

The Dynamics of Architectural Form: Space, Emotion and Memory

Guopeng Li

School of Architecture and Fine Arts, Dalian University of Technology, Dalian, China

Email: liguopeng@dlut.edu.cn

How to cite this paper: Li, G. P. (2019). The Dynamics of Architectural Form: Space, Emotion and Memory. *Art and Design Review*, 7, 187-205.
<https://doi.org/10.4236/adr.2019.74016>

Received: September 2, 2019

Accepted: October 20, 2019

Published: October 23, 2019

Copyright © 2019 by author(s) and Scientific Research Publishing Inc.
This work is licensed under the Creative Commons Attribution International License (CC BY 4.0).
<http://creativecommons.org/licenses/by/4.0/>



Open Access

Abstract

The focus of this paper is in the area of architectural psychological impacts on human senses, behaviours and experiences. Such a study is important and essential in order to unite the senses, feelings and experiences together with the traditional architectural design theories and methods, and then understand how we should design and what we should concern about during design. This paper summarises an approach for architectural design on how to integrate multi-senses into practice and reflect human senses, behaviours and experiences in the realm of environmental psychology. This paper also recommends that architects should be aware of these psychological influences for future design; a consideration of environmental perception and responses should be taken during interior design, architectural design and urban planning.

Keywords

Architecture, Environmental Psychology, Senses, Behaviours, Experiences

1. Introduction

How to level up the visual standard of city landscape? How to enhance the social communication with the help of public space? How to lay out the classroom to promote the enthusiasm of study? How to design an office to improve the work efficiency?

Distinctly, all of these above connect the design of architectural spaces and places with our mind, senses and environmental-impact experiences, which are indeed vital aspects during design and planning. Architectural and scientific research studies on the relations of environmental factors and human psychological, physical behaviours and experiences have already directed architects to improve, or even change the way of design. These researches are mostly focusing

on three objectives: The first one is to talk about the close relations of human senses and architecture. Steven [Holl \(1994\)](#), [Pallasmaa \(2005a, 2005b\)](#), and Peter [Zumthor \(2006\)](#) write to explain the importance of human senses and perception; Rudolf [Arnheim \(1977\)](#) focuses on the dynamics of visual aspect; [Malnar and Vodvarka \(2004\)](#) put forward multi-sensory concern in architectural and landscape design. The second one is to describe the different psychological experiences from different architectural forms. In this area, there are many reports, studies, articles, and books about the relationships between architectural elements, forms, spaces, places and human psychological experiences, such as Richard [Weston's description \(2003\)](#) of the meanings of each material, and Benson [Lau's study \(2007\)](#) on luminous environment in the Monastery of La Tourette. The last one is to find what people really need in the realm of architecture and environment, which is called environmental psychology or architectural psychology. Edward [Hall \(1969\)](#) gives the basic theory of psychology; [Bell, Green, Fisher and Baum \(2001\)](#) as well as Robert [Gifford \(2002\)](#) put the theories into concrete practice.

Till now, these researches and studies have helped design in hospitals, schools, and unit residential. For example, in classrooms with increased natural light, students could achieve higher test scores than those in normal classrooms. And, at least according to research done in London, unfashionable "hospital green" walls did help speed up the healing process. In San Diego, hospital patients, their families and medical staff reported positive effects from exposure to uplifting art and healing gardens ([Jarmusch, 2003](#)).

Consequently, the prospect of design with concern about both architectural form and human psychological needs will make it possible for architects to approach design in a new way, and also could have far-reaching social, personal and economic benefits in the field of urban planning, interior design and architectural design theoretically and practically.

Therefore, the overall aim of this paper is to explore the relationships between architecture and human through analysing emotional and psychological effects on our behaviour, actions, emotions and perceptions influenced by our built environment (buildings and the spaces inside out). Thus, this paper consists of five main parts. Section One explains the people-architecture relations and provides a direction of the roles of architecture itself and human in architectural design and contemporary society; Section Two mainly characterizes the human sense on buildings and the essence of architectural senses, which will provide the communication between people and buildings; Section Three, according to different types of architectural form from basic elements to specified places, will identify the distinct meanings of dissimilar modes of spaces. In Section Four, standing on the point of normal people, an exploration of relationship of environment, psychological impact and behaviour will be presented. And in the last section, the case study of Peter Zumthor's Thermal Bath will help provide a comprehensive understanding of design associated with applications of environmental psychology.

