Cognition of Front and Back in Urban Space and the Correlation with Urban Structure
-Downtown Area of a Japanese City, Saga-

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Abstract
The objectives of this study are to reveal how a set of spatial meanings, front and back (omote and ura in Japanese), is recognized at the city scale and to clarify by conducting a case study the relationship between such spatial cognition and actual state of the urban structure of cities. Both front and back are recognized at the city scale and are by and large regarded attractive. In general, front is associated mainly with larger scale facilities and spaces in urban settings, while back is associated basically with smaller ones. The recognized domains as front and back fundamentally contrast and complement each other in their distribution patterns. The domain of front coincides with the districts in which commercial facilities or public buildings are located mainly on major streets with large traffic: it is planned for effective land use and is comparatively high in land price; contrarily, the realm of back corresponds with the areas in which entertaining businesses or residential facilities are situated mainly on minor streets with little traffic: it is generally low in land price.

Keywords: cognition; front and back; urban structure; downtown; Japan

1. Introduction
1.1 Study Objectives
This study is an attempt to explore an aspect of the organization of meanings in urban space. Among a variety of meanings in urban space, this study specifically focuses on a pair of positional concepts, omote and ura, or front and back. Because the paired concepts, which are generally used to represent certain things' opposite positions or parts, may provide a fundamental reference to spatial cognition and affect the use in and shape of urban space. The objectives of this study are to reveal how the set of spatial meanings is recognized at the city scale and, by conducting a case study, to clarify the relationship between such spatial cognition and actual state of the urban structure of cities.

The distinction of front and back is among the basic mental activities to construct one's image and spatial value system of his world. O. Bollnow (1963), a contemporary philosopher, points out that the spatial reference of front and back is a critical criterion for recognizing one's surrounding environment and acting and orienting oneself in it. Y. Tuan (1977), referring to a variety of Asian to European cities, argues in his phenomenological study that cities have in certain ways front and back regions, although modern cities may have less distinguishable ones. T. Doi, a psychologist as well as a leading critic of Japanese culture, pointed out that these paired concepts are of the keys to comprehension of the Japanese mentality and their culture, such spatial contrast can be found in Japanese cities as well. A variety of vocabularies including omote or ura is used in Japanese to describe front or back realms at the city scale. Neglect of spatial distinction of front and back may be one of the shortcomings of modern cities. A. Rapoport (1977), an architectural anthropologist, states that the freestanding building as well as the destruction of the street in modern cities is related to a refusal to accept the distinction between the important domains of front and back.

Broadening knowledge about meaning system of the contrasting concepts in urban space, accordingly, is critical and constructive not only for understanding more profoundly the patterns and structures of cities and their regions but also for creating environments which fulfill more human needs and enhance people's sense of identity in relation to their living environments.

1.2 Study Methodology
In order to achieve the study objectives above, a set of surveys was conducted by communicating in Japanese: 1) a survey of the images, attractions, and urban facilities that are associated with front or back in urban settings; and 2) a survey of the distribution of the spaces that are recognized as front or back and their relation to the state of urban structure. In the survey of 1), the author used a set of questionnaires.
All of the questions were answered by selecting from amongst the given choices on the questionnaire sheets. The subjects of those surveys were college students in a related field of urban planning and design.

For the survey of 2), the downtown area of Saga was chosen as the study area. It is a typical middle size city in Western Japan in terms of its size in population and urbanization and is the capital of the prefecture of Saga. The same subjects above were asked to indicate on a given map of the study area the ranges that they regarded as the domains of the opposing concepts. A total distribution pattern of each domain was obtained by superimposing on a sheet of tracing paper all the ranges that the subjects drew as the domain. These spatial distribution patterns of front and back are subsequently used to compare with the urban structure of the area in terms of its land use, location of commercial facilities, street network, traffic volume, land price, and land use zoning. The information of these items was gathered from official reports and data published by the relevant public bodies and was processed by the author onto maps of the area.

2. Cognition of Front and Back in Urban Space

2.1 Images of Front and Back

The image of the spaces of front and back was examined by applying the Semantic Differential Method: twelve pairs of antonyms are given to and assessed by the subjects in a five grade scale. The terms, bright, wide, clean, sound, busy, daytime, and active were strongly related to the image of front, while dark, narrow, dirty, unsound, worldly, and nighttime were the relevant descriptors of back. The antonyms of boring and exiting, gloomy and cheerful, and the pair of unpleasant and pleasant definitely describe neither front nor back (Fig. 1).

