

Role of Maps and Public Street Signs in Wayfinding Behavior by Foreign Visitors

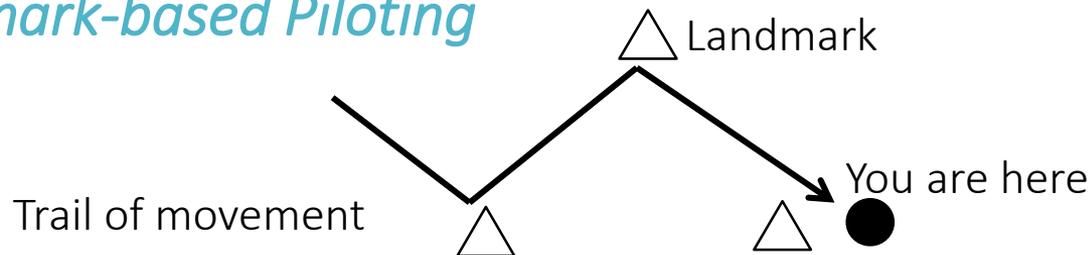
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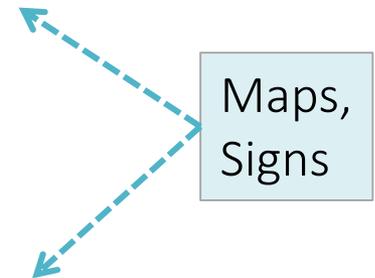
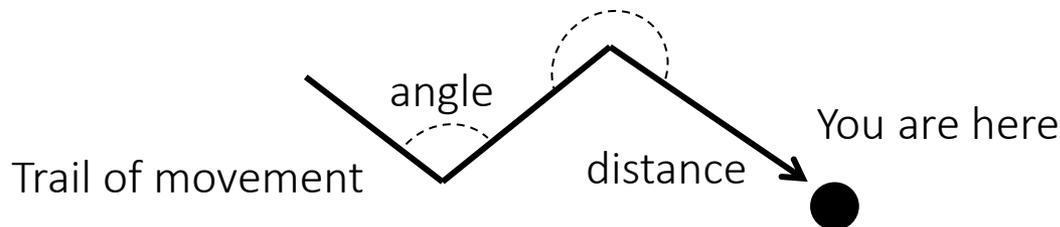
Background: wayfinding and maps

In wayfinding behavior, maps are usually used to plan routes prior to spatial movement. People occasionally use public street signs to confirm their current position on the map and find their way.

Landmark-based Piloting



Path integration (Dead reckoning)



Types of wayfinding behavior (after Golledge 1999)

Sings in the cityscape

In particular, there are many signs, including public and private ones, in downtown Tokyo. In a sense, it is a notable feature of Japanese (or Asian) cityscape due to the loose supervision of billboards.

These signs may play a role of enhancing legibility (Lynch 1960) of a city.



Shinjuku (Tokyo)



Piccadilly Circus (London)

Aim of this study

Public signs can complement maps in wayfinding behavior by showing the current location and giving direction. Foreign visitors in particular tend to rely on signs in an unfamiliar environment.

Previous studies on signs were conducted in the field of design, architecture and transport planning (e.g., Calori and Vanden-Eynden, 2015). Some psychologists are interested in the role of you-are-here maps in spatial cognition (e.g., Levine, 1982).

However, a few studies in cartography and GIScience have dealt with the role of signs in wayfinding behavior and their relationship to maps.

This study examined the current status of public street signs and maps and issues relating to them in wayfinding behavior by foreign visitors.

Data and method

Fieldwork: We obtained data on public signs from our own fieldwork in Shinjuku District (within 1 km of Shinjuku Station), which is one of the most popular tourism sites in Tokyo.

Geocoding: The information displayed on 187 signs was recorded as geotagged photo by using smartphone. Then the locational information of these signs were input as geocoded point data into GIS.

Questionnaire: To examine the role of signs in wayfinding behavior, we carried out a questionnaire survey to 200 foreign visitors to Shinjuku in 2017.



Typology of public signs

Signs with maps were classified as *guiding signs* used to identify one's current location and find one's way. The other types of signs are *directional signs*, *identification signs*, and *regulation signs*.

