G7 FR IV RP MD: Part of the fragments of the 1942 mural from the interior of the façade wall of the upper floor of the Tooth Relic Shrine embedded in a plaster layer in preparation to be displayed at the museum.

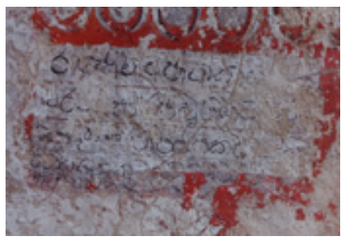
G8. Conservators Mutumali XX (L) and Deeman Ananda (R) restoring the 1942 mural fragments from the interior walls of the Tooth relic shrine embedded in a plaster layer to be displayed in the museum of the Tooth Relic Temple.

The older paint layers

The detachment of painted surfaces due to the thrust of the explosion in the interior walls of the upper floor of the Tooth Relic Shrine revealed several mural layers, at least three, of successive periods under the current murals. These chance discoveries have contributed immensely to establish the history of the Tooth Relic Shrine (see Prematillake and Colombage 2000).

F1 FR OP1: A fragment of one of the older paint layers that came into light when the murals collapsed due to the thrust of the explosion, from the interior of the west wall of the upper floor of the Tooth Relic Shrine. This paint layer has been dated to King Keerti Sri Rajasimha's time (1747-1782) (Prematillak and Colombage 2000:6-7).

Details of the older paint layer



DEVELOPING ALTERNATIVE METHODS FOR URBAN IMAGEABILITY RESEARCH

by
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Introduction

This paper discusses the devising of an alternative data collection technique for a research project that investigated the urban imageability of the World Heritage City of Kandy in Sri Lanka. The concept of urban imageability was first introduced by Kevin Lynch in his seminal study The Image of the City. Lynch (1960) argues that people form mental images of environments based on environments' noticeable features, spatial relationships of those features, and the meanings attributed to the environment and its features. Lynch called these attributes identity, structure, and meanings, respectively. The overall capacity of the environment, derived by these attributes, in evoking strong mental schemata of it is called the imageability of the place. Any research on city image and imageability should derive data on these attributes of identity, structure, and meaning of the place imageability.

Mapping techniques are popular in urban imageability research as devices for eliciting the visuo-spatial schemata (images based on identity-structure attributes) people hold of their environments (Kitchin & Blades 2002). A most basic technique is to ask informants to draw a sketch map of their city. It is widely used, and generally considered to be simple, easy to perform, and promising (Rovine & Weisman 1989). However, during an initial pilot study conducted in Kandy, this was found to be a futile exercise as the informants refused to draw a sketch map, because they either felt uneasy to perform the task in front of the researcher, or they were not confident enough of their map-drawing skill, or they actually did not possess the skill to perform the task, or perhaps due to some other cultural norm or restriction – all of which have been shown earlier as limitations of the method (Evans et.al. 1982, Kitchin 2000). In order to overcome these limitations, some researchers have performed 'map construction' tasks, where the informants are given a set of miniature pieces representing environmental cues in a particular location and asked to construct a model or a map of the location (Stea & Taphanel 1974). It is believed that this method either minimizes or totally eliminates any limitations related to informants' graphic skills and fears. I adopted this method in eliciting the perceptual or visuo-spatial schemata of Kandy in a subsequent pilot study. Unfortunately this method also did not work with the participants. The task seemed to be more complicated than drawing a sketch map: it too required a certain level of cartographical skills in order to understand the base map provided. Furthermore, the number of miniature map features used in the task was also too many to be dealt with; and hence, the respondents did not feel comfortable in performing the task. This therefore compelled me to invent a new method to elicit the environmental schemata of Kandy.

Moreover, the conventional quantitative methods used in environmental and cognitive psychology for spatial cognition research have limitations with regard to eliciting knowledge of environmental meanings. The usual methods followed, such as mapping, verbal direction-giving, map construction, distance/direction judgment, picture recognition, and simulation techniques, are primarily focused on eliciting the visuo-spatial schema and are analyzed appropriately with quantitative methods (Kitchin & Blades 2002). Even though these methods would have been useful in the present study for the purpose of eliciting the visuo-spatial schema of Kandy, they have not been used before, and therefore they are sufficiently not developed, for the task of identifying meanings people assign to and decode from the environment. Thus, it was required that either these methods be improved or some additional method be devised to elicit the meaning schema. Since environmental meanings are too numerous and people's interpretation of them is context-dependent – subjective, cultural, and changeable over time - the type of data required to be rich in detail, embedded in the context, and describe the participants' subjective and cultural biases in meaning construction. Due to this complexity and elusiveness of the subject at hand, people's knowledge of meanings could be difficult to isolate and define: It required more interaction between the researcher and the participants. Both the data and the approach thus had to be qualitative. This required using qualitative approaches as adopted in research in the fields of anthropology, social studies, and human geography in order to elicit meanings. Qualitative inquiry has been widely used to research the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things (Berg 1995).

