STROLLING BEHAVIOUR AROUND THE NEIGHBOURHOOD FOR LEISURE AND SPAPTIAL CONFIGURATION

A study on the informal outdoor leisure of two neighborhoods in Osaka, Japan and two neighborhoods in Bandung, Indonesia.

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0   Abstract

Informal outdoor leisure is seen as explorative activities in the neighborhood by mode of strolling, and unstructured occurrences which happen represent ways of enjoying free time. This study takes advantage of Space Syntax analysis to explain people's strolling behavior around their own neighborhood for leisure. Behavioral tracking observations are applied to record the activities, strolling routes and places visited. Two numerical properties of Space Syntax analysis are used: (1) axial length and (2) measure of integration. This study reveals that: (1) spaces of high axial length which are assumed to provide high visual access to the environment, correlate with high observed strolling, except in naturally built-up area of Kamishinden, Osaka; (2) spaces which more integrate the neighborhood's spatial configuration, which are assumed to provide high visual access and visual exposure to other people, also correlate with high observed strolling; but with less significant correlation compared to (1).

1   Introduction to the topic

Informal outdoor leisure is defined as leisure activities which are voluntarily done by residents in their own neighborhoods' open spaces. At most of the time, the constraints of budget and time force people to consume their nearby areas for leisure. "Leisure" itself is often thought as non-work activities which may include a broad variety of recreational activities in free time. The first part of this study focuses on one universal form of recreational activity which is done by people in their surrounding areas, that is strolling[1]). The word "strolling" means to walk leisurely or idly along or through (The Random House Dictionary). The authors extend this definition as, the activity of moving around the surrounding areas in free time to seek for self-enjoyment, through the route of "home - near home outdoor spaces - back home". Although strolling can be done by many modes, this study focuses on walking and jogging which tend to go only in the surrounding home range areas. The activity of walking and jogging, however, include other activities which are unplanned and unpredictable, or in Kelly's term (Kelly, 1983:pp.= 152-5), unstructured occurrences, which are done merely for self-enjoyment[2]). Takeshi Suzuki (Suzuki, 1997: 125) for example, observed that in strolling, some people might stop for a while and take pleasure of the environment ("tatazumi"), which he argued as one mode of being in public places[3]). In addition, the movement of strolling is not determined by others but results from deliberate choice[4]).

 The second part of the study tries to find how spatial configuration effects routes of strolling. This speculative idea is based on Hillier's paradigm of architecture which relates people and space in a configuration paradigm (Hillier, 1996: 391). Although the types of space are fairly universal (such as: rooms, corridors, courts, streets, squares,

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open spaces, and so forth), they differ significantly when seen from the viewpoint of spatial configuration. The differences in configuration relate to function in many ways (socially and culturally). One of them is that configurations effect patterns of movement, not on the individuals, but to the probabilistic distribution of people.5) The routes of strolling in general are assumed to be influenced by configuration and places visited, as shown in Fig. 1.6)

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2   Space Syntax Analysis and Strolling Behaviour

This study tries to relate spatial configuration and strolling routes by using Space Syntax analysis. Space Syntax is a set of techniques (usually, but not always, involving computers) for the analysis of spatial configurations of all kinds, especially where spatial configuration seems to be a significant aspect of human affairs, as it is in buildings and cities.7) For the purpose of space syntax analysis, maps are presented in "axial maps" which consist of the longest and fewest straight lines that can be drawn through the rights of ways. The authors assumed that outdoor public spaces of the environment afford settings for strolling. Outdoor public spaces are open spaces accessible to all, such as streets, pedestrian street, open ground, square, nature/ greenbelt area, and the like. The term "rights of way" is often used to emphasize the use of those public spaces to pass or travel between places, and that trespassing is allowed by law. In an old naturally built-up area, the rights of way was formed in a long period of time as the society and its environment grew 8). In a newly designed built-up area, the rights of way is planned together with buildings, using established planning criteria ("planned rights of way").

Two numerical properties of Space Syntax: (a) Axial length and (2) Measure of integration, are related to strolling behavior as follows:

(a) Axial length 9) represents the length of straight lines (axis) that can be drawn from a position in the rights of ways. Behaviorally speaking, axial length shows the degree of visual access to the surrounding. Visual access is defined as the possibility of awareness to other distinct spaces because of visibility. Since the main goal of strolling is to seek for self enjoyment through environment (especially visual), it is argued that places of high visual access attract strolling activities. Peter F. Smith (Smith, 1977:pp.= 147-155) in "The Syntax of Cities" states that certain spaces by its forms, generate people's movement. For example, linear spaces and intersections as can be seen in boulevards, promenades, squares, or crossings, attracts people to walk through. It is clear that linear spaces and intersections provide high visibility to other spaces. Furthermore, Christopher Alexander (Alexander,1977: 316) also states that high places which give visibility to the whole environment from above, attracts strollers to explore the neighborhood.

(b) Measure of integration is derived from Hillier's notion of "integration" which he argues as the most important global measure of configuration. The calculation of "integration" is based on the calculation of "relative depth or relative asymmetry" suggested by Hillier, as he writes:

"......to calculate relative asymmetry from any space, work out the mean depth of the system from the space by assigning a depth value to each space according to how

many spaces it is away from the original space; summing these values and dividing by the number of spaces in the system less one (the original space). Then calculate relative asymmetry as follows: 2(MD-1)/(k-2) where MD is the mean depth and k the number of spaces in the system. This will give a value between 0 and 1, with low value indicating a space from which the system is shallow, and high value a space which tends to segregated from the system. Relative asymmetry or relative depth can therefore be thought of more simply as the measure of integration........" (Hillier, 1984:108).