These signs provide visitors with different kind of spatial knowledge.



Guiding sign

Survey knowlege



Directional sign

Route knowledge



Identification sign

Landmark knowledge



Regulation sign
(excluded)

← *Spatial knowledge*
(Siegel&White, 1975)

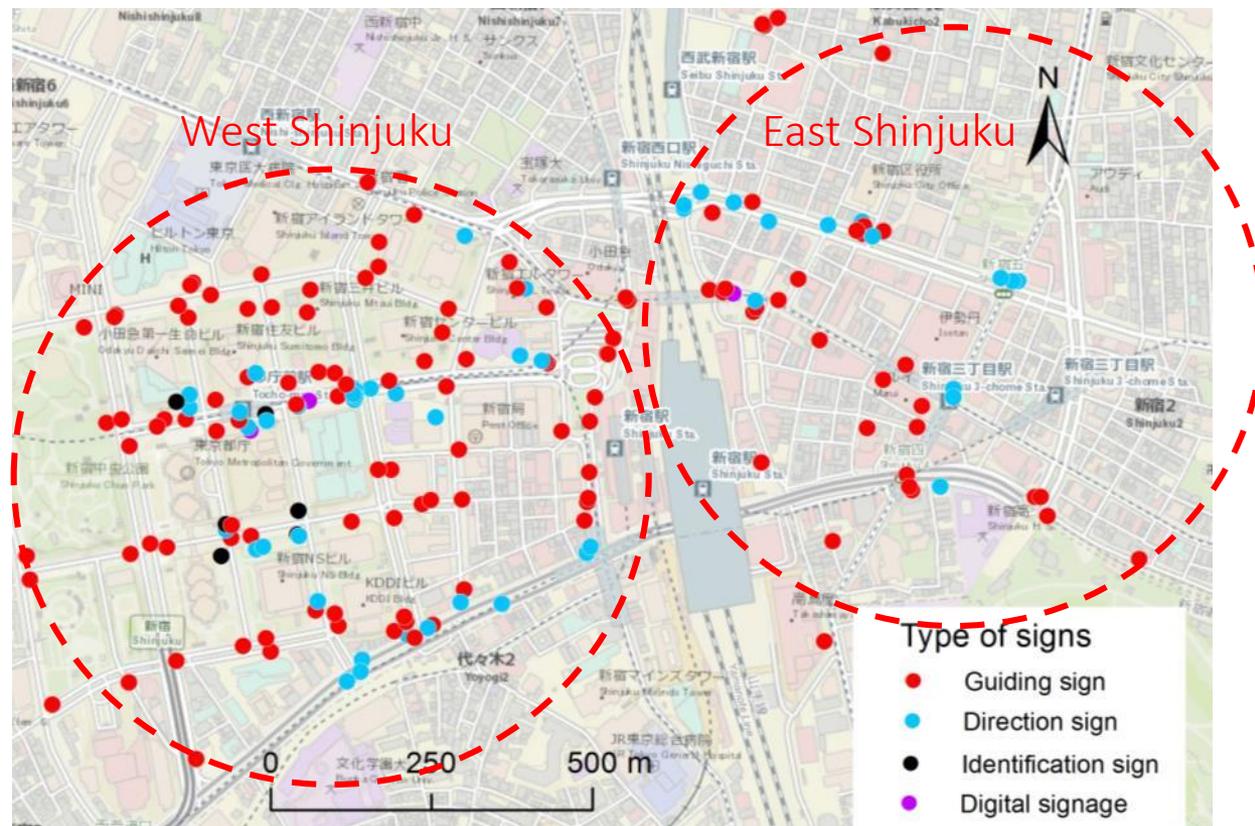
Results (1): Distribution of signs

Data analysis revealed that 65.7% of the signs included a map (classified as the guiding sign).

Within 1 km of Shinjuku Station, public signs were unevenly distributed, and many signs were seen in the new urban area situated on the west side of the district.

Distribution of signs in Shinjuku District

- : Guiding sign
- : Directional sign (at the street corner)
- : Identification sign (only in front of the administrative office)
- : Digital signage (new type of sign)



Contrast between east and west of Shinjuku

West: newly planned development,
regular broad street, skyscrapers

East: disorganized development,
irregular narrow street, high density



Source: Geospatial Information Authority of Japan

Results (2): Expressions

Most of the signs that we observed in Shinjuku displayed multilingual expressions.

