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Urban Imagery and the Main Street of the Nation: The Legibility of Orchard Road in the Eyes of Singaporeans

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Summary. This paper applies Kevin Lynch's famous thesis of legibility to the main street of Singapore—Orchard Road. It is primarily concerned with three issues. How legible is Orchard Road in the eyes of Singaporeans? Who find Orchard Road legible? If Orchard Road is legible to Singaporeans, why is it so? Based upon a combination of comprehensive questionnaire survey of Singaporeans and personal interviews with residents and businessmen operating in Orchard Road, this paper argues that the landscape of Orchard Road, known as the Orchardscape in this paper, is very legible to most Singaporeans. Its legibility is particularly prominent among those with higher education and higher income levels. There is also a distance-decay effect in the Singaporean cognition of the Orchardscape. The legibility of the Orchardscape is explained in relation to the personal and cultural background of individual Singaporeans and landscape cues. We argue that both sets of factors must be taken into consideration in understanding the image of the city. Some practical implications for future city design and planning are offered in the concluding section of the paper.

Introduction

Jane Jacobs, in her classic work *The Death and Life of Great American Cities*, has this advice to offer on cities:

> Think of a city and what comes to mind? Its streets. If a city's streets look interesting, the city looks interesting; if they look dull, the city looks dull. (Jacobs, 1961, p. 29)

In most world cities today, interesting streets host distinctive man-made features, such as buildings and parks (see, for example, Nasar, 1994), and vibrant activities, such as festivals and celebrations. Interesting streets have therefore become the defining characteristic of these great cities in the world (Appleyard, 1981; Nasar, 1988). Drawing on the work of Jane Jacobs (1961) and Kevin Lynch (1960; 1976a), a strong research tradition in 'the image of the city' has proliferated drastically for more than three decades (Pocock, 1971; Saarinen and Husband, 1982; Domosh, 1992; Gosling, 1992). Today, we have a fairly comprehensive understanding of the various

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elements that constitute the distinctive image of the city. The topic continues to be discussed in leading texts in urban design, city planning and urban geography. A cursory reading of the existing literature, however, suggests that most empirical examples in published materials are drawn from cities in the Anglo-Saxon world. We are not quite sure whether the same constitutive elements of the image of the city, in particular its streetscape, can be found in or relevant to cities in developing countries (see Karan and Bladen, 1982; Del Rio, 1992; Yeung and Savage, 1995).

This paper aims to examine the image of an island state, Singapore, with special reference to its main street—Orchard Road. Despite rapid urban transformations and changes that have taken place in Singapore since the 1960s, streets remain extremely important in defining its urban landscape. If a Singaporean is asked to think of a street in Singapore that comes to his/her mind most vividly, Orchard Road is most likely to be the first street to come to mind. This is not surprising because since the mid 1970s, Orchard Road has been developing as the 'main street' in Singapore. Given the high visibility of Orchard Road, this paper offers a cross-sectional examination of the contemporary view of Orchard Road and how Singaporeans perceive the Orchardscape (Figure 1)—Orchard Road and its vicinity of minor roads.

Although this paper is concerned with the 'public image' of the Orchardscape, its focus is essentially on individuals because the sum of 'personal images' forms the 'public image'. Boulding (1956, p. 64) argues that these 'personal images' serve as a "basic bond of any society, culture, sub-culture or organisation". Specifically, this public image of the Orchardscape is translated into one of Kevin Lynch's (1960) twin concepts of *imageability* and *legibility*. Because of the constraint of space, this paper attempts only to show the *legibility* of the Orchardscape (see also Yeung and Savage, 1995). Both personal and landscape factors are evaluated in assessing the Singaporean cognition of the Orchardscape. In terms of personal attributes (for example, age, gender, income and language), this study tries to identify the people who find the Orchardscape legible.

The paper starts with an updated theoretical exposition of the Lynchian approach to the image of the city and the underlying methodology of the initial study in Singapore. Based on data obtained from a variety of sources, the paper then attempts to evaluate *how* legible is the Orchardscape in Singaporean eyes and *what* are its most legible aspects. Further analyses of the data seek to identify differences in the Orchardscape legibility among different Singaporeans. In particular, age, income and language variables are postulated to exercise profound influences on the Singaporean legibility of the Orchardscape. This provides some background on the people *who* find the Orchardscape legible. The penultimate section examines the reasons for the legibility of the Orchardscape in Singaporean eyes in terms of both personal and landscape factors. The aim is to understand *why* the Orchardscape is (or is not) legible. The conclusion puts together the key arguments of the paper and indicates their contemporary relevance, particularly to rapidly developing urban areas.

The Image of the City: Theoretical Perspectives

This paper is theoretically embedded in two research traditions: the image of the city; and urban landscape studies. In conceptual terms, urban landscapes possess both tangible and intangible elements. Tangible elements are constituted by urban morphology and everyday events. Because they are expressed mainly in forms and patterns, these elements affiliate more closely with those elements discussed in Lynch's (1960) concept of legibility. On the other hand, landscape symbolism (Appleyard, 1979; Cosgrove and Daniels, 1988; Hull *et al*., 1994) and its spirit, known as *genius loci* (Norberg-Schulz, 1980), comprise the intangible elements of an urban landscape. They are largely humanistic and subjective; they are also often misunderstood by people from different