The research therefore followed an ethnographic design primarily involving interviewing along with a modified version of the free list survey technique adopted from cognitive anthropological research into cultural domain analysis. The core of ethnographic research is to describe the culture from the native's point of view (Spradley 1979). Geertz (1973a, 1973b) referred to it as giving a 'thick description'. Berg (1995) defines ethnography as a set of formal techniques designed to extract cognitive data. Cognitively organizing one's environment into meaning domains is mediated by one's cultural experience (Rapoport 1976). Discussing how people mentally represent the meanings in their own environment is essentially providing a 'thick, cultural description'. Ethnographic interviewing allows the researcher to be the primary data collection instrument, whilst building a rapport with the participants in a less-restrained manner. It allows the interviewer a detailed exploration of any and all facets of a topic as they arise, and leaves the response open to the discretion of participants without it being constrained by the interviewer (Schensul et.al. 1999). This provided me with the opportunity to elicit the participants' elusive and complex knowledge of meanings of their city.

Ethnographic interviewing conducted in cognitive anthropological research is usually done in two stages. In the initial stage, an informal, exploratory survey would be carried out to define the boundaries of what is being studied, which is referred to as "the cultural domain". A domain is an organized set of words, concepts, or sentences that jointly refer to a single conceptual sphere, reflecting the way in which a given language or culture classifies the relevant domain (Weller & Romney 1988). It is assumed that the researcher does not know a priori how the informants define the subject matter in their own language within their cultural context. This is usually done by asking the respondents to freely list the elements in a particular domain. An in-depth data collection stage follows this preliminary step and is constructed upon the domains defined by the informants. Based on this approach, this research was divided into two phases – a preliminary survey phase that elicited the city image (in terms of city elements) followed by an interviewing phase, as detailed below, which attempted to derive perceptual and meaning attributes of the city elements that formed the city image or the corresponding perceptual and meaning schemata. The free list task was used in the survey phase, and semi-structured interviews, a card-sorting task, and a multiple-choice questionnaire were used during the interviewing phase of the study.

These methods were tested through several pilot studies, as discussed below. They were conducted primarily to develop and test the effectiveness of the data collection methods in eliciting the image of the city and its constituent schemata. They were useful in identifying whether the members of the sample selected for the final study were willing to participate in the study and the manner in which they participate. By serving these purposes, the pilot studies were also useful in ensuring the validity of the study, especially the internal consistency or reliability of the data collection instruments, accuracy of the research design and data collection procedure, and neutrality of the study. Finally, the pilot studies indicated the feasibility of data collection with the selected methods.

Establishing the Credibility of the Free List Survey

In order to overcome the limitations forced by participants' reluctance to engage in sketch mapping and map construction techniques, the free listing survey was developed to elicit the city features that form the city image of Kandy. Since this method had no prior use in urban imageability research, it became imperative to establish the credibility of the technique first. I tested the feasibility and effectiveness of the method in a pilot study conducted in August 2002 in Kandy. Its credibility was then tested against the sketch mapping technique and later through a test-pretest reliability check.

The most useful general elicitation technique for isolating and defining elements in a cultural domain is the free list survey (Borgatti 1999, Weller & Romney 1988). Respondents are asked to write down all the items in a particular domain that they can think of, one item per line, on a piece of paper. The exact same question is asked of all respondents. The number of times each item is mentioned is then counted and sorted in order of decreasing frequency. Items recalled more frequently and first are assumed to be more salient than items recalled last (Borgatti 1999). This is a less demanding task than sketch mapping or map-construction to perform. One does not need any specific skills, other than writing. Even if a respondent does not know how to write, he/she still can verbally list the domain elements in order for the researcher to write them down. Thus, it eliminates all sorts of skill requirements other than the ability to memorize and speak.