To prepare for the 2020 Olympic Games, the Tokyo metropolitan government has been promoting the widespread use of multilingual signs for foreign visitors.

Also, maps on public signs featured pictograms.

Usually, guide map is combined with a wide-area map.

Wide-area map



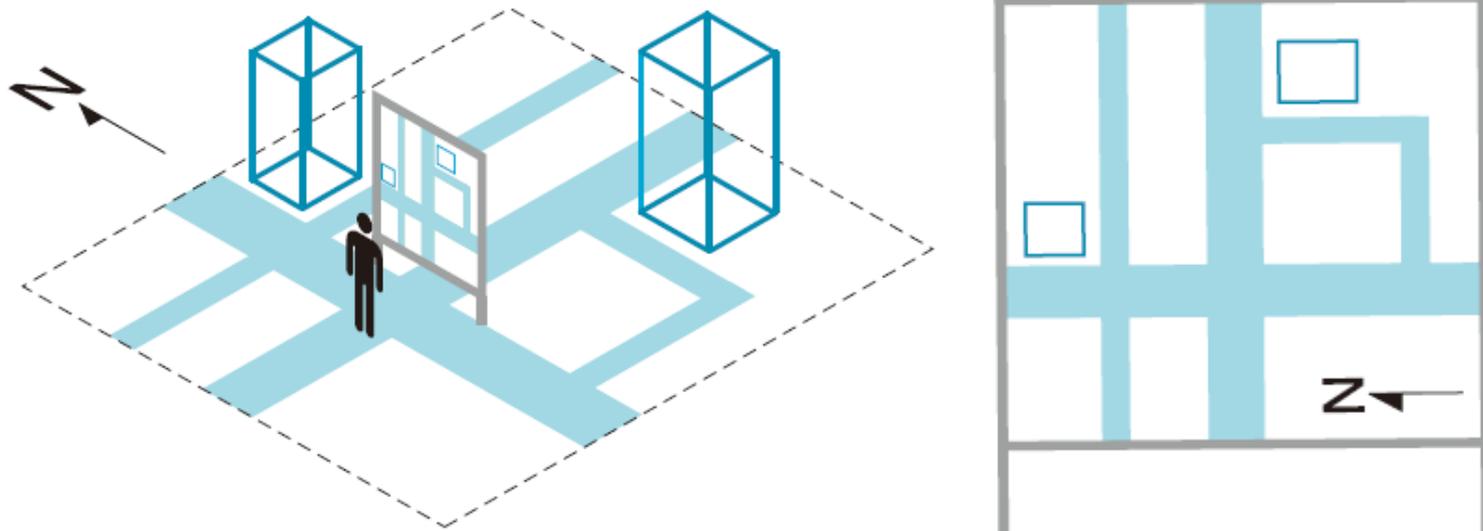
Example of the map on signs based on a guideline for public signs by the Tokyo Metropolitan Government

Results (3): Orientation

A notable feature of the map on a sign is fixed direction; map readers cannot change the direction of the map.

Since most of the maps on signs in Shinjuku were aligned with the direction of the viewer, problems caused by the “alignment effect” described in previous psychology studies can probably be avoided.

In fact, guidelines for public signs set by the municipalities in Tokyo recommend to align the map with the terrain.