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Basically, the line or space that most integrate the system is the one from which all others are shallowest on average. It is argued that the more a space integrate the system, the more possibility to be visited or passed in the random journey (Hillier, 1993: 135). Consequently, those spaces give higher possibility of social encounters , or in other word, to see or/and to be seen by others. Following this line, the authors argue that places which most integrated to the system give both visual access and visual exposure to other people. A research question is raised whether such places are preferable or avoided by strollers.

C: Spatial **Configuration**
R: Strolling Route
P: Places visited
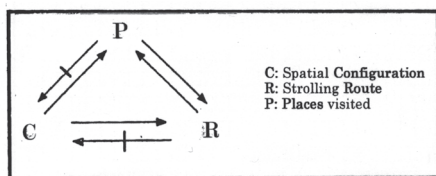
	street with pedestrian	street with no pedestrian	green street	pedestrian only	park	sport-ground	play-ground	natural greenbelt
Takanodai	O 8 – 16m	O 4 – 6m	O 2 – 3m	O 2m	O	O	O	O
Kamishinden	X	O 4 – 6m	O 1m	O 1 – 3m	X	O	O	X
Perumnas	X	O 4 – 6m	X	O 2 – 3m	X	O	O	X
Sekeloa	X	O 2 – 3m	O 1m	O 1 – 2m	X	O	X	X

O : exist, X : non-exist

3   Methodology of the Study

The method consists of three parts: (1)Direct observation, (2) Behavioral Tracking, and (3) Space Syntax Analysis. Four case study areas are chosen where strolling is observed and done by general people from various ages, two in Osaka and two in Bandung Indonesia (Fig.3). Takanodai is a newly designed neighborhood in Senri New Town, while Kamishinden is the original naturally built-up area near Senri New Town. Perumnas Sarijadi is a public housing in a newly developed area, while Sekeloa is a naturally built-up residential area (called "kampong"), next to the Bandung monument square 10). The authors find difficulties in defining the border of the study area, for strolling can expand from one neighborhood to the one next-door, and vice versa. In this study the strolling routes which are observed around the case study area itself, are used to determine the border of the study area The conditions of rights of way in the four study areas can be seen in Fig.2. In addition, some intervening variables are limited : a. concerning the climate, time of observation is chosen when the temperature is comfortable for strolling. (Osaka in late spring (May-June) and in early autumn (September-October), and Bandung's temperature is the same all-year round); b. type of housing is low-rise; c. traffic in main street is low with maximum 6 cars per minute.

(1) Direct observation from one of the streets of the neighborhood to record the average number of strollers by time of day 11). To get a pattern of average number of strolling for a weekday, a Saturday and a Sunday, the observation is done randomly within 30 days, (not just in one day) between sunrise (6 a.m.) and sunset (6 p.m.). In

Figure 1. Diagram of interaction between Configuration, Strolling routes , and Places visited

Figure 2. Conditions of Outdoor Public Spaces in the four Study Areas

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Places visited in strolling routes

A: Takanodai (n=40)
Building types
1.Kindergarten 15.0%
2.Daycare center 15.0%
7.Neighborhood Shops 15.0%
9.Minami Senri Mall 12.5%
8.Community center 5.0%
Open spaces
3.Nature/greenbelt 85%
5.Park 50%
4.Sport ground 35%
10.Toyonaka-Settsu road 25%
9.Playground 12.5%
6.Pond 12.5%
11.Minami-Ibaraki rd. 10.0%

B: Kamishinden (n=40)
Building types
6.Neighborhood shops 77.5%
11.Friends' houses 22.5%
8.Senri Chuo Mall 20.0%
1.Kindergarten 15.0%
2.Daycare center 10.0%
3.Elementary school 10.0%
7.Community center 2.5%
Open spaces
12.Playground 27.5%
4.Sport ground 22.5%
5.Bamboo green street 10.0%
9.Chugoku Highway 5.0%
10.Suita-Minoh road 5.0%

C: Perumnas (n=40)
Building types
2.Neighborhood shops 32.5%
3.Community center 30.0%
4.Friends' houses 15.0%
6.Mosque 12.5%
7.Housing nearby 10.0%
Open spaces
1.Sport ground 70.0%
5.Street vendor 15.0%
8.Public phone 10.0%

D: Sekeloa (n=40)
Building types
5.Neighborhood shops 37.5%
3.Friends' houses 17.5%
7.Mosque 7.5%
Open spaces
1.Monument square 95%
6.Big street nearby 85%
2.Street market 42.5%
4.Street vendor 27.5%