Testing the feasibility of the Free List Survey for Imageability Research

Adopting this survey technique in a pilot study, I asked 50 undergraduate students (25 males and 25 females who are natives of Kandy, and were quite familiar with the city) from different academic disciplines to list fifty environmental elements in the City of Kandy that they could think of. The 50 lists thus produced suggested that each list could be considered as that particular respondent's image of the city, and that an aggregated list of all 50 lists could represent the consensual image or public image of the city of that particular group of respondents. This survey task not only provided a list of imageable environmental elements, but also indicated how important those elements were to each participant, in terms of perceptual significance and/or symbolic significance, both for personal and cultural reasons. In addition, each individual list indicated the extent of the geographical area the city image would be based on. While some lists were totally focused on the city's central area, some included city elements located within the city limits, while others extended beyond city limits to include symbolically important locations that are associated with the city. The consensual list gave the number of times a particular city element was mentioned, and hence, indicated the ranking order of the elements either due to perceptual or associational saliency or both, which could be clarified by further interviewing: participants were in a position to give reasons for their respective choices of city elements with the possibility of further probing and generating more information on what they think of the city's imageability.

Analysis of the consensual list generated from this pilot study data indicated that one could examine the lists to identify what elements were prioritized: whether they fall within the first five items, within the second 10 items, and within the next 10 items, and so on. This showed the elements, which were recalled immediately as opposed to those recalled later. The elements recalled within the first five items listed indicated that those city elements are highly imageable. The city elements listed later indicated the elements within a second order saliency. Furthermore, these second order elements also represented the order in which the city elements are placed (in the city image) around the elements which were mentioned initially. This latter analysis indicated the formation of element clusters in terms of topological spatial relations, and through it, the pattern of cognitive structuring of city elements. Interviews in the final study generated enough information to support these initial analyses and assumptions.

Comparing the Free List Survey with Sketch Mapping

The analysis of free list data collected from 50 undergraduate students in this pilot study proved that the instrument elicits the necessary data. Since the free listing task had been adopted instead of the sketch map technique, it was necessary to compare the two methods and establish that the adopted method is more appropriate for the final study and that it would ensure the accuracy of the research design. During the free list survey, I also asked these 50 undergraduate students to draw a sketch map of Kandy. I compared each sketch map drawn by a student and the free list provided by the same student in order to check whether the same elements were given in both tasks (Table 1). I found that, across the student group, about 60% of city elements mentioned in sketch maps are also given in the free lists. This figure equaled about 40% of elements given in free lists. Thus, free lists had more elements than what was drawn in the sketch maps: Out of all the elements that appeared in a free list, about 60% of them were not shown in the sketch maps. In other words, free lists generated more elements. A careful analysis of sketch maps and free lists revealed the reasons. Sketch maps were concentrated on a micro area of the city, either on the central area of the city (46% of maps) or on the area within the city limit (48%). Only a few (6%) maps referred to elements located beyond the city limits. On the contrary, 62% of free list elements referred to elements located within the city limits, while 30% of free lists mentioned elements beyond the city limits. Altogether 92% of the free lists referred to city elements located within the city limits and/or beyond the city limits. Only 8% of the free lists were completely focused on the elements located within the central area of the city.

Table 1. Comparison of Sketch Maps and Free List Data		
Spatial scope of the data	Sketch maps	Free lists
Within city center only	23 (46%)	04 (08%)
Within city limits only	24 (48%)	31 (62%)
Beyond city limits	03 (06%)	15 (30%)
Total	50 (100%)	50 (100%)

My inference was that the sketch map technique restricts a person to produce all the significant locations in and/or associated with a city due to its inherent aspects of scale and graphical notations, unless the participant has good skills in visualizing a location with cartographical accuracy of scale and notations, or unless one produces several maps of different scales of the same city. On the contrary, the free list task is easy to perform: if the individual is unable to write, he/she could simply name the locations for the researcher to note them down. This allows the participant to mention highly imageable places in and around the city that are associated with the city irrespective of their location. This means that the free list task goes beyond the limits of a map (or topological relationships of elements and therefore scale restrictions) in order to refer to locations that are either or both perceptually and symbolically significant to the city image. Thus it was concluded that free list survey is a valid instrument to elicit city images.

Testing Internal Consistency of Free List Task

Conducted in November 2002, the purpose of the second pilot study was to address the issue of internal consistency related to the stability of the free listing task in eliciting the same list of city elements in a similar ranking order in repeated tests. Even though the free listing task has been widely used in cognitive anthropology research to elicit cultural domains of a group, it has never been used to elicit a city image. Although Appleyard (1969) used a similar technique, along with other methods, to identify legible environmental elements, it was not used to derive all the imageable elements in a city or to subsequently infer the city image. Therefore, it was necessary to verify the consistency of this key data collecting instrument in this study.

