburban
old	a	b	c	d	e	f	new
tense	a	b	c	d	e	f	relaxed
quiet	a	b	c	d	e	f	noisy
vivid	a	b	c	d	e	f	drab
vertical	a	b	c	d	e	f	horizontal
centralized	a	b	c	d	e	f	decentralized
industrial	a	b	c	d	e	f	commercial
clean	a	b	c	d	e	f	dirty
worldly	a	b	c	d	e	f	local
undesirable	a	b	c	d	e	f	desirable
safe	a	b	c	d	e	f	unsafe
rough	a	b	c	d	e	f	smooth

Now evaluate the city in terms of the various aspects of city life listed in the following group of features. Think of the city in terms of its desirability for you as a place in which you can participate in the following activities or in which you can use its various facilities, as described below.

	Excellent	Good	Fair	Poor
arts and education (concerts, exhibitions libraries, universities)	a	b	c	d
employment (commercial, industrial, professional)	a	b	c	d
ethnic and cultural diversity (religion, language, nationalities)	a	b	c	d
geographical location (nearness to other cities, scenic and historical surroundings, climate)	a	b	c	d
health concerns (air and water pollution, police and medical services)	a	b	c	d
homelife activities (residential areas, nearness to schools and playgrounds)	a	b	c	d
media (television, radio, newspapers)	a	b	c	d
recreational activities (bikeways, playgrounds, skating rinks, parks)	a	b	c	d
shopping (downtown, malls, farmer markets)	a	b	c	d
social amusements (restaurants, bars, discotheques, movies)	a	b	c	d
transportation: public and private (parking, mass transit, railway and air service, traffic routes)	a	b	c	d

Using only one phrase, briefly state why you are living in or near this city at the present.

_____

Would you prefer to live somewhere else? _____ Yes _____ No

If so, where? _____

Why? _____

Finally, read through the following list of cities in Canada, listed in alphabetical order. First, rank these cities from the most desirable ("1") to the least desirable ("10") city in which to live. Be sure to include all the cities and feel free to base your rankings on any information you may have regarding these cities. Answer all items. Then, circle the names of the cities in which you have lived at least one year.

_____ Hamilton

_____ Kitchener-Waterloo

_____ London

_____ Montreal

_____ Ottawa

_____ St. Catharines

_____ Toronto

_____ Vancouver

_____ Windsor

_____ Winnipeg

Now, if you have not done so already, circle the names of the cities listed above in which you have lived at least a year and write below the names of any other cities (Canadian or foreign) not included in the above list but in which you have resided at least one year.

You have now completed the questionnaire. THANK YOU FOR PARTICIPATING IN THIS STUDY.

APPENDIX B-1

Unrotated Factor Matrix for Descriptors of Hamilton[a]

Descriptor	Factor I	II	III	IV	V	VI	VII	VIII	Communality
Natural	-.48	-.12	-.30	.14	.43	-.17	-.11	-.23	.63
Contrasting	-.11	.23	.06	-.16	-.23	-.54	.46	.02	.65
Personal	-.56	-.18	.59	-.02	-.01	-.25	.12	.10	.79
Ugly	.76	.09	.28	-.15	.06	.06	-.15	.24	.77
Open	-.60	-.07	.01	.28	-.30	.14	-.25	-.05	.62
Smelly	.64	.10	.27	.23	-.27	.13	-.09	.01	.64
Dynamic	-.54	.56	.09	-.08	-.11	-.08	-.26	-.01	.70
Crowded	.53	.46	-.36	-.15	-.08	.16	-.07	.24	.74
Apathetic	.38	-.56	-.13	.14	-.06	.34	.14	-.04	.63
Poor	.37	-.15	.61	-.15	-.02	.25	-.06	.20	.66
Friendly	-.53	-.06	.49	.12	-.34	.07	.11	-.13	.68
Boring	.74	-.39	.04	-.03	.15	-.12	-.12	.10	.76
Urban	-.15	.55	.07	-.20	.05	.34	.52	.25	.82
Old	.53	.13	-.02	-.20	-.04	-.17	.21	-.35	.54
Tense	.56	.14	-.48	.08	-.27	.09	.11	.01	.66
Quiet	-.52	-.56	-.05	-.22	.27	.18	.09	.13	.76
Vivid	-.74	.23	-.22	.04	-.16	.12	.16	.13	.73
Vertical	-.27	.26	.23	.13	.09	.45	.07	.54	.71
Centralized	-.10	.39	.07	.33	.62	.19	.23	.08	.77
Industrial	.32	.23	.05	.65	.18	-.30	.03	.11	.72
Clean	-.70	-.28	-.20	-.20	.05	.04	-.00	.34	.77
Worldly	-.35	.51	-.04	-.05	-.05	.05	-.49	.12	.65
Undesirable	.67	-.10	-.07	.24	-.15	.06	.16	.03	.58
Safe	-.28	-.12	.02	.60	-.11	-.02	.08	.39	.62
Rough	.46	.31	.34	-.13	.34	-.10	-.13	.02	.58
Eigenvalue	6.54	2.57	1.87	1.45	1.33	1.19	1.16	1.05	
% variance accounted for	26.2	10.3	7.5	5.8	5.3	4.8	4.6	4.2	