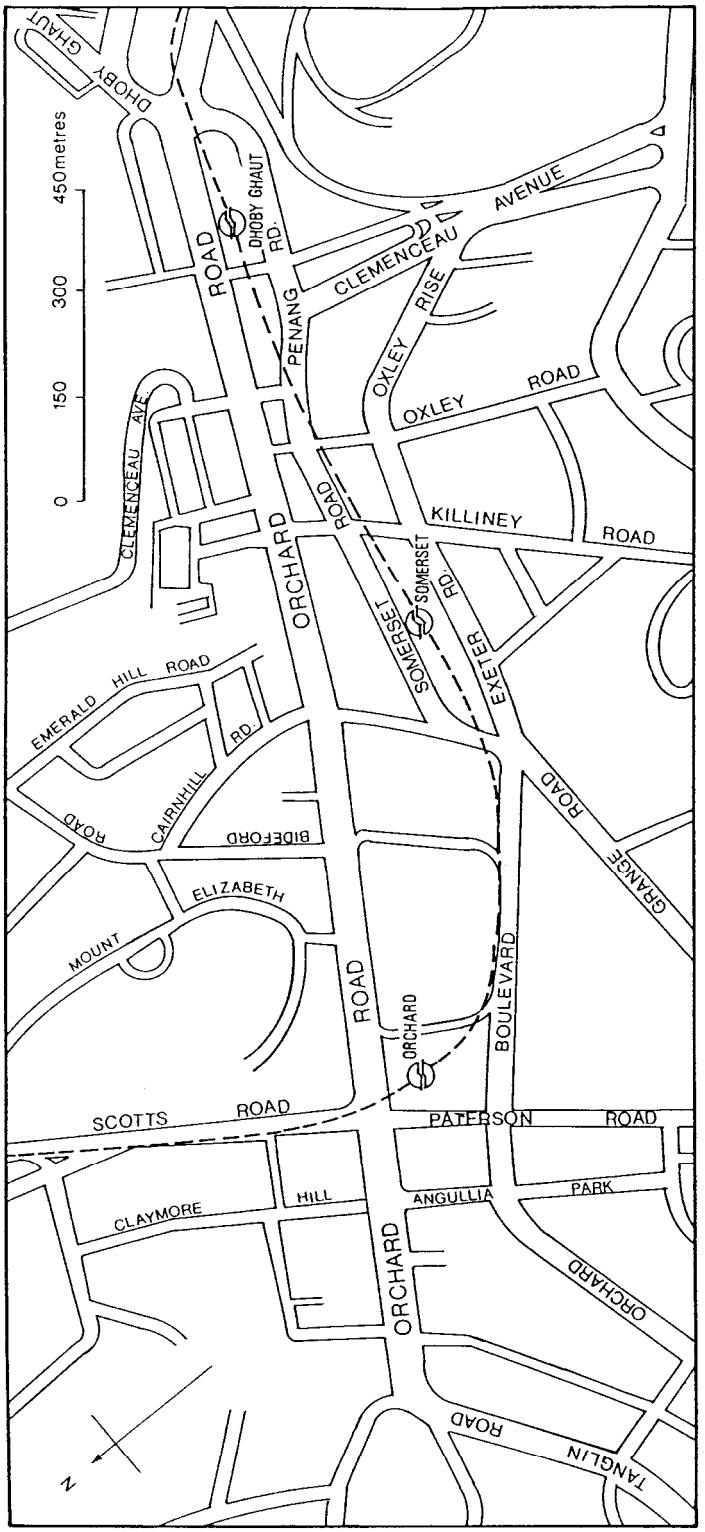

Figure 1. The Orchardscape, Singapore.

socio-economic and cultural backgrounds. It appears, in fact, that Lynch's (1960) legibility is concerned mainly with the tangible elements, whereas his concept of imageability addresses the intangible and symbolic elements of the urban landscape (Yeung and Savage, 1995).

This paper focuses specifically on the tangible elements in the legibility of the Orchardscape, particularly its morphology and structures that have contributed to its distinctive legibility. It assumes that individual observers (beholders) of the landscape have distinctively different personal and societal backgrounds. The interaction between the morphology of the landscape and its beholder gives rise to what is termed landscape cognition, the process of the mental construction of information received from the landscape that is translated into a cognitive image. Assuming the neural process of landscape cognition *per se* is constant, this paper argues that different inputs/sources from the urban landscape and its beholder are the primary factors shaping landscape images. There should be a positive relationship between personal and social factors and the legibility of the urban landscape.

Kevin Lynch's (1960) concept of *legibility* is used to operationalise the landscape image. Lynch (1960, pp. 2–3) defines the legibility of the cityscape as "the ease with which its parts can be recognized and can be organized into a coherent pattern", reflecting his concern with the architectural—or built—environment. In this study, the legibility of the Orchardscape is defined broadly as the potential ease with which Singaporeans could move around within the landscape of Orchard Road. Orchard Road is considered legible under three conditions:

(1) Potentially the interaction between the landscape and its inhabitants has created a mental schema in which places, buildings and landscape elements are easily identified.
(2) There is a relative ordered and coherent structure.
(3) Its inhabitants have a functional sense of place.

A legible landscape can

(1) help an individual interpret information and guide action;
(2) give him/her an important sense of emotional security;
(3) heighten the potential depth and intensity of human experience; and
(4) play a social role by furnishing the raw material for the symbols and collective memories of group communication (Lynch, 1960).

This paper argues that legibility has far more interactive components than those which Lynch (1960) and subsequent researchers in many disciplines have thought of. Legibility can be measured by the identifiability and structure of landscape elements, as well as its functional sense of place. The character and totality of an urban landscape can be broken down into distinctive sets of constitutive elements. Landscape is thus not just 'everything', but a choice of interconnected elements within a totality (Kobayashi, 1989). On the other hand, the perspective or cognition of individual beholders is equally important in understanding the image of the urban landscape. Such landscape imagery performs an existential role in guiding the day-to-day usage of the landscape by urban dwellers. By focusing on the human cognition of landscape, this theoretical framework is responding to the general upsurge of humanistic and perception studies in human geography (Tuan, 1975; Ley, 1985; Pocock, 1989; Bailly, 1993; Ira and Kollar, 1994), landscape design and planning (Berger, 1987; Downing, 1992; Hull, 1992; Purcell, 1992) and landscape aesthetics (Appleyard, 1981; Lang, 1988; Nasar, 1994).

Methodology of the Study

This study was based on a structured questionnaire survey and in-depth interviews. The structured survey aimed at ascertaining data on objective aspects (tangibles factors) of urban imagery, whereas in-depth interviews

shed light on the subjective aspects (intangible factors) of the Singaporean image of the Orchardscape. The survey interviews were carried out in mid 1991. Frequent field trips were made to Orchard Road in order to capture the temporal activities of the Orchardscape, such as National Day Celebration, Swing Singapore and Orchard Road Monthly Dance.

The survey questionnaire was structured into several sections. First, the respondents were asked to locate different buildings and/or places on a blank map indicating only Orchard Road and its immediate vicinity. Secondly, semantic differential questions were designed to probe their subjective evaluations of the Orchardscape. Thirdly, a blank piece of paper was handed out to the respondents who were requested to sketch a map of Orchard Road with as much details as possible (see Lynch, 1960; Jenkins and Walmsley, 1993). This is known as the cognitive map exercise in this paper. Finally, other data were collected from the respondents to facilitate subsequent analyses of independent variables.

Altogether 404 respondents were interviewed in the structured questionnaire survey ($N = 404$). These respondents were permanent residents or citizens of Singapore. Other than age and places of residence, there was no limit to the type of sub-samples in the structured survey. A multi-staged, areally stratified random sampling was adopted. The broad sample was further sub-divided, on the basis of their type of residence, into those staying in the public Housing and Development Board (HDB) flats ($n = 354$) and those in private flats and houses ($n = 50$) to allow for a fair representation of different Singaporeans in the sample.[1] The selection of public housing HDB New Towns was done through an areally stratified random sampling process.

Besides the structured interviews, this study also taps the insights of various people who are closely associated with aspects of the Orchardscape. These interviewees were selected on an *ad hoc* basis in order to elicit qualitative information. Several businessmen, an architect and a planner were interviewed to allow an understanding of the institutional factors shaping the Singaporean image of Orchard Road. A second group of subjects were chosen to express their individual subjective feelings of Orchard Road. Various methods were used during these informal interviews:

(1) Participant observation with interviewees in Orchard Road and in-depth interviews were essential steps in understanding their subjective and spontaneous feelings of the Orchardscape, especially the rhythms of time and space for everyday life situations.
(2) Photographs were used as surrogates of the Orchard Road area if interviewees were unable to 'participate' in the Orchard Road area during interviews. As suggested by Lynch, '{p}ictures can be chosen or doctored in various ways to uncover the landscape features that are strongly associated with feelings' (1976a, p. 113).
(3) In-depth interviews allowed respondents to use their own verbal categories to characterise their image of the Orchardscape, helped them 'see' for themselves the environment (Lynch, 1976b) and enabled individual-by-individual analyses.