A: Takanodai B: Kamishinden
C: Perumnas D: Sekeloa
Left maps:
Blocked areas indicate streets &
open public spaces
Right maps:
— Sub-neighborhood
— Strolling routes
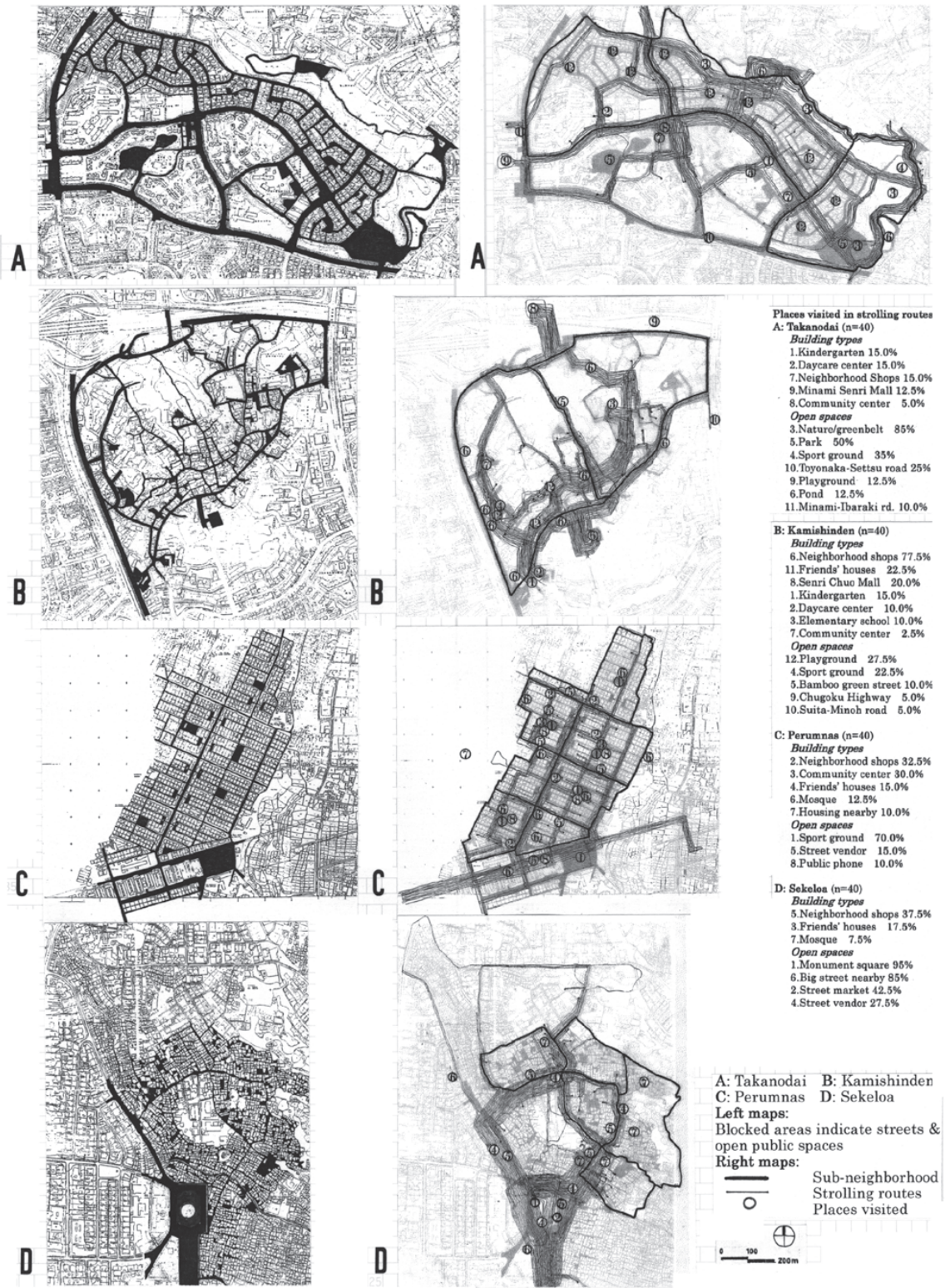O Places visited

0 100 200m

Figure 3 . Maps of Study Areas and Observed Strolling Routes

Bandung it was done in February and March 1997, and in Osaka, in June and October 1997. Some empirical knowledge of body language is used to distinguish strolling from passing the street, for example (a) the dress/accessories for strolling is quite visible; (b) the speed of moving is leisurely; (c) the eye direction moves around/varyingly 12). The result is shown in Fig.5.

(2) Behavioral tracking is applied to record unstructured occurrences during strolling. From a street in the neighborhood the researcher picks a stroller and follows him/her unobtrusively until home. At the end, an informal interview is done to ask about the purpose of strolling, the time of leaving home (duration), the last time he/she strolled before (frequency), and the route 13). Results of behavioral tracking are shown in Fig.3 (routes and places visited), and Fig.6 (unstructured occurrences).

(3) Space Syntax analysis is applied as a tool to relate observed strolling routes with spatial configuration. In the axial map of each study areas, each line is given numbers indicating axial length, a measure of integration, and number of observed routes which pass that line. The bold line in Fig.7-8 indicate spaces with three highest axial length, three lowest measure of integration (most integrated space to system), and three highest observed strolling. Fig.9 shows the correlation between observed strolling and axial length, and between observed strolling and measure of integration.
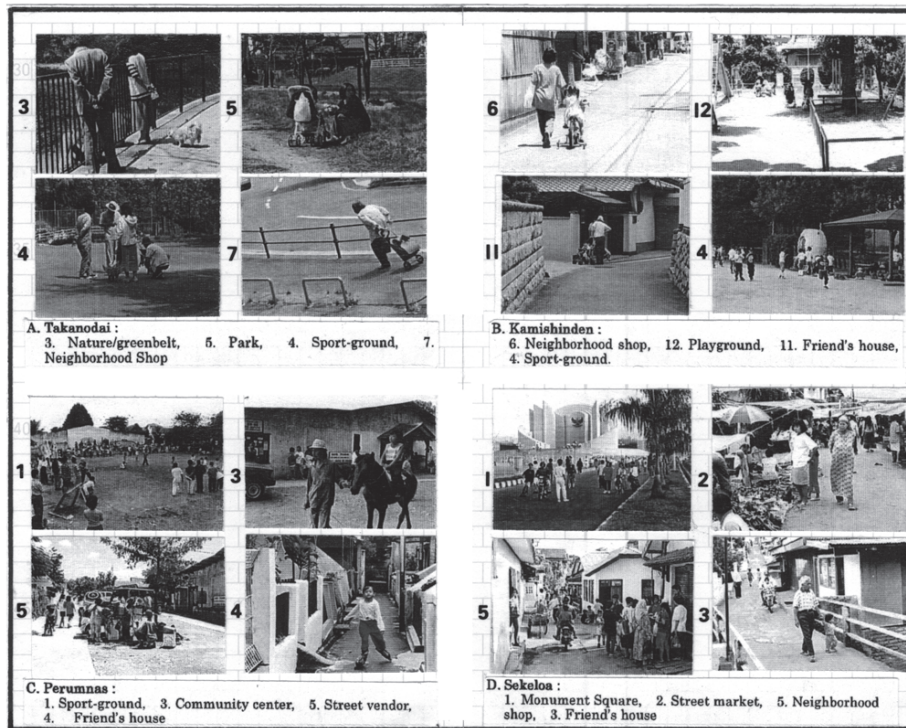
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A. Takanodai :
  3. Nature/greenbelt,   5. Park,   4. Sport-ground,   7.
  Neighborhood Shop