[a] $n = 85$.

APPENDIX B-2

Unrotated Factor Matrix for Descriptors of Kitchener-Waterloo[a]

Descriptor	Factor I	II	III	IV	V	VI	VII	VIII	Communality
Natural	-.56	-.31	.26	-.13	.09	.18	.19	.02	.57
Contrasting	-.19	.01	.02	-.32	.65	-.28	-.25	.23	.76
Personal	-.59	-.17	.50	.10	-.22	.07	-.10	-.08	.71
Ugly	.72	-.08	.12	.13	.07	.02	.05	.29	.65
Open	-.41	-.19	.25	-.30	.10	.39	.06	.04	.52
Smelly	.55	.11	.10	.27	.35	-.25	.07	-.09	.59
Dynamic	-.52	.59	.01	-.10	.07	-.00	.17	.14	.68
Crowded	.25	.55	.13	-.16	-.12	.30	.34	.09	.63
Apathetic	.56	-.52	-.21	.01	-.09	.03	.06	.02	.65
Poor	.34	-.34	.16	-.10	-.18	-.13	.28	-.50	.64
Friendly	-.42	.03	.60	.05	-.14	-.36	.00	.06	.69
Boring	.71	-.47	.06	-.05	-.11	.01	-.01	.15	.77
Urban	.15	.54	.19	-.01	-.03	.29	-.06	.23	.49
Old	.20	.07	.65	.12	.22	-.10	-.23	-.05	.61
Tense	.74	.25	-.14	-.08	-.04	-.07	.00	.06	.65
Quiet	-.31	-.50	.08	.42	.16	.08	-.20	.12	.62
Vivid	-.74	.24	-.16	-.08	.11	.01	.05	-.19	.69
Vertical	.15	.21	-.16	-.28	.02	.04	-.54	-.28	.54
Centralized	-.06	.36	.02	.53	-.32	.29	-.43	-.09	.79
Industrial	.15	.03	-.15	.37	.59	.43	.12	-.34	.85
Clean	-.71	-.15	-.33	-.07	-.03	-.00	.00	.08	.66
Worldly	-.12	.43	-.04	.45	.04	-.38	.36	-.03	.68
Undesirable	.80	.10	.12	-.06	-.01	.13	-.06	.25	.75
Safe	-.28	-.35	.03	.22	.13	.27	.21	.27	.46
Rough	.52	.11	.43	-.25	.16	.18	.09	-.31	.69
Eigenvalue	5.95	2.64	1.74	1.38	1.29	1.21	1.12	1.01	
% variance accounted for	23.8	10.6	6.9	5.5	5.2	4.8	4.5	4.0	

[a] $\underline{n}$ = 114.