2.2 Attractions of Front and Back

The percentage of the respondents who answer that front is attractive was above 82, with 35 percent of the subjects replying that it is very attractive. The ratio of the replies that back is attractive is above 58 percent including 25 percent of the answers that back is very attractive. Only three percent of the subjects found that front is unattractive, while 15 percent answered that front is neither attractive nor unattractive. The ratio of the answers that back is unattractive is also low at seven percent; on the other hand, the percentage of the replies that back is neither attractive nor unattractive reaches 34 percent (Fig. 2).

The reasons for the attractiveness of front given by more than a quarter of the effective answers are its being busy, clean, open, modern, and entertaining. Back, however, is found attractive because it is shady and hidden. Relatively large numbers of the respondents replied that being calmness, worldliness, and popularity also help to constitute the attractiveness of back (Fig. 3).

2.3 Urban Facilities of Front and Back

Types of Buildings: The building types that are associated with front in urban space by the majority of the subjects were: department store, hotel, bank, boutique, western restaurant, office building, government office, electric appliance store, movie

Fig.1. Images of Omote and Ura, Front and Back

Fig.2. Attractiveness of Omote and Ura, Front and Back

Fig.3. Reasons for Attractiveness of Omote and Ura, Front and Back
theater, and book store (Fig. 4).
On the other hand, the building types of back in urban settings were striptease theater, love hotel, snack bar, pub, and apartment house. Pachinko parlors, hospitals, condominiums, business hotels, karaoke saloons, low rise buildings, noodle eateries, vegetable stores, and shrines were definite indicators neither of front nor of back.

Types of Open Spaces: The types of open spaces that are recognized as the representative of the front by the greater part of the respondents were primary artery street, secondary artery street, wide street, and boulevard. Contrarily, the types representing back were alley and narrow street. Local streets, plazas, parks, and green spaces do not clearly represent either front or back (Fig. 5).

Types of Street Furniture: The types of street furniture that are given for the items representing front by the majority were street trees, street arcades, and street lamps, whereas no items of the street furniture are regarded as among the elements of back. Neon signs, phone booths, signboards, and vending machines were not definite descriptors either of front or of back (Fig. 6).

3. Front and Back Domains and the Urban Structure
3.1 Outline of the Study Area
The study area is the central part of Saga city and extends from the Saga railway station of the Kyushu Railway Company on the north to the prefectural government office on the south and extends both east and west of Central Street. Central Street, the main street of the city, runs from the station to the south and reaches the moat and block in which the castle was located during the Edo period. At the western edge of the area, Route 264 passes from north to south and links to Route 207 that runs from east to west at the study area's southern edge. In this area, such facilities are located as the shopping arcade, the district court, the central post office, and the headquarters of the prefectural police (Fig. 7).

3.2 Distribution of Front and Back Domains
The distribution pattern of front shows that the front domain has peaks on Central Street and gradually decreases in accumulation of the answered areas on both sides of the street toward east and west. Along with this primary structure, the front domain has secondary expansions in the South of Railway Station and in an area extending toward the city’s old area, in the South East where the shopping arcade is located, and along Route 207 in the South West (Fig. 8).
In contrast, the area regarded as the back domain fundamentally covers the remaining areas that are not characterized as front realm; the back domain consists of the North of Railway Station as well as of the eastern and western zones off Central Street. No areas are recognized as back, however, as distinctively as Central Street is regarded as front by almost all of the respondents. The area surrounding the shopping arcade is also recognized as a back domain although it is regarded as a front domain by a larger number of the subjects (Fig. 9).
3.3 Comparison with the Urban Structure

**Land Use:** Comparison with the state of land use illustrated by the previous study of Saga City (1993) shows that the front domains coincide mostly with commercial zones and partly with a business zone in which administrative facilities are located. On the other hand, it indicates that back realms mainly cover an amusement zone where restaurants and pubs are located and residential zones mixed partially with a business zone.

**Locations of Commercial Facilities:** Locations of the commercial facilities listed in the directory published by Saga Chamber of Commerce and Industry (1995) were examined and plotted on a map. Department stores, most insurance companies, and banks are located in the parts of the districts conceptualized as front, particularly around the railway station and along Central Street. Movie theaters and most pubs and snack bars are situated in the adjacent area of the shopping arcade, which area is regarded as back by a quarter to one third of those questioned (Fig. 10).

**Street Network:** A comparison of the concepts of front and back with the street network of the study area tells us that the front domain is formed along the primary arterial streets including Central Street and Route 207 (16 meters wide) as well as around the wide streets near the station. Route 207 and 264 are national roads and Central Street is a prefectural road. On Central Street, major events such as the city festival and the road races are held yearly (Fig. 11).