Following the two conventional reliability checks widely practiced in quantitative research, I first conducted a **test-retest check** for the free listing task, with 40 undergraduate students in Arch: 302/Human Behavior & Architecture class of fall 2002 at the Department of Architecture, University of Wisconsin-Milwaukee. In the first test, I asked students to list 30 places in the City of Milwaukee that would come to mind when they hear the name of the city. After two weeks, I had the same group of students performing the identical task. Results showed that 62% of the city elements mentioned in the first test was also mentioned in the second test (retest). Although this is not a highly significant yield, it confirmed that the free listing survey is, to a satisfactory degree, consistent in generating similar results in repeated tests.

Nevertheless, a further analysis of the list of elements that were repeatedly cited in both tests by each individual showed that these repeated city elements could be used to generate a consensual list, and therefore, to identify core (central to the city image) and peripheral (of lesser importance to city image) city features. As shown in the Table 2 below, this group of 40 students repeated only 164 city elements in the retest. Out of this list, exactly half of the city elements were mentioned only once. One could assume then, that these 82 city elements are representative of more idiosyncratic references and could be referred to as 'extreme peripheral' city elements. By eliminating this extreme peripheral city element group from the analysis, it could be possible to form a consensual list constituting the rest of the 82 city elements cited more than once by the group. This consensual list could be further analyzed to identify 'core and peripheral' city elements. Following the criteria I used to analyze the free lists collected from the Sri Lankan student sample in the earlier pilot study, one could assume that the city elements that were mentioned by more than 10 students (25% of the sample) belong to the 'core' category, while those city elements that were mentioned by fewer than 10 students belong to the 'peripheral' category. Sixty two elements belong to the peripheral category and 20 elements fall within the core category. The core category could be further divided into two subsets: 'first order' (those city elements mentioned by more than 50% of the sample) and 'second order' (those city elements mentioned by 25%-49% of the sample) and so on. One of the city elements - the Milwaukee Art Museum - was mentioned by more than 75% of the sample, which prompted me to refer to it as the 'nucleus' of the core group of city features.

Table 2. Analysis of the Retest Data of the Pilot Study					
Category		Number of people mentioned	Number of city elements mentioned	Frequency	Percentage of the frequency
Core	Nucleus	Over 30 (over 75%)	01	37	05.15 %
	First order	20-29 (50%-74%)	09	218	30.32%
	Second order	10-19 (25%-50%)	10	117	16.27%
Periphery		02-09 (Below 25%)	62	265	36.86%
Extreme Periphery		Only 01 person mentioned	82	82	11.40%
Total		N = 40 (100%)	164	719	100.00%

This analysis demonstrated that, even with the moderately significant 62% of the city elements that were repeated in the retest, one could produce a consensual list in order to generate the public image of a city and to identify the core/peripheral groups of city elements. Thus, it proved the reliability of the free list survey instrument.

The pilot studies established the free list survey technique as an effective and reliable data collection method for eliciting the imageable features in any environment. As mentioned in the data analysis techniques discussed below, and as proven in the final study, the method produces the necessary information. The technique helps deriving a consensual list of all the elements which would represent the shared image of the city. Individual city images and the consensual city image could be graphically represented in the form of a map once every element mentioned in the list is drawn on a scaled map of the city.

The Interviewing Phase: Eliciting Data on Structure and Meanings of City Image

However, the free list survey did not clearly show what perceptual and meaning attributes make the city elements highly imageable and how salient those attributes are. Thus, the need arose to gather more data by interviewing the participants. Immediately following the free list survey, I asked the participants why they mentioned those city elements in the lists they produced. These data indicated the perceptual and meaning attributes that contributed to the imageability of these city elements.

In addition, **semi-structured interviews** with the participants were carried out. It included a set of open-ended questions regarding the general information about living in Kandy, the participants' notion of why they think Kandy is a significant city in the country, along with the locations in the city they liked and disliked most. A multiple-choice questionnaire designed to examine the participants' knowledge of sacred meanings in the city, and a card sorting task, which was based on the data given on the free list survey, were also included.