How Legible is the Orchardscape?

The Singaporean legibility of the Orchardscape was operationalised by four questions in the structured questionnaire: the location of places; the identification of places for activities/services; the recognisability of landscape elements; and a cognitive map exercise. The question on the location of places was aimed at ascertaining the ease with which Singaporeans could locate certain places in Orchard Road. The finding that 85 per cent ($N = 344$) of all respondents did not have problems in locating places in Orchard Road clearly demonstrates the legibility of Orchard Road. Specifically, the legibility of the Orchardscape is measured by the accuracy of locating 14 different places on a

blank Orchard Road map provided.[2] As shown in Figure 2, these 14 places are Dynasty Hotel (now renamed Marriott Hotel), Mount Elizabeth Hospital, Lido Cinema (under construction at the time of the survey), Somerset Mass Rapid Transit (MRT) Station, Orchard Parade, Ngee Ann City (under construction at the time of the survey), Centrepoint, Peranakan Centre, Thai Embassy, Orchard Towers, Orchard Theatre, MacDonald House, Cockpit Hotel, and Koek Road.

Table l presents the overall result of Singaporeans' effort in locating these 14 places on the blank map provided. Generally speaking, respondents were able to locate most places well (for example, rank in descending order—Centrepoint, Lido Cinema, Somerset MRT station) except for the Orchard Parade Hotel and Koek Road. Clearly familiarity of places has a lot to do with the current relationship and location of places. Few respondents (14 per cent of all respondents) were able to locate correctly the Orchard Parade Hotel because its name had been changed prior to the survey (previously Ming Court Hotel). Many respondents were not aware of this change and therefore did not know what the new name represented. In the map exercise, however, respondents could locate Ming Court Hotel which shows that respondents were familiar with both the old hotel's name and its location. Koek Road was not 'legible' for many respondents (only l5 per cent of all respondents located it correctly) as it is not currently a well-known place, though it used to be a popular food centre between 1950s and the mid 1970s. This demonstrates that places of popularity can lose 'public memory' when their landscape character is changed over time.

Table 1 also shows that on the average each respondent was able to locate correctly up to seven or eight places (out of 14 places given) on the blank map provided. This finding is endorsed by the cognitive map exercise which was participated in by 291 respondents. Most respondents (89 per cent of 291 respondents) were able to label at least three items on their maps. The three most mentioned landmarks/features were Tang/Dynasty Hotel ($N = 231$), Wisma/Isetan ($N = 167$), and Lucky Plaza ($N = 129$) (Figure 3). The response dropped to 51 per cent for the location of 3–5 landmarks and 22 per cent for 6–10 landmarks. On average, each respondent mentioned five landmarks ($N = 1511$) in the cognitive map exercise (standard deviation ($S_d = 42$).

In order to see how Singaporeans 'use'/utilise the Orchardscape, respondents were asked to name a specific place/business concern for each of the following eight categories of activities/services: department store; supermarket; fast-food outlet; boutique/clothes; restaurant; hotel; disco/lounge; and cinema. The assumption here is that if a place is highly legible, it should have a higher frequency of identification by Singaporeans. The choice of these categories also reflects the dominant functions of the Orchardscape. The findings in Table 2 reflect that a variety of places were suggested for each category of activity/service. Altogether respondents identified 18 department stores, 11 supermarkets, 19 fast-food outlets, 17 boutiques, 28 restaurants, 18 hotels, 19 discotheques/lounges and 5 cinemas in the Orchardscape. This result suggests that the Orchardscape is highly legible because of the wide variety of specific shops, hotels, cinemas and so on that people have identified. The buildings/activities also indicate a variety of landscape cues that could have enhanced Orchard Road's legibility amongst Singaporeans.

Despite the overall wide variety of activities/services, the survey shows that not all of these categories were equally legible amongst Singaporeans. The higher percentage of non-responses indicates that an activity or a service is less legible to respondents. Conversely, a lower percentage of non-responses indicates a higher awareness (legibility) of places among respondents. The legibility of these eight categories of activities/services can thus be ranked, (in descending order): as department stores (14 per cent non-responses), cinemas (24 per cent), hotels (29 per cent), fast-food outlets (34 per cent), supermarkets (37 per cent),

Table 1. Results of locating 14 places in Orchard Road correlated with landscape factors

Name of location	Sample size	Number of correct location	Rank	Distance from MRT	Volume of people	Functional importance
1. Dynasty Hotel	404	287	4	4	2	3
2. Mt Elizabeth Hospital	404	277	5	9	4	7
3. Lido Cinema	404	321	2	7	5	5
4. Somerset MRT Station	404	302	3	1	3	1
5. Orchard Parade	404	57	14	14	11	10
6. Ngee Ann City	404	167	10	4	14	14
7. Centrepoint	404	363	1	3	1	2
8. Peranakan Centre	404	198	8	2	8	9
9. Thai Embassy	404	197	9	10	13	13
10. Orchard Towers	404	151	11	12	10	4
11. Orchard Theatre	404	269	6	8	5	6
12. MacDonald House	404	141	12	6	12	12
13. Cockpit Hotel	404	214	7	11	9	8
14. Koek Road	404	60	13	12	7	11
				$r = 0.615$	$r = 0.781$	$r = 0.732$

Note: All correlation coefficients are based on Spearman's rank method, statistically significant at one-tailed $p = 0.05$.
Source: Based on survey data and fieldwork.

Table 2. Results for identifying places in Orchard Road for eight categories of activities/services

Category for recall	Sample size (*N*)	Ranking of places in each category (percentages)						Non-response (percentages)
		First		Second		Third		
1. Department store	404	Tangs/Studio	26	Wisma/Isetan	17	Centrepoint	11	14
2. Supermarket	404	Cold Storage	36	Yaohan	14	Wisma	8	37
3. Fast-food outlet	404	Centrepoint	14	Wisma	14	Far East Plaza	12	34
4. Boutique/Clothes	404	Tangs/Studio	9	Wisma/Isetan	9	Centrepoint	8	51
5. Restaurant	404	Centrepoint	5	Crown Prince	5	Plaza Singapura	3	63
6. Hotel	404	Mandarin	28	Dynasty	20	Hyatt	6	29
7. Disco/Lounge	404	Fire: Orchard Point	7	Library: Mandarin Hotel	4	Brannigan's: Hyatt Hotel	4	74
8. Cinema	404	Lido	33	Orchard	27	Cathay	14	24

Source: Based on survey data.