2. People-Architecture Relations

Sir Winston Churchill says: “*We shape our buildings, thereafter they shape us.*”. Indeed, people are the creators of artificial environment especially the buildings, also we are influenced by architectural environment gradually and constantly.

2.1. Influences from Architecture as Buildings and Places

In accordance with the different needs and functions, we create different places such as supermarket and sports hall; then, consequentially, we join in and use these places. Afterwards, impacts from the different environmental factors we built lead us to distinct psychological responses and behaviour reactions, and sometimes the appearance of a new type of architectural form could change the original activity content, or even bring a fresh one. For instant, a newly-built swimming pool where accessing a swim, dive or water polo might bring people who live nearby a new habit—swim in the afternoon, but these people would hardly buy food from there. That is all because a place consists of not only the physical size but also the participations and responses from people. Similarly, architecture is not only a construction but also a media of communicating with us and representing the aesthetics, philosophy and our value idea which all give enormous impetus to the progress of human ourselves.

2.2. Influences from Architecture as History, Culture, Politics and Society

Architecture itself not just has a close relationship with us, it reflects a social image. Most of the history, culture and politics of a city are exhibited as the fine art of architecture.

It is obvious that in the architectural history, besides the functions of residence and work, a building is a remarkable promotion of economy and civilization. Take Acropolis, Athens as an example: The Acropolis of Athens was built in fifth century BC. Built on a flat-topped rock which rises 150 meters above sea level, the whole building complex was a monument of the golden period and a witness of fully prosperity of the city of Athens. The reason for its boom is that the construction of Acropolis had three clear themes: the first one is to celebrate and memorize the victory against the Persian army’s aggression. The second one is to glorify and decorate the city, to state and strengthen the status of Athens. The last one is to make the economy increase rapidly, which was the most important aspect. The vast city-building provided a large number of employment opportunities and the extensive construction also attracted all the Greek philosophers, artists, craftsmen and other people to Athens. That made Athens which was originally a small town and did not attract so much attention to a rapid developed economic and cultural centre of Greece.

In like manner, architecture contributes the politics. In the 17th century France, most of the classical architecture was the large-scale national constructions and some of them were specified for the glory of Louis XIV and his regime.

He believed that with the exception of military power, only the great architecture could perform the king of the great and solemn spirit. During this period, the construction of the Louvre East elevation, the Place Vendome and the Palace of Versailles were built for Louis XIV of the “great era” and the “great style”. Napoleon also understood the political role of architecture. The Triumphal Arch (**Figure 1**), the biggest “door” in the world with a construction of 49.4 meters height, 44.8 meters width and 22.3 meters thick, was the best evidence to prove the “military honour”. Such form of the “Empire style” affected people’s cognition of majesty; it brought a great impact on the 19th century European architecture as well.

2.3. Concern with Human Senses, Behaviours and Experiences

Architecture itself not just has a close relationship with us, it reflects a social image. Most of the history, culture and politics of a city are exhibited as the fine art of architecture.

According to the state of the relationship between architecture and us, therefore, the architectural creation is a communication between buildings and human, and among physical elements (facades, structures and landscapes), social factors (history, culture and politics) and our psychological context (emotion, memory and behaviours). Thus, a good designer should not only consider the decisions made for the styles and forms, but also be awareness of the influence from the buildings and places on the people who are using these, and then, on the basis of the psychological responses and behaviour reactions, develop design methods to improve the environmental quality.

Contrarily, less consideration of the psychological influences on human senses, behaviours and responses might cause social and psychological failure. The Pruitt-Igoe housing project (**Figure 2** and **Figure 3**), built in St. Louis, Missouri, USA, has been regarded as one of the most infamous failures of public housing in American history. Katharine G. Bristol (1991) had described that “This version of the Pruitt-Igoe story is a myth. At the Core of the myth is the idea that architectural design was responsible for the demise of Pruitt-Igoe”.



Figure 1. The triumphal arch.



Figure 2. The Pruitt-Igoe housing project.



Figure 3. The demise of Pruitt-Igoe.

This project was designed in 1951 by architect Minoru Yamasaki (who would later design the World Trade Centre) as a part of the post-WWII federal housing program for bringing back the demobilized servicemen to the city life. However, owing to the inattention of social communication and human reaction, within a few years it quickly fell into disrepair and disuse, and heavily vandalized by its own residents. Even worse, many of the architectural design elements of Pruitt-Igoe which were innovations of modernist architecture (high-rise, high-tech, green plants, designed for sunlight and reducing industrial pollution) turned out to be at best inconveniences and breeding grounds for crime, such as its recreational galleries which no one would feel ownership of and “skip-stop” elevators which stopped only at fifth, seventh and tenth floors in an attempt to lessen congestion.