The open-ended questions focused on two aspects: eliciting general information on living in Kandy and describing the informants' likes/ dislikes of locations in the city, and gave informants the opportunity to freely respond to the questions. A set of questions was specifically intended to find out what the participants think are the quintessential attributes and the significance of the city. These questions helped eliciting information on the city meanings at its macro-scale and on the locations that are significant to the identity of the city. Furthermore, answers to this set of questions were compared with each participant's free-lists to verify whether they refer to the same elements as being significant, both in the list and in the interview. Informants were also asked to list 5 locations that he/she finds most pleasing and 5 areas that he/she finds least pleasing in the city, along with the reasons, and the type of environmental features and attributes that

make those locations pleasing (or not) for the informant. Nasar (1998) used this preference test method to elicit information on the social meanings residents attribute to their city.

Card-Sorting Task for Eliciting Cognitive Structure

It was possible to carry out this task only after all the free lists were collected, the consensual list was prepared, and the elements to be included in the core/periphery categories were determined. In order to perform the task, a set of 2" x 3" cards with names of city elements written on them was prepared. Each card represented an element that appeared in the consensual list. This set of cards was used to identify the topological and/ or meaning domains into which the informants categorized the cues, and thereby, cognitively organized the city. I asked the informants to sort out the set of cards into different piles, based on any criteria adopted by them. The card-sorting task is a major data collection method used in ethnographic research in cognitive anthropology (Borgatti 1999, Canter et.al. 1985, Weller & Romney 1988).

The card-sorting task included the several steps: The participants at first sorted the cards into any number of piles based on their own criteria. This showed how residents in Kandy generally organize the city features into different domains. I asked the informants to think of any additional cues that are not represented in the cards, which they thought are important enough to be included in any of the different piles sorted out by them. I wrote down the names of those elements on blank cards and handed them over to the respondents to be included by them in suitable piles. After the sorting task had been completed, I asked the informants to explain why they performed the task in such a way. This helped me identify how meanings are attributed to and decoded from the city, its environmental cues, and how, in the final analysis, the city is cognitively organized into different domains. It was also helpful in determining the different categories of meanings attributed.

Multiple-choice Questionnaire on Sacred Meanings

Finally, I attempted to ascertain whether informants know the historically encoded higher-level meanings of the city. I first told them that it is believed that the city was built based on some higher-level sacred meanings by the Sinhalese monarchs and then asked whether they have any knowledge of such meanings. Then, I presented them with a multiple-choice questionnaire with 10 questions and 5 possible answers for each question focusing on the meanings encoded in some selected environmental elements and the entire city. The choices had either one or two correct answers inferred by James Duncan (1990) to be the meanings encoded in the city. I generated the rest of the possible choices based on similar meanings believed to be encoded in the other ancient cities in the country. This multiple-choice questionnaire method is used in cognitive anthropological studies to elicit meanings (Weller & Romney 1988).

However, administering such a questionnaire might have posed a challenge to some informants, such as Buddhist monks and heritage managers, who are supposed to be knowledgeable about such meanings, but might not know them. In order to avoid such a situation, I first asked a high school student (a resident of the city) to select a possible answer for each question. The answers selected by the student were then shown to the informants and they were requested to give their opinion with regard to the student's answers. I allowed the informants to give their opinion freely and probed their opinions if necessary.

These three methods – open-ended questions, card sorting, and multiple-choice questionnaire – elicited the necessary data required for figuring out the city's imageability attributes of spatial structure and associated meanings and how it may have been perceived by its residents. These techniques were also evaluated through pilot studies before being adopted for the final study.

Methods for Analysing Data

Generating the Consensual City Image

The free lists were analysed first for their contents & then aggregated (by frequency) to form a consensual list. The consensual list contained information on the city elements mentioned as well as the frequency and the rank order in which they are mentioned. Data were tabulated in order to show the overall frequency and rank order (whether the cue is mentioned among the first 5, second 10, third 10, or in the last 25 items listed) as given in Table 3.

Table 3. How Free Lists Data are tabulated/ analyzed

Element	Overall Frequency	Number of times listed in the first five items (1-5)	Number of times listed in the second 10 items (6-15)	Number of times listed in the third 10 items (16-25)	Number of times listed in the last 25 items (26-50)
Temple	49	43	07		
Lake	48	26	19	03	
Street A	15	03	09	02	01
Etc.,					

