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ANALYSIS ON PSYCHOLOGICAL EFFECT OF LARGE-SPACE PUBLIC BUILDINGS ON SURROUNDING RESIDENTS BASED ON PSYCHOLOGICAL SPACE DISTANCE THEORY

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Abstract

With the boom of urban construction, more and more large-space public buildings (LSPBs) have emerged, which widens the psychological space distance between surrounding residents. In this paper, the psychological effect of the LSPBs on the surrounding residents is analysed based on the psychological space distance theory. Eight scenarios were designed according to the construction time of the LSPBs, and the sociality of the surrounding residents. A total of 150 families were selected to make real responses to different scenarios. The responses were analysed in the light of behavioural psychology of people in the LSPBs. The results show that the psychological space distance is unmeasurable, yet affects the behavioural decisions; the psychology of surrounding residences varies with the psychological space distances; the psychological effect on the surrounding residents is negatively correlated with the LSPBs' construction time, and positively with the sociality of the residents. The research findings lay a theoretical basis for the rational design of the LSPBs.

Key words: *Large-Space Public Buildings (LSPBs), Psychological Space Distance, Psychological Effects, Emotional Needs.*

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INTRODUCTION

In the new era of rapid economic development, large space public buildings, as an important place carrying the local cultural spirit and the main spatial link point of the mobile social economic network, have a tremendous impact on the sustainable development and value orientation of the urban social and economic system (Clark, Koopmans, Hof et al., 2014). Such Buildings are often the venues for many people, so they cannot be confined to a fixed form of architecture, but having the highly safety, environmental-friendliness, and localization (Lovreglio, Dias, Song et al., 2018). The psychological space distance reflects the psychological distance and relationship between two individuals to some extent. In terms of different safety distances, the spatial distance can be divided into intimate distance, private distance, social distance and public distance (Matties, Kastner, Klesses et al., 2011; Trope & Liberman, 2010). Some researchers have conducted statistical investigations; the physical environment of the LSPB design is considered to be poor by many, which is the main reason causing the adverse effects on residents (Wang, Guo, Wang et al., 2018).

From the perspective of the physical relationship, the LSPBs can be divided into indoor space, external space, intermediary space, and open space. The external space has the characteristics of openness and flow, which will produce certain impact on residents' psychology (Al‐Zoabi, 2004). The LSPB plays a unique role in social public life. However,

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psychological space distance is an important factor affecting the uncertainty within the supply chain system, while the LSPBs are meaningful sites as a natural environment of human and humanization (Berson, Halevy, Shamir et al., 2015; Rim, Hansen, & Trope, 2013). The psychological distance is the subjective and individual behaviour of the surrounding residents. The residents do not really understand each other's psychological effects and their own emotional needs, which also makes it difficult to study the LSPBs (Singh, Zwickle, Bruskotter et al., 2017). Based on the theory of psychological space distance, this paper explores the psychological effect of the LSPBs on surrounding residents. The research findings shall provide a theoretical basis for the design strategies of the LSPBs.

PUBLICNESS OF LARGE SPACE PUBLIC BUILDINGS

The LSPB is a perfect combination of public life and public space, in which people's social experience will be subtly enriched (Song, Li, Wang et al., 2015). In the different historical periods of China and the Western countries, the LSPBs also existed, but differ greatly in their form and style, ratio scale, symbolic meaning and limitations (Shepard, 2017). A complete large space can be defined in both narrow and broad sense. In the broad sense, the public space includes a certain range of public used space, such as public residential space, public transportation space, and public entertainment space (Thatcher & Milner, 2012). According to the function and function of the public space, there is certain distance from the outside in the design of the urban large space public buildings, because of its cold and enclosed skin of the main building is also the distance between the outside world (Jonathan & Halpern, 2018).

Figure 1 shows the interrelationship between space, people, and activities. Space includes objective world, subjective world and social world; people include human body structure, behavioural characteristics, and mental state; human activities include social activities, spontaneous activities and necessary activities, reflecting the interrelationships between the space, people and activities. People are the main body of the LSPB activities. Because of the gathering of humans, public spaces will have many rich activities and events, but the psychological space distance of people will affect the entertainment atmosphere of public buildings. Figure 2 shows the public construction of large space, including large space planning, large space design, public space design, environmental landscape design, etc., which requires the participation of the public or residents.