B. Kamishinden :
  6. Neighborhood shop,   12. Playground,   11. Friend's house,
  4. Sport-ground.

C. Perumnas :
  1. Sport-ground,   3. Community center,   5. Street vendor,
  4. Friend's house

D. Sekeloa :
  1. Monument Square,   2. Street market,   5. Neighborhood
  shop,   3. Friend's house

figure 4. Some scenes of strolling activities and palces visited in the study areas

Fig.5 Average number of strollers by time of day

Legend: weekdays / Saturdays / Sundays
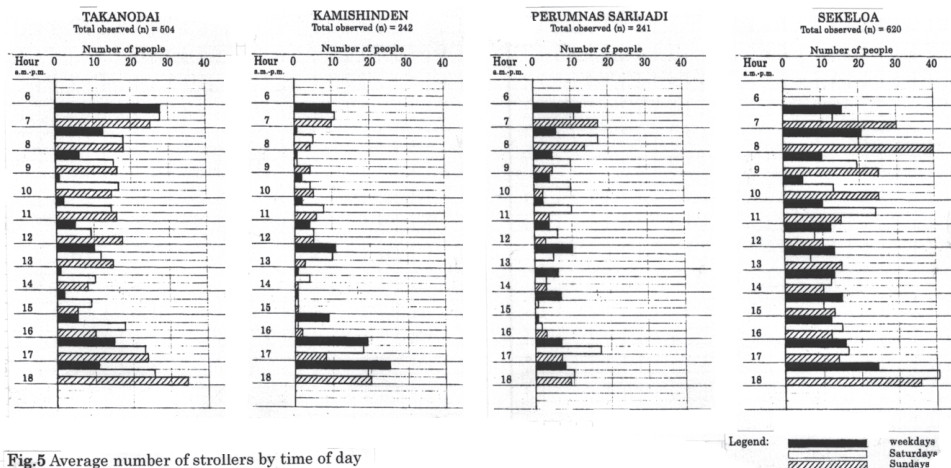
figure 5. Average number of Strollers by time of day

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% of (N = 40)	Takanodai	Kamishinden	Perumnas	Sekeloa
Play/teach child around	30.0	25.0	25.0	35.0
Meet friends in street	5.0	7.5	15.0	42.5
Buy at shop/vendor	37.5	35.0	12.5	25.0
Watch sport ground	12.5	5.0	37.5	67.5
Chat while walk	25.5	25.0	46.0	42.5
Stop at neighbors	0.0	22.5	5.0	7.5
Exercise body	15.0	2.5	7.5	20.0
See street happenings	10.0	15.0	32.5	92.5
See flowers/trees	32.5	0.0	0.0	0.0
Use public phone	2.5	2.5	2.5	12.5
Stand/daydream (tatazumi)	10.0	0.0	0.0	2.5
Play with dog	22.5	20.0	0.0	0.0
Buy vending machine	0.0	2.5	0.0	0.0
Play at playground	12.5	15.0	0.0	0.0
Help the aged	5.0	2.5	0.0	0.0
Rest in park	7.5	0.0	0.0	0.0
Fish/see pond	12.5	0.0	0.0	0.0
Exercise golf	5.0	0.0	0.0	0.0
Read	2.5	0.0	0.0	0.0
Photograph nature	2.5	0.0	0.0	0.0
Pick/cut flower	2.5	0.0	0.0	0.0
Eat at street vendor	0.0	0.0	12.5	25.0
Visit mosque	0.0	0.0	7.5	2.5
See monument	0.0	0.0	0.0	85.0
See river/animal	0.0	0.0	0.0	7.5
Tease opposite sex	0.0	0.0	0.0	5.0
Date	0.0	0.0	2.5	2.5
Sing	0.0	0.0	0.0	2.5
Visit street market	0.0	0.0	10.0	12.5
See housing nearby	0.0	0.0	10.0	0.0

figure 6. Unstructured occurences

2 Analysis of Spatial Configuration and Observed Strolling

2.1 Average number of strollers by time of day (Fig.5)

The average number of strolling on Saturdays and Sundays is higher than on weekdays in Takanodai; while it is not the case in other study areas (almost no difference). In general, within a day, strolling in early morning and late afternoon is higher than that at noon. In Takanodai and Kamishinden, early morning and late afternoon stroll is done mostly by adult and old people to walk, jog, or walk the dog; whereas noon/afternoon stroll is mostly mother and child after kindergarten/daycare center, mothers and friends before shops or pupils after school. Especially on Sundays, fathers and children are more seen. Meanwhile, in Perumnas Sarijadi and Sekeloa, early morning and late afternoon stroll is mostly done by family or teens and friends to walk, jog, or look for something to eat at street vendors; whereas noon/afternoon stroll is mostly mothers before shops, men before mosques, and teens wander idly.