The consensual list provided elements that are mentioned more than once. Thus it included types of elements that have higher consensuality across the group (these are called **core elements**) and more idiosyncratic ones (these are called **peripheral elements**). Usually core elements are cited by many respondents and there are few of these. The peripheral elements are numerous, but listed by just one person or a very small group of people (about 5-6 people). Thus, the list of elements had a core/periphery structure with no absolute boundaries. This is the usual situation with a free list survey data (Borgatti 1999). Consequently it became necessary to determine a boundary for the domain being studied: in this case, it was for the public image of the city. This could be done either by including all the items mentioned by more than one respondent (this will still produce a large list that cannot be dealt with practically), or by looking for a natural break or by grouping of elements or by defining a boundary arbitrarily (Borgatti 1999). In the final study in Kandy, I combined the last two methods. The overall frequency for each element was presented in percentages. Percentages gave a method to cluster the elements, but the selection of particular levels and defining them as core and periphery was somewhat arbitrary. Based on a scale map of the city, the core element groups were mapped in order to be represented as the *consensual/ public image* of the city.

Defining Saliency of Imageability of City Elements

The consensual list partially indicated what elements are possibly highly imageable and the extent to which they are significant for the city image. This was verified by deriving the saliency order of elements by further analysing the free list data.

The order in which elements are listed by individual respondents is not arbitrary. The most *salient elements*, and thus highly imageable elements, tend to occur early. Furthermore, related items tend to be cited close to each other (Borgatti 1999). The saliency could be due to perceptual salience or associational salience or both. The relationship could be either due to similar meanings shared by elements and/or due to perceptual attributes such as topological/spatial proximity of elements and/or similar attributes of color, material, style, and the like.

In order to identify the saliency of imageability of elements, I examined the elements that fell within the first five items listed in the Table 4 above. This set of elements would indicate that they are the most perceptually and/or symbolically salient. However, the reasons for the saliency and the order of saliency still cannot be derived from a mere list. Thus, using the corresponding frequency for each of these elements I calculated a **saliency score**, represented as a factor showing how many times an element appears within the first five items listed out of its total frequency. Data were further analyzed to see how soon a city element had received 50% of its citations. Based on these results, city elements were then categorized into three levels: high-saliency, mid-saliency, and low-saliency. This list was then compared with the core element categories identified from the consensual list.

The comparison was based on several assumptions, and any contradictions emerging from those assumptions required further investigation and analysis. It was initially assumed that the core elements would have a higher saliency ratio. The second assumption was that elements with a higher saliency ratio may be both perceptually and symbolically salient. If this were not the case, then that element would still be a core element for the public image; it may be stronger, either perceptually or symbolically, but not in both regards. On the contrary, a peripheral element might score a higher saliency ratio indicating that that particular element is either perceptually or symbolically significant. Such a situation would question the validity of the core/periphery categorization performed earlier and therefore would deserve attention. It could well be a core element, even though it is mentioned by fewer residents. It may be symbolically worthy yet perceptually obscure or may be perceptually somewhat noticeable but lacking in symbolic content. In the latter case, it could well be topologically associated with another salient element or group of elements. This could be revealed by further analysis of cluster formation of elements via saliency ratio rankings in order to identify any contradictions and the salient order of those elements.

The calculation of the saliency ratio played an important role as a validity check against the core/periphery definition in the city image. Some revisions to the core/periphery definition were necessary after this saliency order analysis. Also, it provided some understanding of what elements might be salient due to both perceptual and meaning attributes and due to one of the two attributes. However, it still did not give the reasons for saliency of elements, which required analyzing interview data.

Defining the Cognitive Structure of City Image

The manner in which the participants grouped different city elements together in the card sorting task indicated the possible ways of structuring the city. Data from each card-sorting task was analyzed to see the different themes assigned to each city feature, and then to identify the dominant themes under which each element was grouped. Then most common groups and their most common constituent elements were identified. These common themes or groups were further analyzed to see whether associational and topological clustering could be found out. Moreover, during the interviews participants were asked to identify the city features or areas that they most liked or disliked. These data on people's preference indicated the affective schema of the city, which is a component of the overall associational schema of the city. Based on these data, the cognitive structure of the city image was identified. This discussion was limited to topological and associational relationships; the positional (direction/distance) relations are not discussed as data were insufficient to explore this aspect of the cognitive structure.

Furthermore, using the appearance order of elements from the consensual table (Table 3), I examined the most salient reference points in the cognitive structure of the city image: it is inferred that the city elements appearing early in the consensual list would be these crucial reference points around which the other city features are cognitively organized. It showed the sequence of formation of different element clusters. It also indicated the most imageable element clusters within the city, the clusters that are more symbolic or perceptually significant, and the hierarchy of these element clusters. It further illustrated the paths that link these significant element clusters and also the elements, which demarcate the city's extent and boundaries of clusters. Furthermore, I could identify the clusters that are sacred and/or socially, and instrumentally dominant.