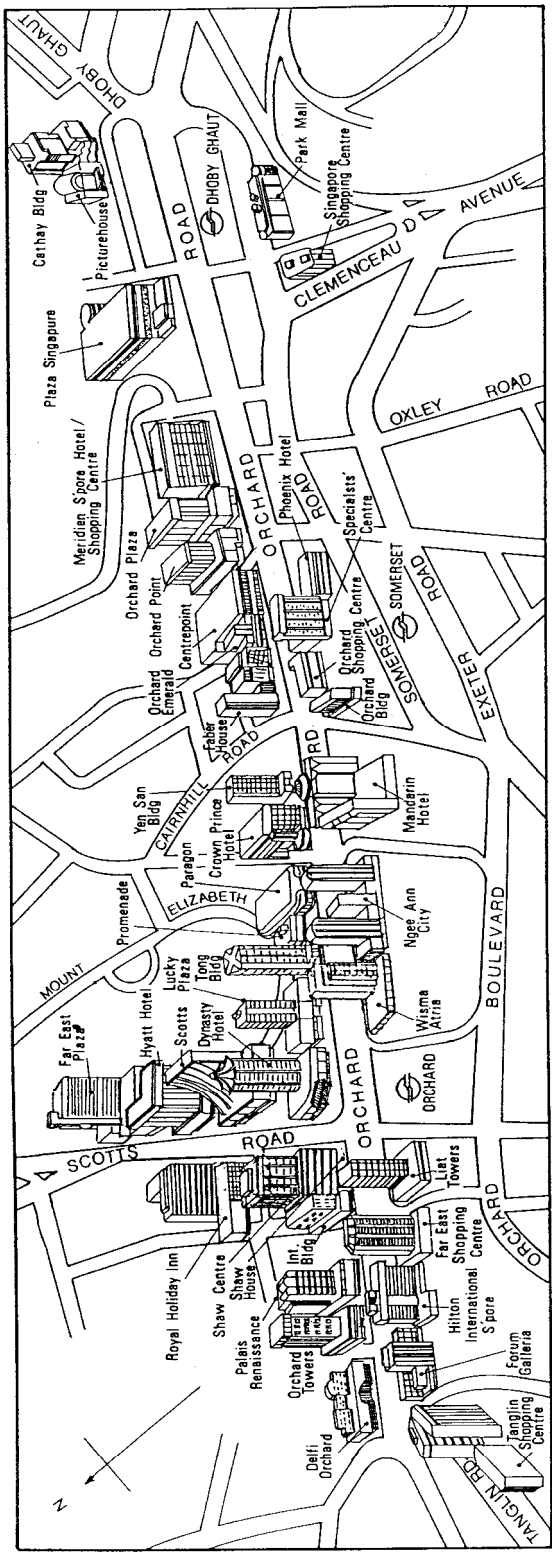

Figure 2. Major landmarks and buildings in the Orchardscape, Singapore.

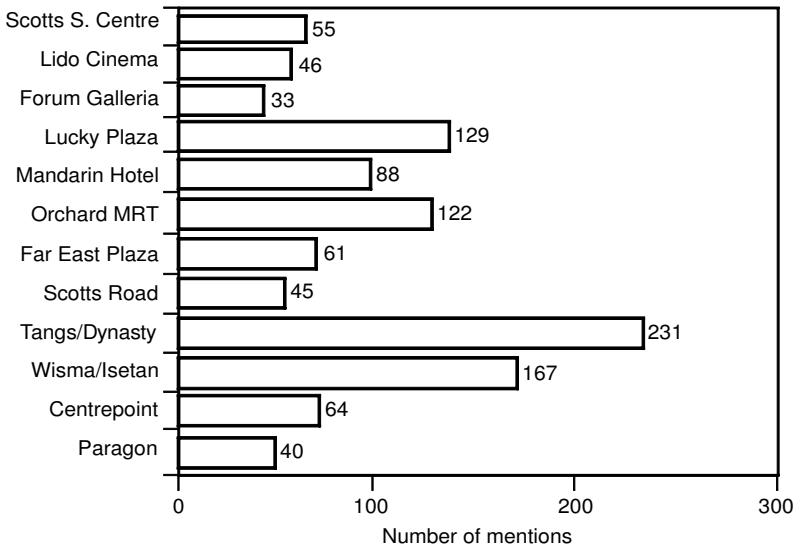

Figure 3. Top 12 artefacts in Orchard Road, Singapore, identified in the cognitive map exercise. *Note:* :-Top 12 items ($N = 1035$) represent 68.5 per cent of total items mentioned ($N = 1511$). *Source:* map exercise data.

boutiques (51 per cent), restaurants (63 per cent) and discotheques/lounges (74 per cent) (see also Table 2). Put in another way, department stores, cinemas and hotels are the most legible buildings/features in the Orchardscape, while discotheques/lounges, restaurants and boutiques are the least legible features along Orchard Road.

Several factors explain the legibility of department stores, cinemas and hotels. First, the establishments with high legibility in Orchard Road have been in the area for long periods of time. These landmarks are Cold Storage (supermarket: 1905), Tangs (department store: 1958), Lido (cinema: 1958) and the Mandarin Hotel (hotel: 1973). Despite the fact that at the time of the survey Lido cinema had been demolished, it remained a highly legible landmark in the Orchardscape, thus showing the enduring influence of established landmarks. Secondly, these establishments have a wide public appeal. More people are likely to visit a cinema, hotel or a large department store than a specific boutique, restaurant or lounge. Thirdly, these cinema, hotel and department stores are generally large establishments encompassing either major buildings or at least large spaces in major buildings. They are thus more visible than a boutique or discotheque which is 'hidden' within a labyrinth of shops in the numerous shopping complexes along Orchard Road.

A highly legible landscape is said to have easily recognised elements (Rapoport, 1984). Five elements—a path, an edge, a district, a node and a landmark—were identified by Lynch (1960) as enhancing the legibility of a cityscape. Based on several questions and the cognitive map exercise, these elements were tested in this study as to whether they were evident in the Singaporean cognition of the Orchardscape. From the responses, the identification of a district and edge is not apparent, a reflection no doubt of the reality of the Orchardscape. Three elements are highly recognised in the Orchardscape: landmarks, nodes and paths.

Landmarks are defined as visible physical objects in a landscape such as a building, a store, or a mountain (Lynch, 1960). The Orchardscape reveals few physical landscape landmarks. All the landmarks in Orchard Road are man-made features (see Figure 2).

Of all the features in Orchard Road, buildings were the most identified landmarks. C.K. Tang/Dynasty Hotel (with 65 per cent 'votes' from all respondents) clearly emerged as the dominant landmark in the Orchardscape, followed by Wisma Atria (15 per cent) and Mandarin Hotel (6 per cent). This result was also supported by findings from the cognitive map exercise. C.K. Tang/Dynasty Hotel ($N = 231$) was the most identified building in Orchard Road, followed by Wisma/Isetan (167), Lucky Plaza (129) and the Orchard MRT (122).