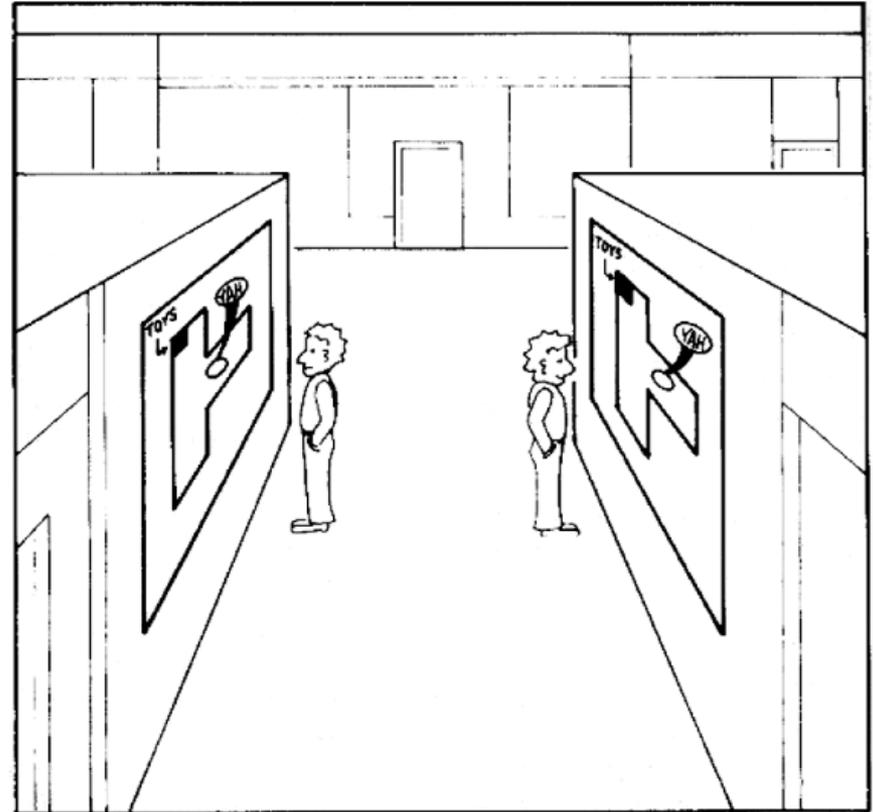


Source: Guideline of public signs in Koto City

Levine (1982) You-Are-Here Maps: Psychological Considerations

Recommendations for designing you-are-here maps:

- (1) provide salient, coordinate labels in both the terrain and the map;
- (2) place the map near an asymmetrical part of the terrain;
- (3) design the you-are-here symbol to indicate map-terrain correspondence;
- (4) align the map with the terrain (to avoid the alignment effect);
- (5) be redundant, that is, use as many of these supplements as possible.



Source: Levine et al (1984)

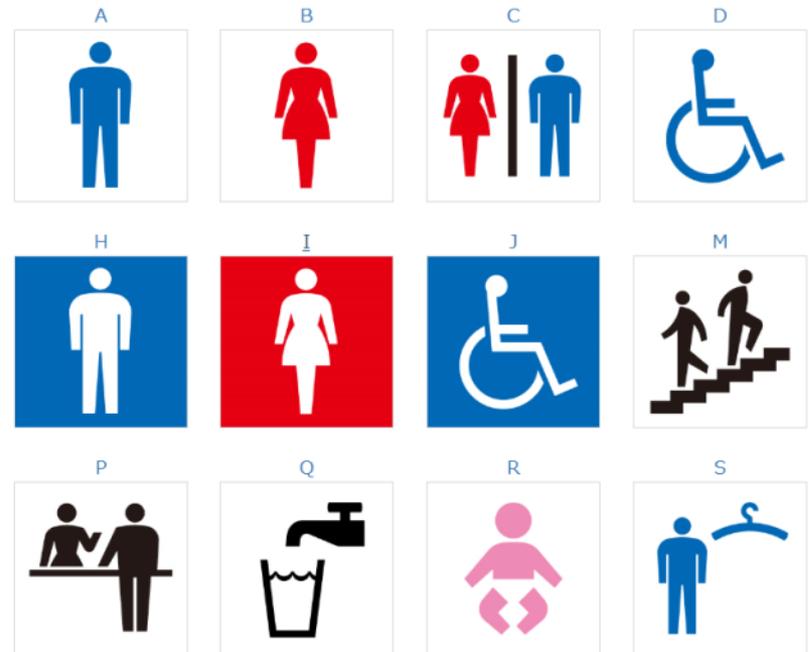
Problems of signs (1): Cultural differences

Maps on public signs featured pictograms and multilingual annotations.

However, we found that the use of pictograms was not uniform, and realized that some expressions might confuse foreigners.

Visitors are forced to rely on landmarks because most of the streets have no name, which is inconvenient for those from western countries.