2.2 Unstructured occurrences (Fig.6)

Results of behavioral tracking provide data on unstructured occurrences, places visited during the strolling, and routes of strolling. Data on unstructured occurrences make clear that certain physical features of the environments are potential for people's strolling. In Takanodai, for example, there are more variety of unstructured occurrences than those in Kamishinden due to the existence of parks and natural greenbelt area. While in Sekeloa, its closeness to Bandung monument square (less than 200 meters) which is also visited by people from all over the city, stimulates people's explorative strolling more variety of specific unstructured occurrences, such as singing or teasing. In addition, unlike Osaka, Bandung's unstructured occurrences include religious activity such as stopping at mosques for rest and pray.

2.3 Space Syntax analysis
The discussion of Axial length in the four study areas is as follows:

a.   Takanodai. The rights of ways in Takanodai is designed and planned in accordance with places of neighborhood facilities. Main streets are designed as linear spaces as possible to provide visual access that integrate the whole neighborhood. Fig.7 shows that one of three highest axial length fits with one of highest observed strolling. There is a significant trend that places which provide high visual access attract strolling activities. The more significant correlation is found between axial length and observed strolling in Takanodai (r = 0.6508, p<0.01) than that of Kamishinden (r = 0.1703, p<0.01)

b.   Kamishinden The rights of ways in Kamishinden is not planned but it is a naturally built-up. In general, the axial length is short. The spatial configuration is an example of the spatial concept in Japanese towns. Kunio Funahashi (Funahashi,1994: 3) states that the space in Japan is characterized as topological sequences of horizontal domains, without any perspective view nor external references such as landmarks and/or paths. In other words, axial length or visual access is limited and not so important. As Fig.9 shows, the correlation between observed strolling and axial length is low (0.1703)

c.   Perumnas Sarijadi. Similar to Takanodai, Perumnas Sarijadi has planned rights of ways. Long linear main streets in grid configuration provide high visual access. Fig.9 shows that compared to Takanodai, more significant correlation between axial length and observed strolling is found (r = 0.7300, p<0.01). Like in Takanodai, places with high visual access seem to be preferable for strolling.

d.   Sekeloa is an example of typically Indonesian urban "kampong", a naturally built-up residential area with labyrinth-like spatial configuration. Only main streets are really public; while most of the alleys or spaces between houses tends to be used as private places. Fig.9 shows that compared to Perumnas Sarijadi, more significant correlation between observed strolling and axial length is found (r = 0.7538, p<0.01). For the case in Sekeloa, strollers' preference of places with high visual access might be a release from the conditions of houses in "kampong" which are narrow, crowded and dark.

The discussion of measure of integration in the four study areas is as follows:

a.   Takanodai. The most significant correlation between observed strolling and measure of integration is found in Takanodai (r = -0.6068, p<0.01), compared to the other three study areas. As mentioned above, Takanodai is planned so that the main street is the most center and provide high visual access as well, by its linearity. Fig.7 clearly shows that in Takanodai, places that are most integrate the neighborhood spatial configuration are preferable for strollers. In addition, the most visited place, that is nature (85%), is also located in places where most integrate the spatial configuration.
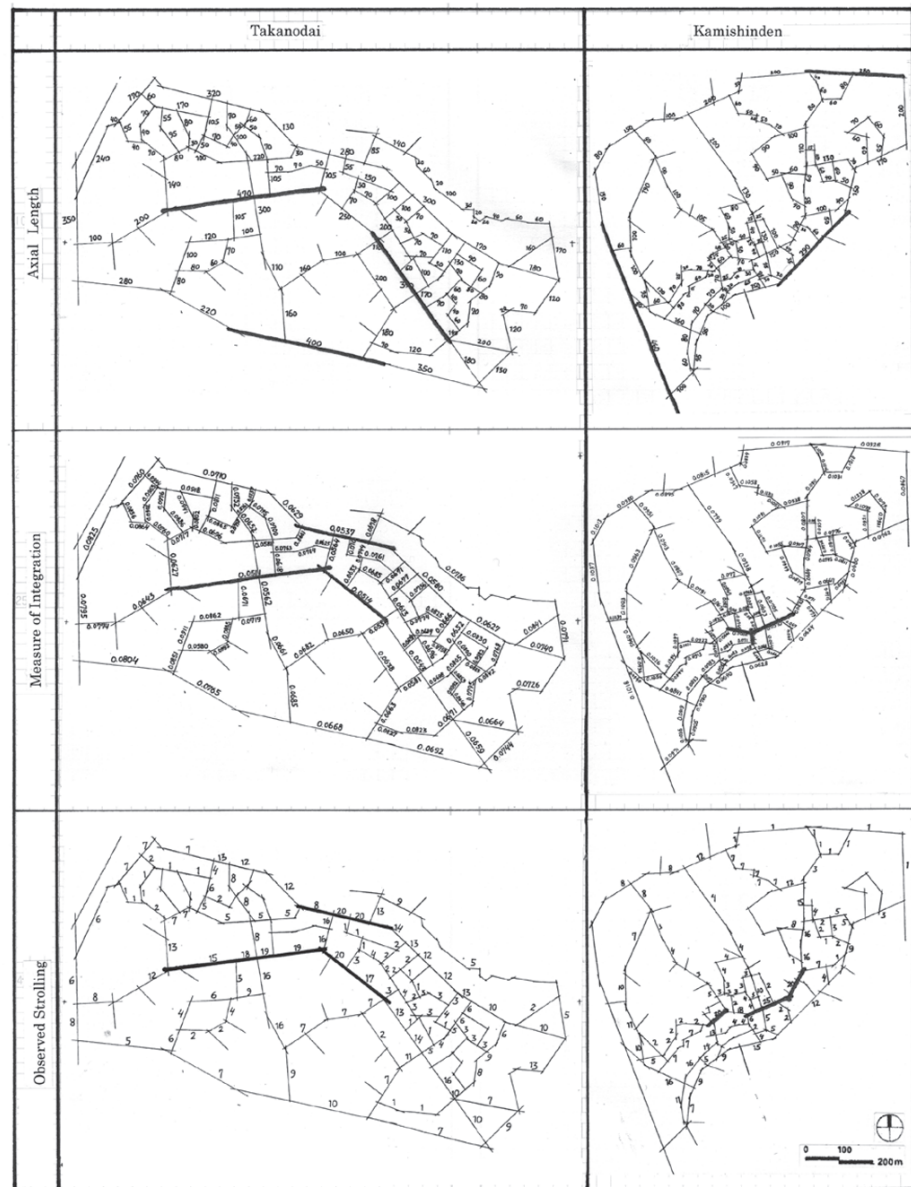
37.8