APPENDIX B-3

Unrotated Factor Matrix for Descriptors of London[a]

Descriptor	Factor I	II	III	IV	V	VI	VII	VIII	Communality
Natural	.59	.01	.14	-.04	-.02	-.22	.19	.17	.48
Contrasting	.04	.45	.24	.32	.10	.51	-.06	.05	.64
Personal	.71	.05	-.00	.14	.33	.01	.01	-.08	.64
Ugly	-.52	.42	-.07	.19	.33	.21	.11	.15	.68
Open	.29	.02	-.03	.63	.34	-.01	-.16	-.19	.66
Smelly	-.41	.32	.36	-.44	.14	-.07	.04	.07	.63
Dynamic	.50	.62	.04	.15	-.04	-.08	-.09	.13	.69
Crowded	-.20	.51	.28	.02	-.20	-.29	-.08	.26	.57
Apathetic	-.57	-.47	.10	.29	.02	.01	.07	.01	.65
Poor	-.05	.22	-.25	.28	-.08	.02	.73	.30	.82
Friendly	.53	.24	-.09	.07	.39	-.34	-.15	-.06	.64
Boring	-.59	-.38	.30	.03	.20	.02	.19	-.19	.69
Urban	.04	.23	-.53	-.33	-.08	.45	.15	-.17	.70
Old	.17	-.42	-.15	-.02	.07	.42	-.29	.35	.61
Tense	-.54	.32	-.29	-.00	-.14	-.26	-.14	.20	.62
Quiet	.22	-.50	.14	.19	-.09	-.27	.46	-.01	.65
Vivid	.64	.17	.24	.00	-.42	.10	-.10	-.13	.70
Vertical	.19	.28	.04	-.26	.34	-.19	.17	-.46	.58
Centralized	.34	-.06	-.31	-.52	.35	-.02	.17	.15	.65
Industrial	.07	.24	.61	-.16	.28	.04	.15	.36	.70
Clean	.63	-.27	-.11	-.00	.03	-.14	.08	.21	.56
Worldly	.35	.34	.18	.02	-.30	.20	.30	-.38	.64
Undesirable	-.72	.05	.17	-.04	.21	.22	.00	-.21	.69
Safe	.42	-.38	.20	-.08	.31	.15	-.01	.13	.50
Rough	-.32	.32	-.45	.20	.23	-.08	.08	.02	.51
Eigenvalue	4.87	2.78	1.72	1.49	1.41	1.27	1.22	1.47	
% variance accounted for	19.5	11.1	6.9	6.0	5.7	5.1	4.9	4.6	

[a] $\underline{n} = 102$.

APPENDIX B-4

Unrotated Factor Matrix for Descriptors of St. Catharines[a]

Descriptor	Factor I	II	III	IV	V	VI	VII	VIII	Communality
Natural	.68	-.01	.02	.25	.31	.07	-.10	-.20	.68
Contrasting	.16	.46	.41	-.18	.05	-.20	.12	-.27	.57
Personal	.33	-.17	.49	-.21	-.01	-.49	.00	.12	.68
Ugly	-.67	.09	.32	-.02	.07	-.18	-.06	.21	.65
Open	.27	-.38	-.01	.19	.45	-.16	.25	.16	.58
Smelly	-.62	.20	.32	-.20	.16	.10	-.12	.10	.63
Dynamic	.52	.42	.12	-.06	.29	.04	.15	.25	.64
Crowded	-.23	.45	.21	.38	-.40	-.06	.02	-.18	.65
Apathetic	-.55	-.42	.07	.06	-.41	-.02	.20	-.19	.74
Poor	-.37	-.26	.16	.36	.31	-.10	-.49	-.23	.76
Friendly	.59	-.04	.36	.11	-.13	-.30	-.21	.24	.71
Boring	-.39	-.49	.01	.04	-.36	-.16	-.01	.14	.57
Urban	-.04	.10	-.29	.65	.13	-.17	.18	.02	.60
Old	.09	-.06	.11	.65	-.05	.01	-.11	.25	.52
Tense	.53	.41	-.19	.09	.07	-.20	.38	-.10	.69
Quiet	.21	-.66	-.13	.02	.15	.30	.03	-.15	.63
Vivid	.71	.22	-.19	-.20	-.11	.13	-.02	-.30	.75
Vertical	-.07	.48	-.40	.03	-.01	.25	-.27	.41	.71
Centralized	.15	.19	-.13	.32	-.42	.10	-.09	.13	.39
Industrial	.09	.06	.66	.17	-.03	.50	-.24	-.15	.81
Clean	.78	-.11	-.15	.10	-.23	-.14	.07	-.08	.73
Worldly	.38	.10	.36	.41	.03	.10	.41	-.03	.63
Undesirable	-.77	-.09	-.00	.08	.22	.12	.14	.10	.70
Safe	.29	-.25	.34	-.13	-.17	.45	.37	.35	.77
Rough	-.56	.12	.17	.14	.14	.19	.21	-.16	.50
Eigenvalue	5.37	2.36	1.94	1.76	1.38	1.26	1.16	1.03	
% variance accounted for	21.5	9.4	7.7	7.1	5.5	5.1	4.7	4.1	

[a] n = 82.