Besides landmarks, the Orchardscape is also identified by nodes. Nodes are points, the strategic spots in a city into which an observer can enter; they are also the intensive foci to and from which he/she is travelling (Lynch, 1960). Based on the respondents' recognition of Orchard Road, three nodes can be identified. These are the Scotts–Paterson Roads junction (as chosen by 43 per cent of all respondents), Wisma Atria/Orchard MRT (19 per cent) and the pedestrian crossing-point near Centrepoint (16 per cent). This finding is further confirmed in the cognitive map exercise. Of the 291 maps drawn, 177 (61 per cent) placed the centre of activity in Orchard Road around the Scotts–Paterson Roads junction (see Figure 2). This indicates that the legibility of the Orchardscape is enhanced by nodes.

Orchard Road dominates the Orchardscape as the main pathway of shopping, tourism and entertainment (see Figure 2). Paths are the channels along which the observer customarily, occasionally or potentially moves (Lynch, 1960). In the cognitive map exercise, 256 (88 per cent) out of 291 maps had buildings, hotels and shopping centres drawn along Orchard Road. This reveals that Orchard Road is the central place of shopping and entertainment for Singaporeans. Orchard Road also remains as the central link between different areas in Singapore. To the north of Singapore, Orchard Road is linked to Serangoon Road (a major road to many housing new towns in the north-east direction, such as Serangoon, Hougang) and Scotts Road (leading to another cluster of new towns including Toa Payoh, Bishan and Ang Mo Kio). To the south, Orchard Road joins with the Central Business District (CBD) of Singapore—Shenton Way. Orchard Road, together with Shenton Way, is under the Restricted Zone Scheme that charges incoming vehicles during busy hours. To the east, one can drive from Orchard Road to East Coast Parkway (ECP) that goes all the way to Changi Airport. Orchard Road also links roads (Tanglin Road and Holland Road) heading west. The opening of the Central Expressway (CTE), which cuts through Orchard Road, adds further to Orchard Road's overall legibility in the perception of Singaporeans eyes.

The centrality of Orchard Road as a path in the Singaporean cognition can also be ascertained by the number of bus routes that pass through it. Forty-two bus numbers ($N = 545$) were suggested by respondents. Orchard Road is a highly legible path since Singaporeans generally know how to get there by bus, unlike many other less legible roads in Singapore. The top 10 bus numbers, however, account for 70 per cent ($N = 383$) of all bus numbers mentioned by the respondents. The spatial distribution of these top 10 bus routes is highly *place-specific* in that each particular bus route is legible only to Singaporeans residing in different parts of Singapore. For example, bus No. 182 is predominantly legible to residents in Woodlands and bus No. 64 is more legible to residents in Bukit Merah and Geylang. This suggests a functional relationship in that bus routes have become legible because people use them frequently. The spatial distribution of the top 10 bus routes is also *directionally-biased*. Different new towns and housing areas in Singapore are served by buses to Orchard Road from different directions: north (106, 111, 182), east (7, 14, 64, 65), south (14, 16, 143) and west (7, 143, 174, 190).

Who Finds the Orchardscape Legible?

Cross-tabulations of the survey data show that Singaporeans have different legibilities

of the Orchardscape. Three independent variables, age, income and language, are particularly significant in this regard. In terms of age, younger respondents aged between 15 and 19 years seemingly have more trouble (34 per cent) locating places in Orchard Road than older respondents from 20–49 years old (9–13 per cent) (see Table 3). This result supports in part the view that youngsters at the learning stage of their cognitive development (Piaget, 1954) are likely to have more problems locating places. It also shows that older people with greater experience and familiarity have a better grasp of the Orchard Road area.

Age also plays an important role in shaping one's specific identification of landscape features. In Table 3, the relationship between age and place identification is depicted. The general trend is that the Singaporean's ability to locate and identify places in the Orchardscape increases with increasing age. With regard to department stores, however, there were some differences in age and legibility of these places. C.K. Tang is more legible to older Singaporeans, a reflection no doubt of the store's long-established history, its functional relevance to and patronage by older Singaporeans. The Mandarin Hotel and the Lido Cinema (now reconstructed) are also more legible to older Singaporeans since they are buildings in Orchard Road with a relatively long history. The choices of landmarks and nodes was found to vary between different age groups. More youngsters (31 per cent) chose Wisma Atria as a landmark than the elderly (5 per cent). More youngsters (36 per cent) also chose Wisma Atria/Orchard MRT as a node than older respondents (19 per cent) (Table 3). This is because the building has become a 'playground' for youngsters. Wisma Atria/Isetan, nevertheless, is more legible to younger generation Singaporeans because many teenagers are used to 'hanging out' and meeting at this shopping complex—partly because of its accessibility to the Orchard Road MRT by an underground link.

The Orchardscape is more legible to the higher-income and well-educated Singaporeans who frequent Orchard Road. Respondents in the higher-income group (with more education) tended to patronise Orchard Road more often than those of the lower-income (less-educated) group. The higher-income group thus found fewer problems in locating places in Orchard Road (4–5 per cent) compared with the lower-income group (21 per cent). This is not surprising since 42 per cent of the lower-income group expressed unfamiliarity with the Orchardscape. Using the cinema-theatre as an example, people in the higher-income levels, showed a lower percentage of non-response ($r = -0.744$; significant at 1-tailed $p = 0.05$). The Lido theatre was thus more legible to higher-income Singaporeans partly because it was solely an English movie theatre in a high-class area.

Income-group differentials are also obvious in the choice of landmarks and nodes. More respondents from the higher-income group considered C.K. Tang (department store) as *the* landmark in Orchard Road. This is evident in a high correlation coefficient ($r = 0.886$; significant at 1-tailed $p = 0.05$) between income levels and the percentage of respondents choosing C.K. Tang as a landmark. This finding partly reflects the fact that higher-income Singaporeans could afford to patronise C.K. Tang more often. More respondents from the lower-income group, however, chose Wisma Atria/Orchard MRT as a node. There is a highly inverse relationship ($r = -0.964$, significant at l-tailed $p = 0.05$) between income levels and the percentage of respondents choosing Wisma Atria/Orchard MRT as a node. Lower-income Singaporeans normally take the MRT to Orchard Road. Since Wisma Atria is linked to the station, it has become highly legible to the MRT users. On the other hand, higher-income Singaporeans identified clearly the Scotts–Paterson Roads junction ($r = 0.75$, significant at 1-tailed $p = 0.05$) because they were used to driving to Orchard Road and hence this road function was very legible to them.