Figure 1. **The interrelationship of space, people and activities**

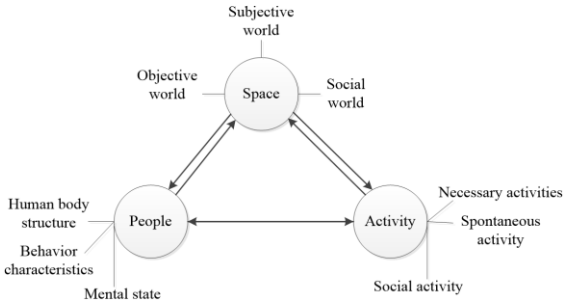
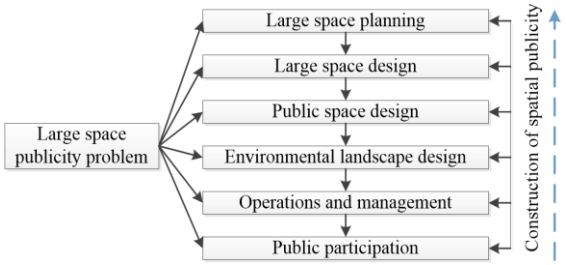


Figure 2. **Public construction of large space**



PSYCHOLOGICAL SPACE DISTANCE

Research design

In a certain environmental space, people will freely choose the level of representation based on their feelings caused by their different psychological space distance for different things. With the increase in the people's psychological space distance and reduction in the representation of things, it shall be easier to make low-level construal. The distance of psychological space determines that people will make different behavioural decisions. It has an important impact on the psychology of the surrounding residents. Psychological space distance is the perception of objective distance, but the two distances are different: the objective distance is measurable, while the psychological space distance is unmeasurable. Under the influence of large space public buildings, the psychological space perceived by different

residents also varies, which depends mainly on individual differences, individual's ability to deal with objective information of each dimension, and their psychological preferences. However, there exists the interaction effect between different residents' perception of the psychological distance at each dimension.

Table 1. **Influencing factors of comfort of large space public building space environment**

Influence factor	Content
Space environment	Temperature (room temperature) Humidity (relative humidity) Airflow Radiation temperature
Human body	Clothing volume Activity
Inhomogeneity environment	Upper and lower temperature distribution Radiation temperature inhomogeneity Room temperature variation Uneven and variable flow

Table 1 shows the factors affecting the environmental comfort of the LSPBs, including space environment, human body and inhomogeneous environment. This study aims to disclose the impact of the space environment of the LSPB on the psychology of surrounding residents. For this, a total of eight scenarios were designed according to the construction time of the large space public buildings, the sociality of the surrounding residents and the psychological effect caused by the building space environment, as shown in Table 2.

Establishment and testing of psychological space distance model

Psychological space distance is the three-dimensional extension of the world around. It is the distance and structure relationship between people. According to the research conditions above, 150 families were selected to test the psychological impact of the LSPBs on them. The selected subjects only needed to make real responses according to different situations. As the construction time of the LSPBs increases, the psychological impact on surrounding residents is weakened, and the social impacts are not significant. In addition to the measurement from spatial dimension, it's also necessary to test whether the sociality of the surrounding residents will be affected by the psychological distance from the perspective of sociality for the establishment of psychological space distance model. By contrast, the sociality of the surrounding residents is greatly influenced by psychological space distance, and there is also a significant magnitude effect.

PSYCHOLOGICAL EFFECTS OF LARGE PUBLIC BUILDINGS ON SURROUNDING RESIDENTS

Behavioural psychology of people in the space of public buildings

Figure 3 shows the relationship between architectural design and people. The architectural design includes architectural space and architectural entities. At present, the design of public buildings has started to be human-centred, providing an interdependent environment for the surrounding residents' lives and interpersonal exchanges. Due to the psychological distance of people's own space, their responses to the surrounding space environment will be affected by psychological potential factors and also differ psychologically. In large space public buildings, the flow of people was divided into fixed flow and non-fixed flow. There existed big differences in behaviour patterns and psychological needs between different people flows.