Pictograms specified by Japan Industrial Standards(JIS)



Confusing pictograms



Problems of signs (2): Inconsistency

Inconsistency of design and contents between facilities or municipalities may confuse foreign visitors.

- Signs within station or building are managed by owners (e.g., railroad company, prefecture).
- Roadway signs are specified by the road authority.

Redressing imbalance in distribution of sign is needed.



Variation of you-are-here maps on public signs



Housing display



Evacuation map

TMG guiding sign



Kabukicho guide



Problems of signs (3): Maintenance

Guidelines of public signs by municipalities recommend to keep ledger of signs.

Nevertheless, old and new information coexists in the same map on sign.

Hence, regular inspection and revision should be made by the administrator of signs.

Source: Itabashi city sign design guideline



An example of ledger

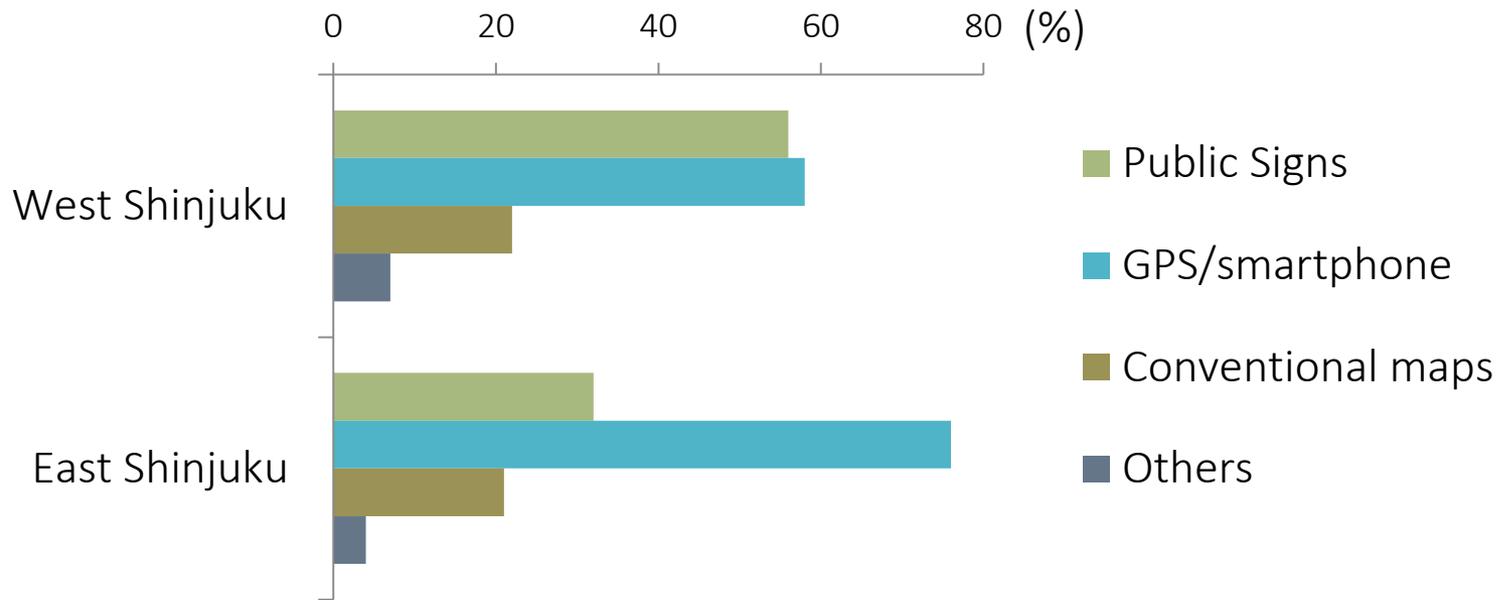
No	MC-1	種別	MC	所管	資産活用課	誘導起点駅	
名称	指定避難場所			内容			
案内対象施設							
所在地	本町24-1	住宅地図	95左	設置場所	〇〇小学校(敷地内)		
設置年度	H20	更新年度	H25	撤去			
本体サイズ	全高	2850	全幅	1200	奥行		
表示サイズ	高さ	1020	幅	1190	両面	〇	面数



How signs are used by foreign visitors?