figure 7. Map of axial length, measure of integration and observed strolling in Takanodai and Kamishinden

b.   Kamishinden. The less significant correlation (r = -0.3835, p<0.01) between observed strolling and measure of integration is found here compared to Takanodai. As Fig.3 shows, the most visited places is shops which are located in both segregated and integrated places. In addition, the second most visited place is friend's house which might be located in segregated places too.

c.   Perumnas Sarijadi The less significant correlation between observed strolling and measure of integration is found here (r = -0.4789, p<0.01) compared to Takanodai. Similar to Kamishinden, the most visited place, which is sport-ground (70%) is not located in the most integrated place, but in the highest axial length instead . However, other places visited are located in integrated places, such as neighborhood shops, and community center. Fig.8 shows that two lines of highest observed strolling fit with two of lowest measure of integration (thus, with places that integrate to the spatial configuration).
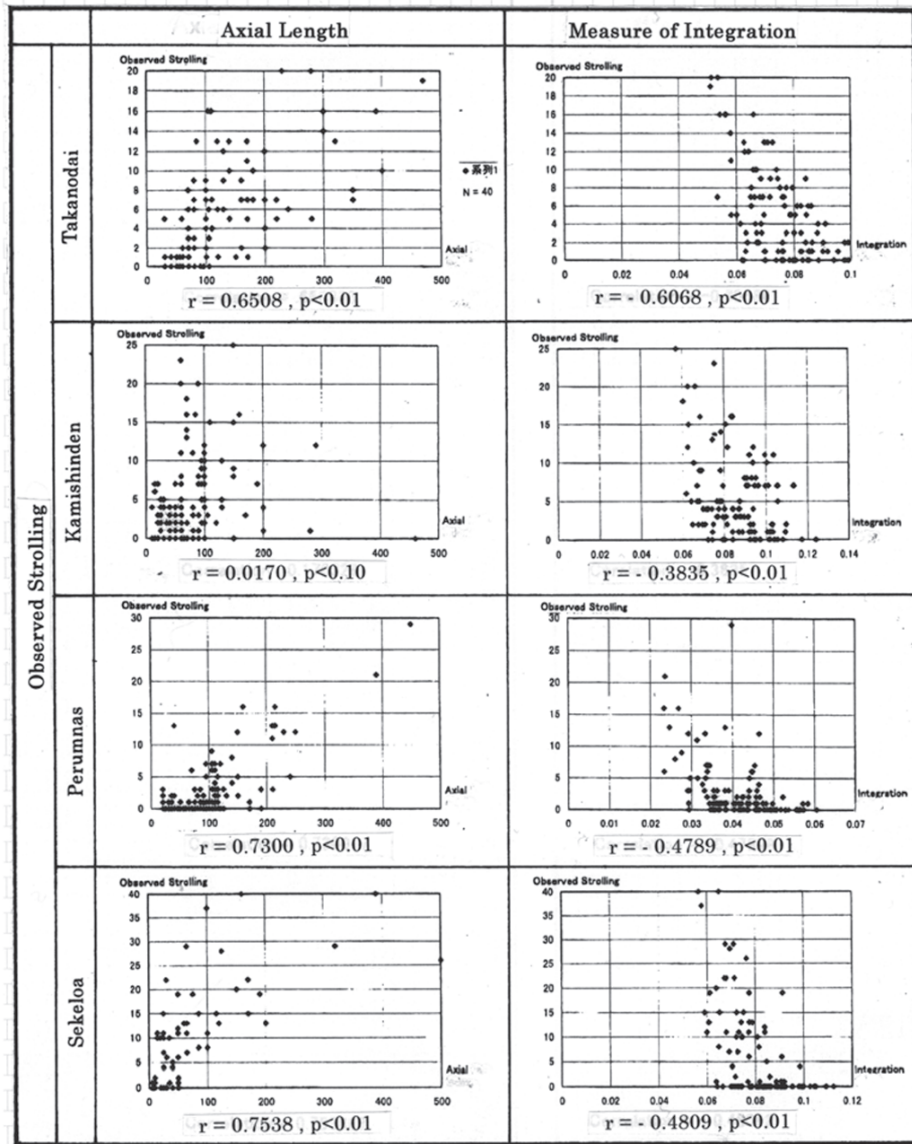
37.9