Differences in the legibility of the Orchardscape were also found among respon-

Table 3. Relationship between age and correct locations for 14 places in Orchard Road

Location in Orchard Road	Age Group									
	15–19		20–29		30–39		40–49		Total	
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage
1. Dynasty Hotel	32	50	96	76	101	76	58	73	287	71
2. Mt Elizabeth Hospital	22	34	90	71	101	76	64	80	277	69
3. Lido Cinema	33	52	106	83	115	86	67	84	321	79
4. Somerset MRT Station	49	77	98	77	94	71	61	76	302	75
5. Orchard Parade	1	1	25	20	19	14	12	15	57	14
6. Ngee Ann City	15	23	56	44	60	45	36	45	167	41
7. Centrepoint	58	91	115	91	115	86	75	84	363	90
8. Peranakan Centre	17	27	73	57	73	55	35	44	198	49
9. Thai Embassy	9	14	64	50	75	56	49	61	197	49
10. Orchard Towers	11	17	54	43	54	41	32	40	151	37
11. Orchard Theatre	36	56	93	73	90	68	50	63	269	67
12. MacDonald House	14	22	39	31	51	38	37	46	141	35
13. Cockpit Hotel	16	25	73	57	81	61	44	55	214	53
14. Koek Road	0	0	11	9	22	17	27	34	60	15

Total sample size is 404.
Source: Based on survey data.

dents from different language groups. The non-English-educated groups (20–33 per cent) had more than double the problem in locating places in Orchard Road than the English-educated group (10 per cent). One obvious reason is that almost all buildings, landmarks and road signs in Orchard Road are labelled in English and thus are not easily understood or identified by the non-English-educated groups. Most landscape cues (signs, bus directories and public street maps) in Orchard Road are written in English, non-English-educated Singaporeans do not find the landscape 'readable' and legible.

Age, income and language *biases* in the legibility of the Orchardscape confirm the results from other studies on urban cognition (Appleyard, 1970; Pocock, 1976). The younger and lower-income Singaporeans found Wisma Atria and Orchard MRT Station their centre of activities and hence had a higher legibility of this area in Orchard Road. Tangs and the Scotts–Paterson junction served better as foci for the older and higher-income Singaporeans.

Why is the Orchardscape Legible?

To explain the legibility of the Orchardscape, a dialectical process between human agency and the landscape is considered. The degree of landscape legibility is defined by its inhabitants. Since every human being can be a geographer (Lowenthal, 1961; Tuan, 1990), each person defines his/her legibility in terms of direct movements and personal experiences in space. Having identified what is legible in the Orchardscape and who finds it legible, this paper aims to explain its legibility in terms of personal and landscape factors. Both sets of factors must be examined in order to arrive at a more valid and accurate assessment of the Orchardscape legibility because the interrelationships of both sets of factors cannot be isolated. Personal factors include experience, spatial proximity and mode of transport. Landscape factors refer to landscape cues, structure and functions.

Experience is one of the most important personal factors affecting legibility. Generally speaking, the more experience (i.e. greater utilisation) an individual has with a landscape, the more legible the landscape becomes. This is because the image of a landscape "is built up as a result of all past experience of the possessor of the image" so that "part of the image is the history of the image itself" (Boulding, 1956, p. 6). Out of 344 respondents who found Orchard Road legible, 37 per cent (the highest percentage) cited their familiarity with Orchard Road. By 'familiarity', respondents meant their experience and personal encounters with Orchard Road. This confirms that 'familiarity and interest' are important factors affecting one's urban image (Karan and Bladen, 1982).

Experience is also related to age and the frequency of visits. *Ceteris paribus*, as a Singaporean gets older, he/she tends to have more encounters with Orchard Road and thus the area becomes more legible because of greater personal familiarity and experience. With the exception of Dynasty Hotel (now Marriott Hotel), Somerset MRT station and Centrepoint (identified as one of the 'playgrounds' of younger Singaporeans), the rest of the 14 locations have increasing percentages of correct location with increasing age of respondents. Those who visited Orchard Road fairly frequently (for example, at least 2–3 times a month) could also identify more places for the eight categories of activities/services.

Geographical distance from Orchard Road is another determinant of the respondents' legibility of the Orchardscape. Proximity to Orchard Road was based on the respondents' residence (see Table 4). With the exception of Peranakan Centre, a distance-decay relationship is found to be statistically significant for 14 locations in the Orchardscape. In other words, the further a Singaporean stays from Orchard Road, the lower is his number of correct locations for the 14 places given. This is probably because Singaporeans located residentially nearer to Orchard Road (in areas such as Toa Payoh and Stevens Road) patronise Orchard Road more often than those staying further away (such as in Jurong West, Upper Serangoon), and so the

former group is more familiar with Orchard Road. Since those staying further away tend to come from the lower-income group, the spatial constraint is defined more in terms of relative distance (for example, transport costs). Spatial proximity (and distance-decay effect) is thus considered as a constraint in one's familiarity of the Orchard landscape.

Finally, the mode of transport is found to have a direct bearing on the Singaporean's legibility of the Orchardscape. It is assumed here that Singaporeans who drive to Orchard Road require a higher legibility (greater reliance on landscape cues) of the area than those who take the MRT. This is because the former group needs a legible cognitive landscape image for directions and parking (Appleyard *et al.*, 1967), while the latter group, riding an MRT train for instance, requires less-specific directional information. The ranking for the mode of transport in descending order by the authors prior to the survey is therefore foot, car (driving), motor-cycle, bus, MRT, taxi and rider. Except for the Somerset MRT station, Orchard Parade, Ngee Ann City and Centrepoint, this ranking of the mode of transport highly correlated with the percentages of correct locations (between $r = 0.703$ to $r = 0.929$; statistically significant at 1-tailed $p = 0.05$) (see Table 4).[3] This result implies that respondents using specific private and independent modes of mobility (such as foot, car) required better legibility of the Orchardscape and hence they were able to locate the 14 places along Orchard Road more correctly.

In terms of landscape factors, it is generally accepted that the more landscape cues available, the greater the legibility of a landscape. Landscape cues refer to those landscape features (such as landmarks, signs, names) or attributes (such as colour, smell) that give an individual a sense of direction and help to facilitate his/her movement in the landscape. These cues (culturally specific) must be understood because they provide the locational settings within the environment; they indicate directions and guidance that govern appropriate behaviour; and they ease movement as well as decrease people's anxiety in moving around, thus making co-action possible (Rapoport, 1984).

Respondents identified landmarks as the most important landscape cues in Orchard Road. For 20 per cent of all respondents, buildings as landmarks contributed most to legibility. Visual cues such as unique architecture (56 per cent of total responses), unique colour (13 per cent) and prominent location (8 per cent) are dominant reasons why buildings are identified as landmarks. These factors correspond well with findings made by previous studies (Sholl, 1992; Kempley, 1994; Nasar, 1994) that the colour, texture, style, shape, symbolic status and spatial separation of buildings were the factors of enduring image and landmarks. A further 12 per cent found other landscape cues such as the availability of street directories and roadside signs as increasing the ease of locating places. Signboards (in English) and road directories are especially important to drivers. Building names are also useful landscape cues in enhancing legibility. The Lido theatre is a good example. Although it was demolished in 1990, it remained as a significant landscape cue (situated at the Scott–Paterson Roads junction) in the Singaporean legibility of the Orchardscape (see Tables 1 and 3).