Answers to the question on tools for wayfinding are analyzed by dividing samples into east and west Shinjuku.

Foreign visitors commonly use GPS/smartphone. Signs are used solely in east Shinjuku; there are a few signs in east Shinjuku.



Tools for wayfinding by foreign visitors (multiple answer)

Conclusions

Although public signs and maps on the street in downtown Tokyo sometimes cause problems in foreign visitors' wayfinding, they have undoubtedly helped to provide accurate directions through characters and pictograms.

Solutions to the problems of signs found in this study:

- (1) Cultural difference can be solved by adjusting the style and contents of the map on sign to manners and customs of foreign visitors.
- (2) Inconsistency problems can be solved by coordination among the administrators of signs based on a guideline.
- (3) Maintenance problems should be solved by regular inspection and revision by the administrator of signs.

Application of the ICTs to public signs

Answers to the questionnaire survey suggests a possibility of the combination between ICTs and public signs.

- Connection with cyberspace (e.g., QR code, RFID)
- Digital signage: The role of digital signage which is promoted by the Tokyo metropolitan government can be limited: limited number, cost-benefit weakness, issues of map making...

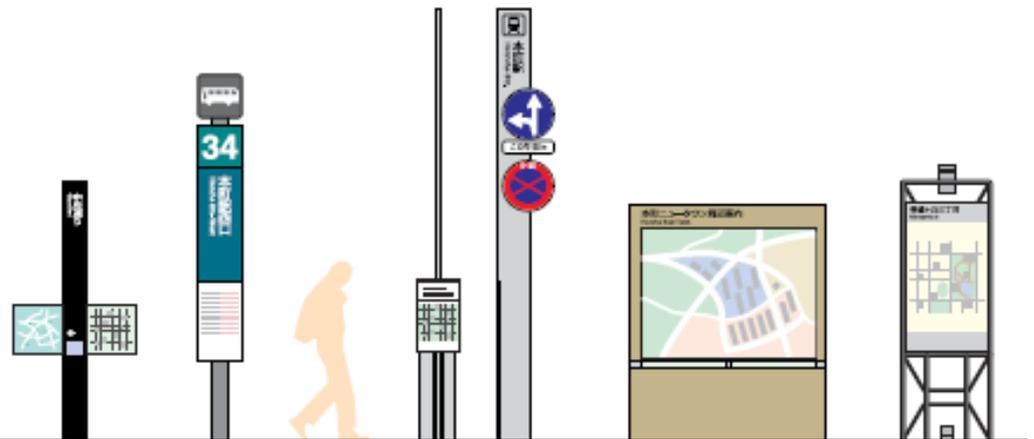
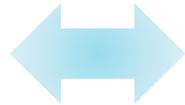
Digital signage



Implications for the study of ubiquitous mapping

Two roles of signs in wayfinding :

- “You-are-here maps are the original form, the grandmother of all location based services” (Klippel et al. 2010); guiding signs play a role of ubiquitous mapping in a real-world space by showing current location and direction.
- Direction (or identification) sign is an environmental cue connecting the map and the real-world space: public signs can be regarded as an annotation of actual size maps in the real-world urban space.... replaced by LBS?



Modified from Aboc Co. Ltd.

References

Calori, C and Vanden-Eynden, D. 2015. Signage and wayfinding design : a complete guide to creating environmental graphic design systems (2nd Ed.). Wiley.

Golledge, R.G. eds. 1999. *Wayfinding Behavior: Cognitive mapping and other spatial processes*. Johns Hopkins UP.

Klippel, A., Hirtle, S. and Davies, C. 2010. You-are-here maps: creating spatial awareness through map-like representations. *Spatial Cognition & Computation* 10: 836-93.

Levine, M. 1982. You-Are-Here Maps: Psychological Considerations. *Environment and Behavior* 14: 221-237.

Lynch, K. 1960. *The Image of the City*. The MIT Press.

Siegel, A.W. and White, S.H. 1975. The development of spatial representations of large-scale environments. In *Advances in Child Development and Behavior* Vol.10, Ed. Rees, H.W. , 9-55. Amsterdam: Academic Press.

Thank you for your kind
attention!

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