Defining Symbolic and Perceptual Attributes

Interview transcriptions were initially analyzed with **content analysis** techniques in order to reduce data by coding, data sorting into categories, and representing them in matrices (Berg 1995, LeCompte & Schensul 1999). At this stage, I searched for the reasons participants had given regarding why certain city elements mentioned (in the free list), were considered significant, were liked/ disliked, and were included in a certain pile during the sorting task. This analysis was carried out for each element, and the reasons given for listing them were tabulated against each element.

The analysis then moved into a second phase that involved an analytic induction method. In analytic induction, data are further analyzed in order to identify patterns/ themes based on deduced propositions or theory-derived concepts (Patton 2002). A set of preliminary categories were used (based on the theoretical framework of the study) to start the coding and categorization. The categories had a hierarchical structure. The two main categories were 'perceptual attributes' and 'associational attributes'. There were a number of categories under each one of the above, representing different variables in them. For example, the perceptual attribute category included all the references to noticeable variables such as form, visibility, materiality, etc. The associational categories had variables such as sacred meanings, social meanings, and instrumental meanings, affective categories and other components in these meaning categories. These were tabulated in correspondence with the city elements in the consensual list. Thus it represented the perceptual and/or symbolic significance of each element and the factors that make them distinctive.

Another key concern in analytic induction strategy was to identify the negative cases or disconfirming patterns that were contrary to theory-derived concepts and assumptions used in the analysis. Moreover, data were analyzed to identify the culture-specific taxonomies (cultural domains) that the participants used to refer to perceptual and symbolic attributes of the city elements. This is referred to as domain analysis (LeCompte & Schensul 1999).

This brings us to the final phase of the analysis, which develops explanations for the patterns identified, whilst comparing them with the theoretical framework and findings from other relevant studies, and furthermore, building working hypotheses that could be further investigated.

Conclusions

The free list survey proved to be very valuable for the study. It is an easy task to perform; it elicits more information on people's image of an environment than other popularly-used elicitation techniques, such as sketch mapping and map-making exercises; and is also useful in devising measures to evaluate the saliency of imageability of city features that cannot be achieved through most of the usual methods. With the free list method it was easy to define the consensual city image, its core/periphery, and its structure. I found that the combined form of a free list survey and a semi-structured interview method is an effective alternative to widely-used mapping techniques in urban imageability research. Triangulation of different data through several methods and collection of different types of data at the same time augmented each other and generated adequate data for the study. Guba (1981) mentions that triangulation of different data collection methods provides a greater opportunity to understand/ derive different perspectives participants would have of the phenomenon under examination and, hence, gives greater credibility to the study. Accordingly, the main data collection instrument and other data sources collectively derived accurate information for answering the research questions.

A research design that combines different methods should give careful attention to issues of validity or trustworthiness of the study. Different methods have conventional and preferred criteria, especially designed to address validity threats particular to those methods. Even though it is generally believed that triangulating methods could overcome any weaknesses in the methods, it does not necessarily mean that all the validity threats would be automatically taken care of by simply combining methods. Instead, there would be unseen validity threats that might not be detected by the application of conventional rules or techniques. Thus, validity criteria for a mixed method research study should be carefully considered and delineated.

A key validity issue in devising the free list survey was its reliability. Guba (1981) defines the consistency or reliability of a research project as the manner in which the findings of a study would be consistently repeated, if the study were replicated with the same or similar participants in the same or similar context. There are two components to the consistency criterion: the internal consistency refers to the extent to which a data collection instrument or procedure would yield the same results over repeated trials, and the external consistency refers to the comparability of results in repeated studies using the same methods by different researchers in the same or similar situations (Schensul et.al. 1999). The most important internal consistency issue in the study is related to the stability of the free listing task in eliciting the same list of city elements in a similar ranking order in repeated tests. This was established during the two pilot studies via comparison of the free list task with sketch-mapping technique and through test-retest check. I have later used the same set of combined methods in similar urban imageability research in the World Heritage Cities of Guanajuato, Mexico and Bhaktapur, Nepal, in which I found the method to be effective and trustworthy in generating the necessary data, thus establishing its external consistency.