The structure of the Orchard Road landscape provides another set of cues that facilitates the Singaporean's mental organisation of Orchard Road. The structure of the Orchardscape is operationalised through three variables (order, coherence and simplicity) that are known as predictors of environmental image (Lynch, 1960; Kaplan, 1973; 1987; Arnheim, 1977; Smith, 1988). Order refers to the 'completeness' and 'symmetry' of the Orchardscape. Of all respondents, 80 per cent considered Orchard Road as either 'quite ordered' or 'very ordered' (see Table 5). Cognitive maps drawn by respondents also exemplify an 'orderly' perception of the Orchardscape. This is not surprising as Orchard Road is a simple straight road with several minor roads branching from the main road. Major buildings are established in a linear pattern on two sides of the road in a more-or-less symmetrical way.

Table 4. Correlation coefficients between percentages of correct locations in Orchard Road and personal factors

Name of location	Sample size (N)	Residence (distance)[a] (r_s; $df = 10$)	Frequency of visits (r_s; $df = 4$)	Income level (r_s; $df = 6$)	Education level (r_s; $df = 4$)	Mode of transport[b] (r_s; $df = 5$)
1. Dynasty Hotel	404	0.548	1.00	0.976	0.943	0.857
2. Mt Elizabeth Hospital	404	0.804	0.943	1.00	0.943	0.829
3. Lido Cinema	404	0.555	1.00	0.952	0.986	0.937
4. Somerset MRT Station	404	0.755	0.943	0.667	0.941	0.286[c]
5. Orchard Parade	404	0.596	0.943	0.807	0.943	0.288[c]
6. Ngee Ann City	404	0.682	0.943	0.857	1.00	0.577[c]
7. Centrepoint	404	0.631	0.943	0.611[c]	0.928	0.45[c]
8. Peranakan Centre	404	0.49[c]	0.943	1.00	0.943	0.786
9. Thai Embassy	404	0.72	1.00	0.976	0.943	0.893
10. Orchard Towers	404	0.573	0.829	0.97	0.986	0.893
11. Orchard Theatre	404	0.636	0.943	0.81	0.829	0.721
12. MacDonald House	404	0.643	0.943	0.929	0.986	0.821
13. Cockpit Hotel	404	0.699	0.771	0.976	1.00	0.893
14. Koek Road	404	0.839	0.257[c]	0.905	0.829	0.786

[a]The independent variable; place of residence is ranked according to increasing geographical distance from Orchard Road as: Orchard Road, Stevens Road, Pandan Valley, Bukit Merah, Toa Payoh, Geylang/Aljunied, East Coast, Bedok, Upper Serangoon, Hougang, Jurong East, Woodlands.

[b]The mode of transport is ranked according to the importance of legibility as: walk, car (driving), motor cycle, bus, MRT, Taxi, and rider.

[c]All correlation coefficients (r_s) are based on Spearman's rank method, statistically significant at one-tailed $p = 0.05$ except with [c].

Source: Based on survey data and fieldwork.

Table 5. Results of semantic differential questions on 17 attributes of Orchard Road

Adjectives[a]	Scale 1		Scale 2		Scale 3		Scale 4		Scale 5		
	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Number	Percentage	Total
1. Fast pace	132	32	136	34	118	29	16	4	2	1	404
2. Variety	11	3	27	7	30	7	153	38	183	45	404
3. Crowded	217	54	127	31	37	9	20	5	3	1	404
4. Colourful	2	1	8	2	47	11	150	37	197	49	404
5. Lively	2	1	5	1	30	7	144	36	223	55	404
6. Safe	2	1	31	8	74	18	175	43	122	30	404
7. Clean	1	0	9	2	34	9	191	47	169	42	404
8. Beautiful	1	0	3	1	73	18	141	35	186	46	404
9. Interesting	1	0	26	6	92	23	162	40	123	31	404
10. Pleasant	3	1	10	2	88	22	208	51	95	24	404
11. Unique	23	6	75	18	99	25	169	42	38	9	404
12. Modern	0	0	5	1	61	15	215	53	123	31	404
13. Developed	0	0	0	0	39	10	183	45	182	45	404
14. Universal	1	0	9	2	39	10	104	26	251	62	404
15. Ordered	4	1	45	11	31	8	215	53	109	27	404
16. Simple	6	1	67	17	36	9	165	41	130	32	404
17. Recognisable	2	1	18	4	22	5	202	50	160	40	404

[a]These 17 attributes were originally asked by using opposite adjectives.
Source: Based on survey data.

'Coherence' is defined by the degree that the elements of the Orchardscape are 'hanging together'. About 90 per cent of all respondents found coherence in the Orchardscape. This sense of coherence is manifested in the linear interconnections (the Orchard Mall and pedestrian walks) among four centres of gravity in Orchard Road (along Scotts Road, around Wisma Atria/Orchard MRT, around Centrepoint/Somerset MRT and around Plaza Singapura/Dhoby Ghaut MRT). As with the spatial organisation of today's cities, Orchard Road is pedestrian-friendly on the assumption that "people like to be on foot as observers and participants in the urban scene" (Heckscher, 1977, p. 29). Pedestrian walks are further reinforced by government efforts to improve both the walkway and tree shelters along the Orchard Mall (Yeung and Savage, 1995).

The last element of the Orchardscape structure is its simplicity. 'Simplicity' refers to the ease of identifying elements in the Orchardscape. Of all respondents, 73 per cent referred to the Orchardscape as simple and user-friendly (see Table 5). This simplicity is partly reflected in the lack of winding roads/alleys and the fact that major buildings are neatly arranged on either side of Orchard Road. Orchard Road, as the main thoroughfare of retail (such as Tangs, Wisma, Centrepoint), hotels (such as Marriott, Mandarin), fast-food outlets (such as MacDonalds, Burger King, Kentucky Fried Chicken), cinemas (such as the former Lido, Picturehouse and Cathay Cinema), and entertainment (including Fire discotheque, Where Else, Fame), has provided respondents with a sufficient variety of visible landscape cues (landmarks, nodes, paths, signs, directory), thereby enhancing its legibility.

Functional landscape factors also explain the legibility of the Orchardscape. Three functional factors explain whether a place in the Orchardscape becomes legible: the volume of people, its distance from the MRT station, and the functional importance of the place. Table 1 shows that hotels, shopping centres, cinemas, the hospital and the MRT stations were easily located because these buildings cater to a higher volume of people ($r = 0.781$). This endorses the view that places catering to a higher volume of people are legible to more people. Distance to the nearest MRT stations also explains why certain places in the Orchardscape are more legible in the Singaporean cognition (see Table 1). The survey shows that the nearer a place to an MRT station, the more legible the place is ($r = 0.615$; statistically significant at 1-tailed $p = 0.05$), a reflection that most respondents (50 per cent) went to Orchard Road by the MRT. Hence, Centrepoint (Somerset MRT station) and Marriott Hotel (Orchard station) which are near to MRT stations, are more legible than those locations further away from the MRT stations (such as Orchard Towers).

The functional/utilitarian aspect of Orchard Road also defines one's sense of place in the Orchardscape. A well-utilised landscape tends to heighten one's sense of place and makes the landscape more legible because "function, as the meaning attached, is the essence of geography cognized" (Jakle, 1987, p. 158). Singaporeans derive functional place utility from Orchard Road. The great variety of attractive things that Orchard Road offers can be said to enhance the area's legibility. The cognitive map exercise demonstrates the attractions and services of Orchard Road in terms of entertainment, shopping, food and people. Shopping centres/hotels (49 per cent) and the crowds (13 per cent) were reported by respondents as the two most attractive things along Orchard Road. The role of Orchard Road as an arena for entertainment—place for fun, enjoyment, gathering and celebration should not be overlooked.