Conversely, this comparison indicates that the back realm falls in the areas composed of minor streets like local streets or alleys, all of which are narrower than nine meters in width.
Note: The lists on Directory of Commerce and Industry in Saga (Saga Chamber of Commerce and Industry, 1995), was mapped by the author.

Traffic Volume: Official statistics of the Road Section at Saga Prefecture (1990) indicate that all the arterial streets have intensive car traffic; Central Street and Route 207 in particular have the largest volume with more than 16,000 cars over twelve hours of daytime. Although no data are available for the minor streets, experience indicates that they have considerably smaller volumes than the arterials.

According to the data of the study above, pedestrian traffic is concentrated especially on the shopping arcade and a part of Central Street, where volumes are more than 7,000 persons over eight hours of daytime (Fig. 12). Large volumes of bicycle traffic, with over 2,000 vehicles over eight hours of daytime, run through most of Central Street and the shopping arcade and its vicinity.

These patterns show that traffic is basically concentrated on the streets situated in the front domain, on Central Street in particular, but not on the minor streets located in the back realm with an exception of the area adjacent to the shopping arcade.

Land Price: An analysis of land value assessment by Saga Tax Office (1994) reveals that the highest land prices are found in the blocks south of the railway station, along a section of Central Street, and along the frontage of the largest department store, where land prices are above 450,000 yen per square meter (Fig. 13).

Other sections of Central Street and the shopping arcade are relatively high in price with values of more than 200,000 yen per square meter. The prices of the rest of the study area are generally low.

These tendencies indicate that the areas conceptualized as front have high land prices; this is not the case with the areas of back except, again, the area in the vicinity of the shopping arcade.

Land Use Zoning: Comparison with the land use zoning under the present City Planning Law indicates that all of the front areas are designated as the commercial districts while the back areas are distributed between two different categories of land use (Fig. 14). The blocks around the shopping arcade are designated as the commercial districts, while the blocks in Center West and South West (except along the arterial street) are designated as the residential districts.

The highest floor area ratio (FAR) of 5.0 is found in
the typical front area, or in the blocks nearby the railway station and along the sides of Central Street, and FAR of 4.0 is found in other areas of front. The areas of back have modest FAR of 3.0 with the exception of the areas adjacent to the shopping arcade that have an FAR of 4.0.

Table 1 summarizes the outcomes of these comparative analyses between the designated front and back domains and the items of urban structure of the study area.

Table 1

| Domain             | Urban Structure Item | Description                                                                 |
|--------------------|----------------------|----------------------------------------------------------------------------|
| Front              |                      | Areas of front have larger scale commercial and service industries, including retail and finance, or public offices are located on major streets that perform the role of important traffic routes. It is generally high in land price, zoned commercially, and represents the effective land use districts with relatively higher floor area ratios. |
| Back               |                      | Areas of back correspond to the areas in which either eating or drinking houses and amusement facilities, or residences and minor public facilities are located. Both these areas are predominantly composed of minor streets with little traffic and |

4. Conclusion

1) Summation

1) Front and back are also recognized definitely at the city scale as paired opposing concepts with basically the generally accepted meanings and implications. Both realms expressed by the antonyms are regarded as attractive, though front is perceived as more attractive than back.

2) Front is associated mainly with urban facilities located in the heart of cities such as commercial or office buildings and principal streets, on the other hand, back is associated basically with minor urban facilities located in the amusement districts of cities and minor streets.

3) The domains recognized as front and back in the study area have a distribution pattern in which the two opposing spaces fundamentally contrast in position and complement each other in space. The domain of front definitely occupies the blocks in front of the railway station and along the main street of the city. The blocks nearby the shopping mall and the administrative facilities are of the domain of front as well. The realm of back, on the other hand, covers the rest of the whole area, or the range behind the domain of front, though it is not so distinguishable as the realm of front is.

4) The domain of front fundamentally coincides with the region in which larger scale commercial and service industries, including retail and finance, or public offices are located on major streets that perform the role of important traffic routes. It is generally high in land price, zoned commercially, and represents the effective land use districts with relatively higher floor area ratios.

5) The realm of back, meanwhile, corresponds to the areas in which either eating or drinking houses and amusement facilities, or residences and minor public facilities are located. Both these areas are predominantly composed of minor streets with little traffic and
are generally zoned as residential districts. The former area has relatively large pedestrian traffic and rather highly assessed land prices, while the latter has little pedestrian traffic and low land prices assessed with it.