APPENDIX B-5

Unrotated Factor Matrix for Descriptors of Windsor[a]

Descriptor	Factor I	II	III	IV	V	VI	VII	Communality
Natural	-.55	-.08	.02	-.33	.36	.01	.32	.65
Contrasting	-.01	.47	.45	-.31	.22	.13	.24	.64
Personal	-.43	-.39	.38	.11	.19	-.07	.17	.56
Ugly	.67	-.17	-.19	.21	.18	.18	.01	.60
Open	-.47	.01	.12	.02	.27	.05	-.41	.48
Smelly	.58	.08	.51	.20	-.04	-.06	-.02	.65
Dynamic	-.43	.51	.25	.28	.22	-.05	-.17	.67
Crowded	.16	.41	-.18	.38	-.02	.46	-.13	.60
Apathetic	.72	-.16	-.13	-.30	-.04	-.02	.01	.65
Poor	.54	-.10	-.25	.25	.24	-.24	-.05	.55
Friendly	-.40	-.44	.06	.51	.10	-.16	-.01	.65
Boring	.67	-.31	-.09	-.14	.10	-.19	.07	.62
Urban	.31	.24	.40	-.08	-.03	-.04	-.30	.41
Old	.40	-.13	.32	-.24	.33	.37	.19	.62
Tense	.38	.69	-.15	.07	-.07	.07	-.00	.66
Quiet	-.43	-.57	-.26	-.07	.07	.09	.06	.60
Vivid	-.74	.26	-.01	.05	-.00	-.24	-.13	.69
Vertical	-.35	.49	-.15	.07	.11	-.33	.31	.61
Centralized	.04	.23	.14	.11	-.61	-.17	.45	.68
Industrial	.15	-.29	.40	.48	.08	.20	.24	.60
Clean	-.70	.04	-.32	-.08	.15	.09	.09	.64
Worldly	-.38	.44	-.24	.20	.17	.33	.22	.62
Undesirable	.67	.12	-.28	.10	.20	.20	.08	.64
Safe	-.44	-.29	-.01	.15	-.43	.44	.07	.68
Rough	.46	.15	-.13	.37	.24	-.29	.24	.58
Eigenvalue	5.89	2.81	1.64	1.49	1.28	1.19	1.04	
% variance accounted for	23.6	11.2	6.6	6.0	5.1	4.8	4.2	

[a] $n = 103$.

APPENDIX C-1

Unrotated Factor Matrix for Environmental Features of Hamilton[a]

Feature	Factor I	Factor II	Factor III	Communality
Arts	.66	-.07	.19	.47
Employment	.54	.44	-.25	.55
Ethnic	.62	.45	-.21	.63
Geographical	.58	.26	-.41	.57
Health	.36	.61	.21	.55
Homelife	.55	.20	.57	.67
Media	.68	-.06	.20	.51
Recreational	.55	-.31	.51	.65
Shopping	.67	-.22	-.32	.60
Social	.65	-.53	-.22	.75
Transportation	.57	-.45	-.13	.54
Eigenvalue	3.83	1.52	1.15	
% variance accounted for	34.8	13.8	10.5	

[a] $n = 91$.

APPENDIX C-2

Unrotated Factor Matrix for Environmental Features of Kitchener-Waterloo[a]

Feature	Factor I	Factor II	Communality
Arts	.49	-.25	.30
Employment	.61	-.09	.37
Ethnic	.61	.00	.37
Geographical	.52	.57	.60
Health	.53	.45	.49
Homelife	.66	.46	.65
Media	.70	-.11	.50
Recreational	.70	.14	.51
Shopping	.69	-.41	.65
Social	.67	-.39	.60
Transportation	.64	-.23	.46
Eigenvalue	4.29	1.21	
% variance accounted for	39.0	11.0	

[a] $n = 122$.