The buildings remained largely vacant for years, and after spending more than five million dollars and several failed attempts to rehabilitate the area, the first building was demolished on March 16, 1972. The demolition of the entire complex was completed in 1976.

3. Senses of Architectural Form

Architecture is the link between nature and man-made realm. Through the

senses of architectural forms, we could have perception and experience, and then we understand the world and ourselves much better.

3.1. Perception through Senses

“Our immediate awareness of the phenomenal world is given through perception. We are highly dependent upon seeing our surroundings in a satisfactory manner. Not only do we have to find our way through the multitude of things, but we should also ‘understand’ or ‘judge’ the things to make them serviceable to us.” Christian Norberg-Schulz (1963).

People attempt to make the environment surrounded familiar through perception, so that they could organize activities in it confidently and favourably. The varieties of senses to perception reflect different possibilities of understanding surroundings. Senses are joined together, so that we learn, following we clear about what establishes important information. Thus, the way we understand surroundings including architecture is directly related to the way we process received environmental information from senses.

The five classical senses (sight, hearing, touch, smell and taste) are the most essential sensory experiences in architectural realm. We interact with the architectural form through these senses. With these intersections, we could realize the value of spaces and places, and they become meaningful to us too.

It is also worth to remember that there are some more sensations we experience that are not formally categorised as one of the five classical senses, such as orientation, gravity, balance, temperature, enclosure and moods.

3.2. Planning and Design for Human Senses

“The task of architecture is to strengthen our sense of the real, not to create settings of mere fabrication and fantasy. The essential mental task of the art of building is mediation and integration. Architecture articulates the experiences of being-in-the-world and it strengthens the sense of reality and self. It frames and structures experiences and projects a specific horizon of perception and meaning.” Juhani Pallasmaa (2005b).

Multi-sensory design is becoming more and more popular in unit residential, special schools and hospitals; in particular the ones focus on touching effects for the blind people. All these are concentrating on offering psychological experiences and multi-sensory responses which express the identities of these designs. Several architectures have been constructed on the basis of emphasising specified senses, particularly the senses of sight and touch. The examples are The Church of Light (visual sense) (Figure 4), Civil Rights Memorial (sense of touch) (Figure 5) and Vietnam Veterans Memorial (sense of touch) (Figure 6).

It is regrettable that there are few buildings presenting other senses except sight and touch. But it is indubitable that through careful and imaginative design, it is possible to build more buildings which provide a wider range of sensory experiences to the users. It is worth to note that when planning for a multi-sensory



Figure 4. The church of light.



Figure 5. Civil rights memorial.



Figure 6. Vietnam veterans memorial.

design, in order to maximise the value of certain experiences, a systemic and imaginative design method is required. Additionally, the things being introduced should be concerned about seriously: the objectives of multi-sensory designs should be clear, the range of senses should be confirmed, the accessibility should be easy, as well as the safety issues should be carefully thought about.

4. Impacts from Architectural Experiences

We have innate abilities to perceive the environment around us; our bodies can be aware of the subtleties of changes in patterns and proportions. Therefore, no matter consciously or unconsciously, the human body is physiologically receiving information from surroundings which may be at work influencing us on psychological behaviours when we are living, working, studying or playing within the built environment. The investigation of artificial structures and their possible impact on human behaviours would surely, but not completely, confirm why and how people might behave in a particular space or place, such as people always show their awe at the sight of the awesome vertical interior of a Medieval or Gothic cathedral (**Figure 7**); a huge structure makes a person feel overwhelmed and vulnerable; a deviant temperature (too cold or too hot) or noise level (too noisy or too quiet) may cause a person psychological pressure. For revealing these emotionally or spiritually factors, the physical surroundings which would affect the senses in any environment should be concerned.

The psychological and behavioural effects between people and their physical environments are complex. However, when the elements, spaces and places are taken into account separately, they become quite clear.

4.1. Experiences from Elements

In a manner of speaking, if a building is a body, light & shadow, materials, colour, water and structure are the spirit, muscle, skin, blood and bones respectively. Concrete elements such as material, colour and light (which are considered as the main aspects of visual art by Donald Judd, 1994), and some other ambient environments, such as water, sound and temperature make up the whole built environment. These elements are experienced as characteristics of a building through the senses of body, including not only the visual sense, but also senses such as hearing, smell, touch and taste.