Conclusion

In the Singaporean perception, the Orchardscape is a legible landscape. The sound of heavy traffic at the Scotts–Paterson Roads junction, the smell of beef-noodles at Picnic Food Court and chicken-rice/*kuay teow* at Cuppage Centre, the crowded feeling during the monthly dance and the week-ends, and other visual stimuli all lead to the more

sensually appealing Orchardscape. Generally speaking, most Singaporeans find no difficulties moving around and locating places in the Orchardscape (85 per cent of respondents). Centrepoint, Lido Cinema, Somerset MRT station were more correctly located than 14 other locations. Department stores (Tangs), cinemas (Lido) and hotels (Mandarin) are the most legible features in the Orchardscape. Not surprisingly all these activities were identified as specific buildings in the landscape and, hence, serve as landmarks. In contrast, discotheques, boutiques and restaurants are the least legible landscape features. This is because most of them are found in shopping centres or hotels and are not easily identified as landmarks in the Orchardscape.

With regard to landscape elements, C.K. Tang/Dynasty Hotel (65 per cent of all respondents) emerged as the landmark of Orchard Road whereas the Scotts–Paterson Roads junction (43 per cent of all respondents) was the most identified node. Of course, Orchard Road (88 per cent of map responses) is itself a path in the dense transport network of the central area. These findings, however, reveal significant variations among Singaporeans based on differences in age, income and language in their legibility of the Orchardscape. This study has found the Orchardscape to be more legible to the older, higher-income and English-educated Singaporeans.

The overall ease of movement among Singaporeans in the Orchardscape can be explained partly by personal attributes (Heinemeyer, 1967; Appleyard, 1970; Pocock, 1976; Karan and Bladen, 1982; Romann, 1989) such as experience (average $r = 0.89$), spatial proximity (average $r = 0.65$) and mode of transport ranked according to legibility (average $r = 0.71$). This legibility can also be explained by landscape cues (Lynch, 1960; Sholl, 1992) such as landmarks (such as the C.K. Tang/Dynasty Hotel), nodes (such as the Scotts–Paterson junction), paths (such as the main Orchard Road), landscape structure such as order (80 per cent of all respondents), coherence (90 per cent of all respondents) and simplicity (73 per cent of all respondents), as well as other functional cues such as distance to the MRT stations ($r = 0.62$), signs, buses and road directories.

This paper has shown that both factors pertinent to Singaporeans (personal and societal) and the Orchardscape (tangible and intangible) are equally important in influencing the Singaporean landscape cognition. Future studies of landscape images, in particular in rapidly developing urban areas, should therefore consider both personal and landscape, tangible and intangible influences. The legibility of Orchard Road is a composite outcome of landscape elements (landmark, node, path) and identified places in the Orchardscape. This study has also endorsed past works that found experience as an important factor affecting legibility (for example, Karan and Bladen, 1982; Spector, 1982). Two other commonly overlooked factors—spatial proximity and mode of transport, nonetheless, are found to be important in this study. On the landscape factors, the relevance of visual cues (such as signs, landmarks) and functional importance in enhancing legibility supports results in other studies (Lynch, 1960; Nasar, 1990). This study has also shown the usefulness of statistical data (from the structured survey and cognitive map exercise) in portraying the legibility of the Orchardscape.

The findings of this paper suggest relevance in several ways. First, in response to the call for landscape geography and place as the central concern in humanistic geography (Relph, 1989; Hull *et al.*, 1994), this paper demonstrates the significance of understanding urban landscape cognition. The intangible elements (such as symbols, character, aesthetics) of a city, though difficult to ascertain tangibly and statistically, are integral components of residents' cognition of the city. In this case, the cognition is translated in terms of legibility. Much more work needs to be done to understand the intangible elements of the urban landscape. These elements constitute the imageability of the urban landscape (Yeung and Savage, 1995).

Secondly, behaviourally oriented studies in geography, though having an established tradition dating all the way back to the early 20th century, are still "the road not taken, the road still beckoning" (Kates, 1987). Cognitive studies can shed light on the spatial decision-making and behaviour of individuals (Lowenthal, 1961; Ira and Kollar, 1994; Livingstone *et al.*, 1994). Its proliferation in cultural and humanistic geography has been a rather recent phenomenon. This study of the Singaporean image of the Orchardscape is an elaboration of the geographical interest in the image of landscape. A relevant methodological implication of this study is that an understanding of the image of the city by employing techniques from cultural and humanistic geography can provide a more fruitful and insightful area for future research.

Thirdly, the applicability of cognitive studies in guiding future urban planning and design for a better living and working environment must be recognised (Lynch, 1984; Rapoport, 1984; Hull, 1992; Gosling, 1994; Nasar, 1994). By incorporating the Singaporean image into future planning for Orchard Road, studies of this sort facilitate the public involvement in landscape planning (Mitchell, 1989; Hull *et al.*, 1994). This is because

> {e}xperts can only lay out the choices; you must help make the decisions. No one is more qualified to decide social, moral, and economic issues… than you the individual citizen. This privilege and this burden are yours in a democratic society. (Revelle and Revelle, 1981, p. 735)

Legibility has been shown to be affected by landscape cues, structure and functions. This finding implies that a legible city requires more landscape cues, order and coherence. The grid pattern of urban planning in America is an example of how legibility can be enhanced by simple and coherent city structure. This principle can also be applied to the design of new towns in rapidly developing urban areas. For example, many new towns in Singapore (such as Ang Mo Kio) are apparently not very legible to many visitors. The arrangement of blocks of flats is chaotic and incoherent, making identification difficult for non-residents. There are also insufficient visual and landscape cues (such as maps and directories) to heighten the legibility of many places in Singapore. A landscape without sufficient cues may totally disorientate visitors. Good legibility gives people an important sense of emotional security in their movements within a landscape. In this context, future urban design in rapidly developing areas or towns should pay more attention to cues and structures to ensure a city of higher legibility.

Notes

1. In 1990, there were 650 000 residential units provided by the HDB to accommodate some 88 per cent of Singapore's 2.87m population (Ministry of Communications and Information, n.d.). Therefore, 350 (400×0.876) sample respondents were selected from the HDB dwellers, whereas 50 were from private apartments and houses.
2. Only relative locations of each place to one another are counted because it is these relative locations that ultimately matter in their movements in the Orchard Road area.
3. For Centrepoint, its popularity to Singaporeans is so high that it is legible to everyone irrespective of their mode of transport. Somerset MRT station is obviously less known to those who drive than to those who take MRT to Orchard Road, leading to low correlation ($r = 0.179$). Lastly, both Orchard Parade and Ngee Ann City are so new that most Singaporeans tend to neglect them.

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