APPENDIX C-3

Unrotated Factor Matrix for Environmental Features of London[a]

Feature	Factor I	Factor II	Factor III	Communality
Arts	.66	-.22	.02	.48
Employment	.52	.45	.30	.56
Ethnic	.43	-.26	.64	.66
Geographical	.55	.38	.40	.60
Health	.53	.46	-.04	.49
Homelife	.56	.46	-.34	.65
Media	.61	-.39	-.37	.65
Recreational	.71	.05	-.25	.58
Shopping	.68	.13	-.20	.53
Social	.73	-.35	.12	.68
Transportation	.62	-.51	-.01	.65
Eigenvalue	4.06	1.44	1.04	
% variance accounted for	36.9	13.1	9.4	

[a] $n = 111$.

APPENDIX C-4

Unrotated Factor Matrix for Environmental Features of St. Catharines[a]

Feature	Factor I	Factor II	Factor III	Communality
Arts	.59	-.03	.50	.60
Employment	.41	.03	.30	.26
Ethnic	.40	-.60	.38	.67
Geographical	.47	-.49	-.23	.52
Health	.59	-.29	-.40	.60
Homelife	.66	-.18	-.45	.67
Media	.38	.50	-.32	.50
Recreational	.58	.14	-.24	.41
Shopping	.75	.11	.05	.57
Social	.55	.20	.51	.60
Transportation	.49	.65	.02	.66
Eigenvalue	3.26	1.46	1.32	
% variance accounted for	29.7	13.3	12.0	

[a] $\underline{n}$ = .80.

APPENDIX C-5

Unrotated Factor Matrix for Environmental Features of Windsor[a]

Feature	Factor I	Factor II	Factor III	Communality
Arts	.63	-.22	-.29	.52
Employment	.44	.55	.21	.54
Ethnic	.39	.10	.34	.28
Geographical	.50	.44	-.18	.48
Health	.58	-.53	.18	.64
Homelife	.61	-.23	.52	.69
Media	.58	.37	.24	.53
Recreational	.72	-.22	.19	.60
Shopping	.74	.04	-.11	.56
Social	.71	.17	-.35	.66
Transportation	.65	-.20	-.50	.71
Eigenvalue	4.02	1.14	1.05	
% variance accounted for	36.5	10.4	9.6	

[a] $\underline{n} = 104$.

APPENDIX D-1

Additional Statistics for Descriptive Adjectives, by City

Descriptor	Total	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Natural	1.28(526)	1.33(93)	1.08(123)	1.07(116)	1.07(86)	1.33(108)
Contrasting	1.43(530)	1.49(94)	1.39(123)	1.44(117)	1.35(87)	1.41(109)
Personal	1.47(528)	1.44(93)	1.37(122)	1.48(117)	1.36(87)	1.44(109)
Ugly	1.31(529)	1.28(94)	1.07(123)	.93(116)	.97(87)	1.36(109)
Open	1.42(528)	1.38(94)	1.25(123)	1.43(117)	1.34(87)	1.41(107)
Smelly	1.57(529)	1.23(94)	1.25(123)	.92(117)	1.13(86)	1.30(109)
Dynamic	1.33(527)	1.35(93)	1.35(122)	1.33(117)	1.27(87)	1.27(108)
Crowded	1.28(529)	1.25(94)	1.31(122)	1.11(117)	1.21(87)	1.34(109)
Apathetic	1.38(527)	1.32(93)	1.21(123)	1.30(116)	1.39(86)	1.40(109)
Poor	1.01(526)	.93(92)	.77(123)	.84(116)	.86(87)	1.00(108)
Friendly	1.34(528)	1.34(93)	1.17(123)	1.39(116)	1.30(87)	1.37(109)
Boring	1.47(529)	1.58(94)	1.37(123)	1.12(116)	1.34(87)	1.52(109)
Urban	1.40(529)	1.34(94)	1.36(123)	1.36(116)	1.33(87)	1.35(109)
Old	1.21(524)	1.23(93)	1.25(122)	1.18(113)	1.17(87)	1.18(109)
Tense	1.20(527)	1.27(94)	1.16(122)	1.18(116)	.85(86)	1.24(109)
Quiet	1.31(530)	1.16(94)	1.10(123)	1.05(117)	1.16(87)	1.30(109)
Vivid	1.25(528)	1.24(94)	1.14(122)	1.02(117)	1.09(86)	1.22(109)
Vertical	1.36(521)	1.37(92)	1.37(121)	1.24(114)	1.29(87)	1.41(107)
Centralized	1.36(528)	1.20(93)	1.35(123)	1.36(116)	1.44(87)	1.39(109)
Industrial	1.53(528)	.63(94)	1.30(121)	1.14(117)	1.31(87)	1.09(109)
Clean	1.50(529)	1.35(93)	.96(123)	.84(117)	1.12(87)	1.45(109)
Worldly	1.24(526)	1.32(92)	1.08(123)	1.23(116)	1.15(87)	1.34(108)
Undesirable	1.38(529)	1.45(94)	1.26(123)	.94(116)	1.01(87)	1.42(109)
Safe	1.24(530)	1.26(94)	1.22(123)	1.08(117)	1.33(87)	1.29(109)
Rough	1.19(529)	1.10(94)	1.07(122)	.85(117)	1.10(87)	1.21(109)