figure 8. Map of axial length, measure of integration and observed strolling in Perumnas and Sekeloa.
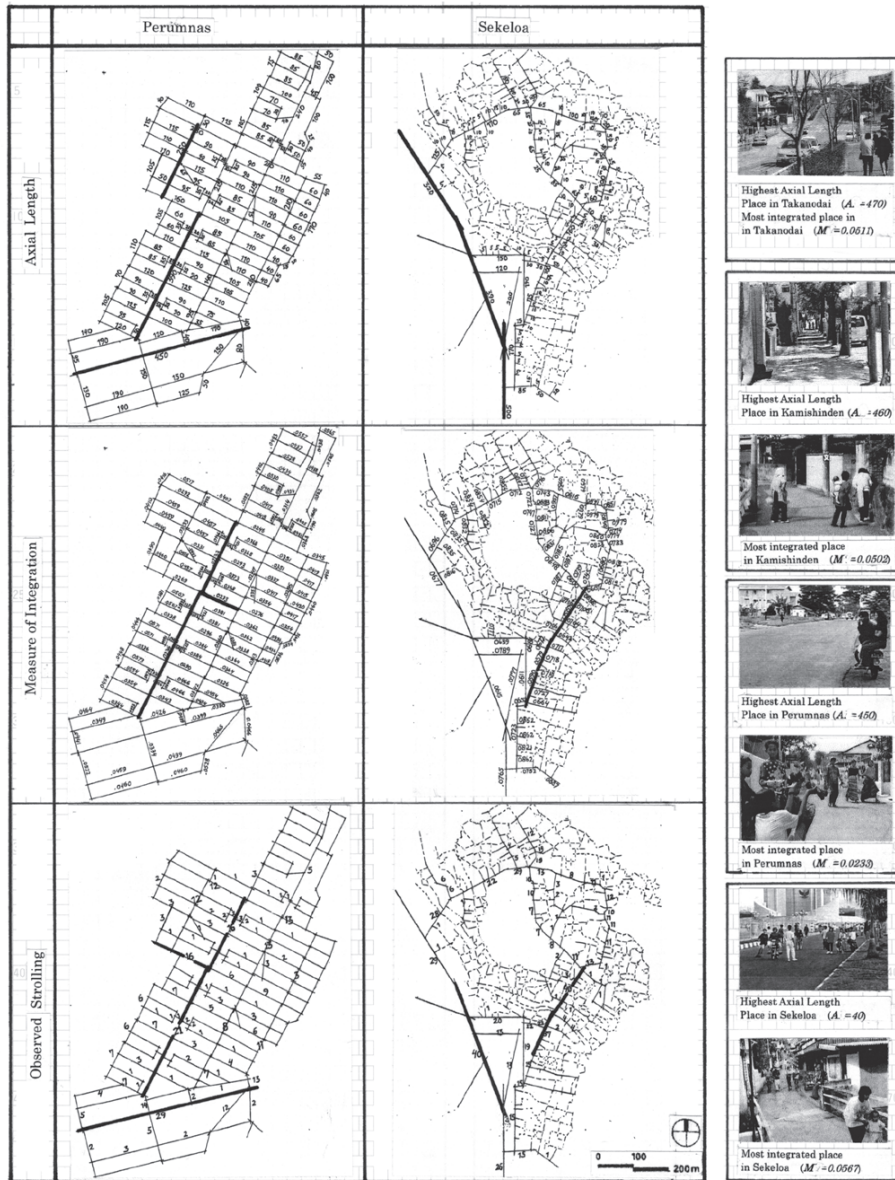
d.   Sekeloa. Similar to Perumnas Sarijadi, the less significant correlation between observed strolling and measure of integration is found here (r = -0.4809, p<0.01). Strollers in Sekeloa visit mostly Monument square (95%) and big street nearby (85%) which are not located in plaaces that most integrate the spatial configuration of the environment. But other well visited places are in places which integrate the spatial system, such as shops and street vendors. Same as in Perumnas Sarijadi, Fig.8 shows that two lines of highest observed strolling fit with two of the lowest measure of integration.

5   Concluding remark

The results of this study reveal that there is a relationship between spatial configuration and strolling routes around neighborhood for leisure. Generally, in places with high axial length, thus provide high visual access, strolling is more observed. In places with low measure of integration, thus places that tend to integrate the spatial con-

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figure 9. Correlation of observed strolling with axial length and measure of integration.

figuration, and provide high visual access and high visual exposure to other people, strolling is also more observed. However, less significant correlation is found in between observed strolling and measure of integration than in between observed strolling and axial length.

The fact that places of high visual access attract strollers, confirms the statements mentioned before (Smith, 1977:pp.=147-155; Alexander,1977:316). Since high visual access provide more possibility of good view of the environment, this phenomenon suggests there is a human intellectual need for experiencing aesthetics in everyday life environment.

The fact that places of high visual access and exposure to other people are preferable, suggests that the presence of people do attracts other people. Consequently, an environment that fit strolling activity is not just an environment which physically affords the activity of strolling, but also an environment where the people are interestingly kind and well behave (a humanistic viewpoint)

Besides the effects of spatial configuration, strolling behavior for leisure can be seen as interaction between available facilities and people's purposes. Although the main purpose of strolling is generally the same, people in Takanodai mostly go to nature because it is available. For strolling, the existence of shops in Kamishinden, sport-ground in Perumnas, or Monument Square in Sekeloa has the same function as nature in Takanodai. Further study on individual cases of strolling can be suggested.

6   Notes

1)   The authors view strolling as a universal way to enjoy free time based on some facts such as: (1) according to the National Survey in America, 1986, the highest percentage of outdoor activity by adults is "walking for pleasure" (50%) with a sample of 2000 (in J. Allen Patmore, 1983); and also (2) the General Household Survey of People over 16 in England, 1980, the most popular outdoor sport is "walking > two miles" with a sample of about two million (in John R. Kelly, 1983); and (3) Hillier (1997) in his book "Space is the machine" states that all children are space explorer when the stroll around to develop spatial knowledge of the environment.