2) Concluding Comments

This study tried to explore a symbolic organization of urban space concerning the distinction of front and back realms on the city level. It found that spatial cognition of the opposing concepts correlates with actual state of urban structure of a city. The images and facilities associated with front and back in urban settings in general correspond with the physical features of the designated domains of front and back in a specific study area. It didn’t tell, however, whether people’s cognition affects formation of such a spatial contrast in cities or physical features of the urban structure affect the people’s mental responses. Both directions might be necessary in order to inquire into the question. R. Korff (1990), a sociologist, for instance, argues that a socially instituted meaning structured the city while A. Rapoport (1982) states that affective responses of people to their environment are based on its meaning and its particular aspects.

The subjects of the self-report surveys were limited to Japanese students in the related field since the main concern of this study was not in the variety of spatial cognition by individual or cultural differences but in the relationship between the cognition and physical structures of cities; and, certain knowledge to read physical patterns of cities was required for answering the questions. Ordinary people with less relevant knowledge possibly have less distinct and less consistent cognition of front and back at the city scale, and the cognition may vary a great deal with their individual or cultural differences of people. A. Berque (1982), a scholar of geography and Japanese culture, points out that the opposed concepts reflect on the symbolic organization of Japanese cities. The findings of this study support such view.

Although validity of this study is limited, notions drawn from it would be still useful for practice in urban planning and design. In order to fulfill more people’s needs and enhance their sense of identity, not only providing amenity and functions that are needed but also creating a more meaningful built environment should be a primary goal of the project. The distinction of front and back is among the major issues of the organization of meaning in urban space. Cities and their parts should be carefully planned and designed in a way to create or reinforce such a spatial distinction. The planning and designing of this symbolic contrast is crucial in terms of making urban space more “legible” with rich distinctiveness and characteristics in its form and visual quality, which provides urban space with more diversity in its meaning system.

Not only nature of the front domain but also that of the back domain should be secured at the block scale, particularly in residential areas, for providing more sense of security, privacy, and rest and retreat in urban settings. City planning practice in modern cities appear to have brought notable expansions of the front realms on the city level at the expense of loss of their back realms. Large scale urban renewal provides typical examples. Zoning codes which lead intensive land uses may also have promoted this transformation of cities. If the spatial distinction of front and back is of importance to the organization of urban space on the city level, as argued in this study, such projects and planning that make the most of the characteristics of both of the contrasting realms should be introduced to the area proposals, instead of merely enlarging the front domain.

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Notes

1. Omote means something’s principal side or visible part and implies something demonstrated, public, formal, or positive; in contrast, ura means the hidden side or invisible part and suggests something private, informal, or negative. As suggested by a number of English terms that use front or back, for instance, front man, front page, and backbiting, back chat, front and back as English words share most of the same meanings and implications with the Japanese counterparts.

2. Forty-three paired vocabularies that include omote and ura with them can be found in Great Dictionary of Japanese by Shogakukan. Eleven pairs of them stand for the positions of facilities at the block or city scales. Omote-dori, that is a busy main street, and ura-dori, or a lonely back alley, are of the typical examples.

3. This self-report measure was administered in 1996 to 77 sophomores of the Dept. of Civil Engineering at Saga Univ. and the subjects who gave effective replies counted 75.

4. Population of Saga city is circa 166,000; 74.5 percent of its population lives in the densely inhabited districts, whereas the average population of Japanese cities is about 140,000, and 78.3 percent of their population live in the districts as in 1995.

5. Hotels specifically designed for lovers’ use.

6. Japan’s most popular arcade game; a variety of pinball.

7. Prerecorded musical accompaniment. Singing songs backed by karaoke is one of the most popular leisure-time activities among Japanese people.

8. K. Lynch stressed, in A Theory of Good City Form, the importance of "sense" which is the match between environment, man's sensory and mental capabilities, and his cultural constructs. The importance of meaning in physical environment has been emphasized also in the arguments seeking for a new planning and design policy. See for instance, T. Turner (1996), City as Landscape, and J. Punter & M. Carmona (1997), The Design Dimension of Planning.

9. See K. Lynch (1960), The Image of the City.

10. C. Alexander also argues the necessity of creating a front and back distinction in urban settings. See his book A Pattern Language, pp. 276-279 and pp. 301-303.

11. J. Jacobs admired and emphasized the essentialness of the diversity in cities and urban life. See Jacobs, The Death and Life of Great American Cities.

12. See Alexander, “Quiet Backs” of the above-mentioned book, pp. 301-303.

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