Use of the free list survey for image elicitation and then defining the saliency and the core/periphery of the city image is based on the assumption that people would mention most salient and consensual city features first in the list. Except for one person, others who participated in the final study followed this assumed way of listing city features. This particular participant listed the city features taking an imaginary route moving from the main entry of the city towards the Temple of the Tooth Relic, the most important feature of the city. This was apparently an outlier to the common pattern and hence to the assumption upon which the method was devised; it became valuable evidence to establish the trustworthiness of the instrument in image elicitation. When asked what route he would take in the case of moving out from the city, he said that he would start from the Temple and follow the same route backward. It indicated that there is an important city feature that defines the nucleus of the city image (where his imaginary route ends or begins) and that there is a particular directional hierarchy to the city image. The findings of the spatio-symbolic structure of the city confirmed that this actually is highly probable. Thus it is likely that the free list method would indicate the ways of recalling the city image and consequently indicate various structural attributes of the city image in addition to eliciting the most consensual and highly imageable city features.

I hypothesize that this method should work in any given context irrespective of the degree of imageability of the locale, and will definitely indicate whether that locale is a highly imageable and consensual environment or not: In a highly imageable city, like Kandy, participants are highly likely to create lists that include more consensual, socially significant city features than purely idiosyncratic ones and that start with the most salient city features. In cities with weaker imageability, participants are likely to produce lists that include more idiosyncratic city features than those with community significance, and perhaps start the lists with city features that are purely personal. I argue that the method will work in both cases; in the former it will generate a consensual list indicating the high imageability of the locale and in the latter, it will be difficult to generate a shared image for the city through the free lists, indicating that that city has weaker imageability. I argue that even the cases that do not conform to the common way of recalling the city features, such as the participant who used a certain imaginary route to list city features in Kandy, would indicate the nature of the consensuality and the imageability of the city. If a city's imageability is weak, one may find that people adopt different idiosyncratic ways of recalling city features. In addition, such circumstances would make it difficult to adopt the ordinal ranking system used in this study to evaluate the degree of imageability of city features, indicating that the consensual imageability of that environment is weak. Replication studies should therefore be done in locations with varying degree of imageability to further explore the reliability of the method.

The free list survey did not elicit data on events and non-visual sensory cues in Kandy, except for some references to the annual procession. Even though the instructions given to the participants asked them to list activities and non-visual sensory cues in Kandy, they overwhelmingly mentioned memorable locations in Kandy. I attribute this issue to two reasons: neither did I give specific instructions to the participants during the free listing task to talk about these cues in the city, nor did I probe them with questions that elicit this information during interviews. I consider this as a process issue, i.e., how I conducted the interviews and the free list survey, rather than a problem of the methods used. I could have effectively used the free list survey to elicit information about the events and non-visual sensory cues in the city. For example, had I conducted another free list survey in which I would have asked participants to list only the activities in Kandy that they could recall, I could have obtained a list of activities, which would have, in turn, helped me to identify the activities that are highly imageable, consensual or idiosyncratic, and salient, etc., - thus, the event schema of Kandy. Similarly, I could have obtained information on non-visual sensory cues in the city, by conducting a separate free listing survey. Accordingly, this limitation is actually about the manner in which data were collected rather than about the specific method used in the study.

I made two interesting observations of the method, which will require further investigation. In one of the pilot studies, I observed that there were some differences between the city images elicited through sketch-mapping and the free list survey. While sketch maps tend to elicit images of the city center areas, a free list survey is likely to elicit images of a relatively larger geographical area for the same city. The reasons for this phenomenon are not clear. Furthermore, I observed that when people list city elements during the free list task they tend to take a certain 'mental route', starting from a highly imageable city feature followed by features spatially and/or symbolically associated with it and then moving on to other highly imageable features located elsewhere, and then coming back to the 'area' from which they started this mental journey and filling in the rest of the relatively less-imageable features in that particular area. This manner of listing city features might indicate that the free listing task may be able to elicit the possible cognitive route maps people hold in their minds, and thus eliciting another way of structuring the city image. However, none of these observations were examined in-depth in the present study and, therefore, need further research; if these claims are true, the validity and applicability of both methods can be greatly improved.

Popular, effective, and widely-used data collection methods sometimes may not perform as expected due to many situation-specific reasons, and the researchers should be able to maintain a degree of flexibility and innovation in such contexts. Methods devised to address such situations should be rigorously tested for their effectiveness and reliability before deploying for final study. New ways of collecting data may lead to serendipitous findings of the phenomenon being studied, which may never have been revealed through the use of conventional methods.

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