The Present of Architectural Psychology Researches in China- Based on the Bibliometric Analysis and Knowledge Mapping

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Abstract. Architectural Psychology is an interdisciplinary subject of psychology and architecture that focuses on architectural design by using Gestalt psychology, cognitive psychology and other related psychology principles. Researchers from China have achieved fruitful achievements in the field of architectural psychology during past thirty-three years. To reveal the current situation of the field in China, 129 related papers from the China National Knowledge Infrastructure (CNKI) were analyzed by CiteSpace II software. The results show that: (1) the studies of the field in China have been started since 1984 and the annual number of the papers increased dramatically from 2008 and reached a historical peak in 2016. Shanxi Architecture tops the list of contributing publishing journals; Wuhan University, Southwest Jiaotong University and Chongqing University are the best performer among the contributing organizations. (2) “Environmental Psychology”, “Architectural Design” and “Architectural Psychology” are the most frequency keywords. The frontiers of the field in China are “architectural creation” and “environmental psychology” while the popular research topics were “residential environment”, “spatial environment”, “environmental psychology”, “architectural theory” and “architectural psychology”.

1. Introduction
As a branch of environmental or ecological psychology, Architectural Psychology is an interdisciplinary subject of psychology and architecture that focuses on architectural design psychology, architectural design cognition, architectural space and environmental-behavior research by using Gestalt psychology, cognitive psychology and other related psychology principles [1], which can provide people a stress-free, healthy and happy atmosphere. Western researchers post a lot of important theory and model on architectural psychology. Notable among them is David Canter, the author of Psychology for Architects, who analyzes, explains and understands how people interact with the buildings and spaces around them [2]. Although researchers from China carrying out research on the field of Architectural Psychology is relatively late, which the earliest article was published in 1984 [3], many papers on architectural psychology have been published in China during past thirty-three years. Among these researches, Chinese researchers have explored the study of architectural psychology from theory and practice (e.g., “[4-12]”). In the theoretical analysis of the field, Chinese
researchers have explored the meaning and effect of psychology on architectural design (e.g., ‘[4-5]’). In the practical analysis of the field, Chinese researchers have explored the application of architectural psychology [6-7], such as the design of kindergarten (e.g., ‘[8]’), commercial pedestrian street (e.g., ‘[9]’), university library (e.g., ‘[10]’), museum (e.g., ‘[11]’) and subway station (e.g., ‘[12]’) by architectural psychology. According to the above-mentioned clues, researchers from China have achieved fruitful achievements in the field of architectural psychology in the period of 1984-2017, unfortunately, a thorough quantitative analysis of objectively identify influential journals and organizations as well as the popular research trends and topics has not been found. To help Chinese researchers to conduct better on the field of architectural psychology, the current study presents a quantitative review of the field of architectural psychology in China based on the bibliometric analysis and knowledge mapping with the help of the CiteSpace II software [13].

2. Methodology

2.1. data sources

The data sources were chosen from the of China National Knowledge Infrastructure (CKNI), and first launched in June 1999 by Tsinghua University and Tsinghua Tongfang Holding Group, which collects 90% of Chinese knowledge resources, comprehensive coverage of journals, dissertations, newspapers, proceedings, yearbooks, reference works and law. To search conducted in the CNKI collection under the heading “architectural psychology”, it yielded 142 published papers of all types. The initial search attempt resulted in a total of 129 studies excluding the irrelevant articles, which contains 117 journal articles and 12 Dissertation.

2.2 data processing

129 studies were saved in RIS format which includes the crucial information, such as titles, authors’ names and affiliations, abstract and keywords. The bibliometric analyses and knowledge mapping were conducted with Java CiteSpace II software [12], which supports the construction and visualization of bibliographic record networks and is suitable for visualizing relative small ones [13].

3. Results

3.1 Bibliometric analysis results

3.1.1 Publishing trend. Fig 1 demonstrates the publishing trend of studies in the field of architectural psychology in China. The studies of the field in China started since 1984. The period of from 1984 to 2007 shows a slow growth with 38 related papers in 24 years. The annual number of the papers increased dramatically from 6 articles in 2008 to 21 articles in 2016, reaching the historical peak by 2016.