Table 2. **Subentry table of psychological impact of large space public buildings on peripheral residents**

No.	Construction Period	Sociality of the neighbouring residents	Psychological space distance	Psychological impact
1	2	oneself	Small	High
2	2	Familiarity with others	Small	High
3	4	oneself	Medium	High
4	4	Familiarity with others	Medium	Medium
5	6	oneself	Medium	Medium
6	6	Familiarity with others	Medium	Medium
7	8	oneself	Large	Low
8	8	Familiarity with others	Large	Low

Figure 3. **The relation between architectural design and people**

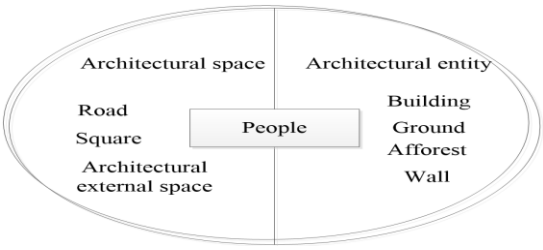
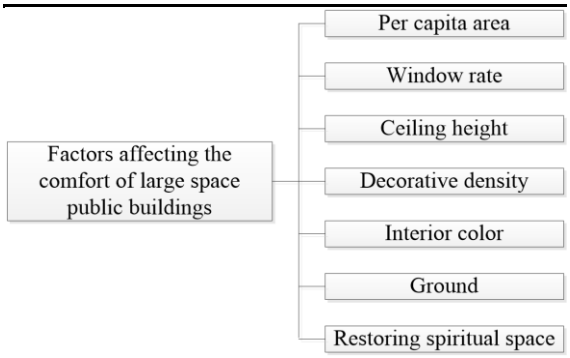


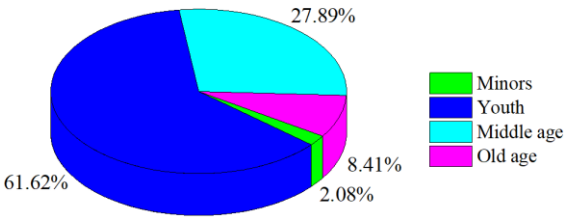
Figure 4. **The relation between architectural design and people**



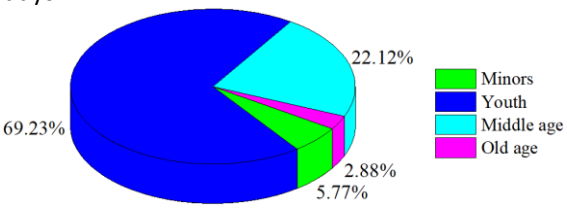
Design of large space public buildings based on the psychological needs of the surrounding residents

Figure 4 shows the factors affecting the comfort of the LSPB, including per capita unit area, window ratio, ceiling height, decorative density, interior colour and ground etc. The surrounding residents have special requirements for the living environment. From the psychological space distance, the living conditions of the residents around the public buildings should be enough for them to have more opportunities for communication. Take the LSPBs in the metro as an example. Figure 5 shows the pedestrians composition of public buildings in the metro space on the working hours and non-working days. It can be seen that on working days or non-working days, the pedestrian is mostly the youth, of which most are office workers; the morning and evening rush hours around the metro have seriously affected the normal life of the surrounding residents. Therefore, in the design of large space public buildings, it should be mainly considered not disturbing the normal life of the surrounding residents.

Figure 5. **Pedestrian composition of metro large space public buildings on working and non-working days**



(a) Age composition of pedestrians on working days



(b) Age composition of pedestrians on non-working days

CONCLUSIONS

Based on the theory of psychological space distance, this paper explores the psychological effect of the LSPB on surrounding residents. The specific conclusions are as follows:

(1) People are the main body of large-scale public building activities. Because of the gathering of people, public spaces will have many rich activities and events, but the psychological space distance of people will affect the entertainment atmosphere of public buildings;

(2) Under the influence of the LSPBs, the psychological space perceived by different residents also varies, which depends mainly on individual differences, individual's ability to deal with objective information of each dimension, and their psychological preferences. However, there is the interaction effect between different residents' perception of the psychological distance at each dimension;

(3) People's own sense of psychological space distance, and their response to the surrounding space environment will be affected by psychological potential factors, and produce different psychological reactions. The design of large space public buildings should consider not to disturb the normal life of the surrounding residents.

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