2)   In the context of leisure, Kelly used the word "unstructured occurrences" in the meaning of "moments of leisure" to distinguish from "events" which he defines as "structured leisure". While moments of leisure or occurrences are momentary and fleeting, leisure events are planned and scheduled or constructed for enjoyment. In other words, unstructured occurrences are extrinsic production of people's leisure creativity. This follows Kelly's definition of Leisure in Everyday Life in which he suggests that leisure should be defined by the quality and orientation of the experience rather than its form or location , there is no end to the activities or contexts. He further suggests that the defining dimensions of leisure are not so much in what, where, as in how and with whom.

3)   In Indonesia, people do this "tatazumi" in front of their houses looking at streets, and never do it in parks or natural/ green areas like in Japan. They usually do it after job until sunset time. The general condition of free time in Indonesia is closely connected to the fixed times for praying. (98% of the population is Islam people who pray five times a day, sunrise: 5:30, noon: 12:00, afternoon: 15:30, sunset: 18:00, and night:19:00). At sunset pray, the whole family like to gather at home or nearby mosque to pray; and this force people to spend free time after job or school at close-to-home areas, until sunset.

4)   Large part of work travel behavior is routinized in the sense of using the same mode, the same time and following the same route. Some other purposes are also routinized to a lesser extent such as religious purposes, medical related reasons, or food shopping. Some examples of strolling activities can be given as follows: (a) when a resident has free time and is "under-stimulated" or boring as try to find something to do or interesting, then he/she just wander around the neighborhood without any planned place to visit. (b) when a resident is "stimulated" by something in the neighborhood and then walk there to explore further, for example to see the change of leaves' colors. (c) strolling can also be done simultaneously before or after a task/work is accomplished such as a mother after picking up a child from school then walk around to show the child about the environment.

5)   Hillier argues that built-environments are, thus, probabilistic space machines. Further he states that all types of spaces are essentially configuration strategies, that, spaces physically designed for one set of activities are often easily adapted for others.

6)   Following Hillier's terms, strolling routes is "movement", and places visited is "attraction". Following his statement, places visited and strolling routes may influence each other, but the other two relations are asymmetric. Configuration may influence the location of places visited, but the location of places visited cannot influence configuration. Likewise, configuration may influence strolling routes but strolling routes cannot influence configuration.

7)   This definition is taken from the homepage in World Wibe Site: http: //www.spacesyntax.com. Originally conceived by Professor Bill Hillier and his colleagues in The Bartlett School of Architecture and Planning at University College London in the 1980's as a tool to help architects simulate the likely effects of their designs, Space Syntax has since grown to become a tool used around the world in a variety of research fields and applications.

8)   Historically, "rights of way" is called "rights of passage". In most cases it is not clear whether "rights of way" was formed before the buildings, or formed naturally after the buildings had been built).

9)   The term "axial length" is derived from Hillier's notion of "Axial Line Index" which represents the number of convex spaces it traverses. This study assumes that convex spaces are rights of way, and the axial lines are straight lines, so the number of convex spaces can be represented by the length of axial line.

10) Bandung and Osaka both represent big cities in Asia,   of approximately equal population and areas. (Bandung is the capital city of West Java Province with the population of 2,058,122 people in 1993. The average temperatures range from 18 - 30 degree all year round). Neighborhoods in big cities are chosen for

37.11

study areas because big cities are where consumptive activities such as leisure grow well. (a) Kampong Sekeloa was once rice filed and began to grow fifty years ago. Now it is stagnate and isolated for it cannot catch up with the fast modern formal sectors. The residents are heterogeneous coming from different ethnic groups of all over Indonesia. This neighborhood has a labyrinth-like street configuration with no infra-structure system. Most houses have no yard and open spaces are hard to be found. (b) Perumnas Sarijadi was built in 1979 by the government for civil workers, retirees, and low income people. The residents are quite homogeneous of Sundanese/West Java people. This neighborhood has grid-like street configuration with planned infra-structure system. Open spaces are provided and almost every house has small gardens. (c) Takanodai was built in 1970 and is completed with modern facilities of a new town. Its street configuration is a well planned combination of grid and curve. (d) Kamishinden is a combination of old and new Japanese neighborhood where traditional houses, temple, and traditional farms still exist. It has irregular street configuration.

37.12

11) One of the neighborhood street is chosen for the location of direct observation under some considerations: (a) the street is mostly used by the nearby residents, in the sense that it is neither a collector road from other neighborhoods nor a city road, and (b) the traffic is low with maximum 6 cars in a minute, and (c) there is a place in that street where the observers can see the street unobtrusively, such as a community center in Takanodai and Perumnas Sarijadi, a playground in Kamishinden, a neighborhood shop in Sekeloa.

12) The speed of "walking leisurely" is the most distinguishable from the speed of "passing" in four study areas. Concerning the accessories of wear, in Osaka many strollers use sport shoes, training sport wear, hat gloves, wheel-chair, baby-cart, bag-cart, golf-stick, camera, dog's accessories, and the like; while in Bandung strollers mostly wear sandals and T-shirt (just visible enough to distinguish them from formal wear of shirts and shoes).

13) Samples for behavioral tracking are chosen randomly from the street (forty for each study area). At the end of the stroll, in front of their home an interview is done, and one of the information asked is the unobserved route from home until the researcher see them. The term "informal interview" is coined to mean indirect interview blended or embedded in an informal conversation. The researcher acts as a stroller who lost his/her way around and asks for help with a map. Then the researcher begin to introduce him/herself as a student who study the area, and start asking some questions.

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