![Fig 1. Publishing trend in the area of architectural psychology in China (1984-2017).](image-url)
3.1.2. Contributing journals. Table 1 presents the top 10 journals contributing to the field of architectural psychology in China. The statistics indicate that Shanxi Architecture tops the list with a total of 11 articles, followed by Doors and Windows, World Architecture and Journal of Architectural Education in Institutions of Higher Learning, each of which published 4 articles.

| Rank | Author                                                   | Frequency |
|------|----------------------------------------------------------|-----------|
| 1    | Shanxi Architecture                                     | 11        |
| 2    | Doors and Windows                                       | 4         |
| 3    | World Architecture                                      | 4         |
| 4    | Journal of Architectural Education in Institutions of Higher Learning | 4         |
| 5    | Huazhong Architecture                                   | 3         |
| 6    | Art Science and Technology                              | 3         |
| 7    | Industrial Construction                                 | 3         |
| 8    | Jiangxi Building Materials                              | 3         |
| 9    | Architectural knowledge                                 | 3         |
| 10   | Sichuan Architecture                                    | 3         |

3.1.3. Contributing organizations. Table 2 depicts the top 10 organizations contributing to architectural psychology research in China. As seen, Wuhan University, Southwest Jiaotong University and Chongqing University all published 5 articles and ranked at the top of the Contributing organizations list, followed by Taiyuan University of Technology.

| Rank | Author                              | Frequency |
|------|-------------------------------------|-----------|
| 1    | Wuhan University                    | 5         |
| 2    | Southwest Jiaotong University       | 5         |
| 3    | Chongqing University                | 5         |
| 4    | Taiyuan University of Technology    | 4         |
| 5    | Tongji University                   | 3         |
| 6    | Tianjin University                  | 3         |
| 7    | Henan University                    | 3         |
| 8    | Beijing University of Technology    | 3         |
| 9    | Huazhong University of Science and Technology | 2         |
| 10   | Xi’an University of Architecture and Technology | 2         |

3.2. Knowledge mapping results

3.2.1. High frequency keywords. Top 10 keywords of the field in China were presented in Table 3 and visualized in Fig 2. As shown, “Environmental Psychology”, “Architectural Design” and “Architectural Psychology” are the most frequency keywords, followed by “Architectural Environmental Psychology” and “Application”.

| Rank | Keywords                              | Frequency |
|------|---------------------------------------|-----------|
| 1    | Environmental Psychology              | 54        |
| 2    | Architectural Design                  | 29        |
| 3    | Architectural Psychology              | 14        |
| 4    | Architectural Environmental Psychology | 12        |
3.2.2. Popular research trends. Fig 3 shows the top two keywords with the strongest citation bursts. As shown, “architectural creation” was began 1988 to 1991 while “environmental psychology” was began 2011 to 2015. The statistics suggest that the topic of “environmental psychology” is the major frontiers of architectural psychology research in China.
3.2.3. Popular research topics. Fig 4 shows the top five largest clusters with Modularity Q is 0.885 and the Mean Silhouette is 0.863 analyzed by CiteSpace II. The top five largest clusters are “residential environment”, “spatial environment”, “environmental psychology”, “architectural theory” and “architectural psychology” respectively. Among them, the size of cluster “residential environment” is the largest, with 6 high frequency keywords, such as “residential environment”, “privacy”, “upwards”, “sense of oppression”, and so on.

4. Conclusions and further research
During past thirty-three years, many papers on architectural psychology have been published in China, but a thorough quantitative analysis of objectively identify influential journals and organizations as well as the popular research trends and topics has not been found. To fill this gap, this paper presents a quantitative review of the field of architectural psychology in China based on the bibliometric analysis and knowledge mapping. The bibliometric analysis results show that the studies of the field in China have started since 1984, the annual number of the papers increased dramatically from 2008 and reached a historical peak in 2016. Shanxi Architecture tops the list of contributing publishing journals, followed by Doors and Windows, World Architecture and Journal of Architectural Education in Institutions of Higher Learning. Wuhan University, Southwest Jiaotong University and Chongqing University are the best performer among the contributing organizations. The knowledge mapping results show that “Environmental Psychology”, “Architectural Design” and “Architectural Psychology” are the most frequency keywords, followed by “Architectural Environmental Psychology” and “Application”. The frontiers of architectural psychology research in China is “architectural creation” from 1988 to 1991 while the frontiers of the field transform into “environmental psychology” in the period from 2011 to 2015. Cluster analysis by CiteSpace II obtains five largest clusters, which are “residential environment”, “spatial environment”, “environmental psychology”, “architectural theory” and “architectural psychology” respectively.

For future research, we could present the research topics by years and provide new insights by timeline analysis. Moreover, we could compare the research between China and developed country to help Chinese researchers conduct better on the field of architectural psychology.

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