Note. Standard deviations are reported first in each column with figures in parentheses denoting sample sizes (n).

APPENDIX D-2

Additional Statistics for Environmental

Features by City

Feature	Total	HAMLTN	KTCHNR	LONDON	STCATH	WINDSR
Arts	.84(529)	.86(94)	.76(123)	.67(117)	.83(86)	.84(109)
Employment	.80(527)	.77(94)	.84(123)	.70(117)	.86(85)	.78(108)
Ethnic	.83(526)	.80(93)	.79(123)	.78(115)	.81(87)	.82(108)
Geographical	.86(530)	.67(94)	.74(123)	.85(117)	.66(87)	.94(109)
Health	.85(527)	.81(94)	.67(123)	.65(117)	.64(86)	.75(107)
Homelife	.77(526)	.77(92)	.73(123)	.69(117)	.74(86)	.83(108)
Media	.93(529)	.91(94)	.87(123)	.95(116)	.89(87)	1.04(109)
Recreational	.82(526)	.82(92)	.77(123)	.76(116)	.72(86)	.83(109)
Shopping	.75(530)	.72(94)	.71(123)	.70(117)	.67(87)	.84(109)
Social	.86(525)	.87(94)	.83(122)	.78(115)	.83(86)	.91(108)
Transportation	.85(529)	.80(94)	.84(123)	.87(117)	.80(86)	.90(109)

Note. Standard deviations are reported first in each column with figures in parentheses denoting sample sizes (n).

APPENDIX E

List of Abbreviations

CANCORR:	Canonical correlation analysis (Nie et al., 1975).
CTSLVD:	Number of cities in which the subject previously lived.
DISCRIM:	Discriminant function analyses (Nie et al., 1975).
FCOMP:	Factor comparison analyses (Inter-University Consortium, 1971).
HAMLTN:	Hamilton, Ontario.
HICLSTR:	Hierarchical clustering analyses (Barr et al., 1976).
KTCHNR:	Kitchener-Waterloo, Ontario.
LIVEIN:	Whether or not the subject lived in the city proper.
LONDON:	London, Ontario.
MANOVA:	Multivariate analyses of variance (Barr et al., 1972).
PCA:	Principal components analyses (Nie et al., 1975).
PREFMOVE:	Whether or not the subject would prefer to move elsewhere.
SD:	Semantic Differential rating scale.
STCATH:	St. Catharines, Ontario.
WINDSR:	Windsor, Ontario.
YRSNEAR:	Number of years the subject lived in or near the city.

VITA AUCTORIS

Christine Louise Hansvick is the daughter of John Elwood and Delphine (Penske) Hansvick. She was born November 10, 1949, in Vesta, Minnesota, and attended Vesta Elementary Public School and Redwood Falls Public and High Schools, Redwood Falls, Minnesota. In September 1967 she enrolled in the charter class at Southwest State University, Marshall, Minnesota. In June 1971 she graduated with a Bachelor of Arts degree in Business Administration. She received her Master of Arts degree in Psychology at the University of Windsor, Windsor, Ontario, in 1975.