4.2. Experiences from Spaces

“Space has since become such an integral part of our thinking about architecture



Figure 7. The interior of Cathédrale Notre Dame de Paris.

that we are practically incapable of thinking about it at all without putting our main emphasis on the spatial displacement of the subject in time.” Kenneth Frampton, 1995.

The experiences of spaces are from concepts of human inventions (such as scale, vertical or horizontal, straight or curve, order or disorder, symmetry or asymmetry, and mobility) which are not tangible but are observable and contain an element of measure. These concepts give form to building elements and help order these elements in order to describe a built environment.

4.3. Experiences from Places

The experiences of places with the help of architectural elements and spatial forms give meanings to spaces, memorable, fantastic, or common. Generally, the properties of places include religion and quotidian.

4.4. Planning and Design for Human Experiences

Naturally, people want to seek a place where they will experience the feelings of competent, confident, comfortable and enjoyable. Thus, the creation of an appropriate environment is believed to increase the good experience of well-being and behavioural effectiveness in people.

For this reason, the most important thing is having attentions on how people notice their environment and understanding the meaning of each architectural elements and forms. For example, the understanding of people perceiving architecture the applications of psychological responses from architectural elements and forms in Acropolis, Athens received huge rewards: besides the rectangular base and the canopy were designed with subtle curves (**Figure 8**), the corner columns of the Parthenon were designed to be thicker and spaced closer to surrounding columns to realize visually interpreted as being of equal size and spacing; the entire structure and the columns are slightly tapered. This method was also used in “David” (**Figure 9**), though it is not a building. Therefore, elements, spaces, and places of architecture seem to have the ability to influence and reflect the psychological experiences of its users.



Figure 8. Parthenon in Acropolis, Athens.



Figure 9. David.

5. Environment Psychologies: “Space, Emotion and Memory” & Human Behaviours

Understanding human behaviours and psychological responses from architecture starts with understanding how people notice the environment surrounded.

5.1. Environmental Psychology

With the birth of architecture, it provides us an artificial environment different from nature; it is not only a space with three dimensions, but an important aspect influencing our physiological, psychological and social consciousness. So carefully thinking about our bodies and the relationships between our bodies and environmental psychology is essential.

In the real lives, our behaviours and moods just occur in the context of an environment which includes all the natural and built surroundings; they are meaningful only if they can be understood in terms of the environmental context. Thus, the environment determines whether or not behaviours are possible and significant, for instance, one cannot walk through where a wall blocks his way; one cannot lie on a bed where no bed exists. Therefore, when we change the environment to make buildings humane and suitable for activities, our behaviours and experiences are changed and enriched by the environment. This study of psychological reaction in relation to environment is environmental psychology. Robert Gifford (2002) gives the definition of Environment Psychology that “Environmental Psychology is the study of transactions between individuals and their physical settings”.

Standing on the point of normal individual, environmental psychology involves four main parts: personal space, territoriality, crowding and privacy, as well as other ambient environments. Individual differences should be respected during the research of individual environmental psychology. As a function of the characteristics, individual environmental psychology follows different individual situations, such as gender, age and personality, and each of these personal situa-

tions plays an important role in forming individual environmental psychological responses. Duo to the differences of backgrounds and situations, the spatial and psychological behaviours vary widely. For instance, great changes took place in personal space with the change of gender and age: with the increase of ages, personal space increases with time for both men and women, and the growth rate of men is more obvious than that of women (**Figure 10**¹).

5.2. Planning and Design for Human Behaviours

Ultimately, can environmental psychology contribute to a better planning or design? The answer is absolutely yes. The aim of environmental psychology is oriented towards influencing the work of planning and design, which include architectural design, interior design, and urban planning, and improving the human environment. In this circumstance, processing a planning or a design with the help of environmental psychology is essential, as shown in **Figure 11**.

First of all, emphasize the importance of research in individuals' situations (such as age, gender, lifestyle and background for private buildings) and social conditions (such as standard of living, culture and history for public constructions). That can minimize the gap between the designers and the people who will eventually live and work in these buildings. Sufficient communication between designers and clients should be taken at the first step. Second, design with concern about environmental psychology. The feelings of personal space, territoriality, crowding and privacy exist everywhere, even though they may change in a different condition. Designers should develop ways to fulfil these requirements, especially in detail design. The last but not the least, gather responses from these users, analyse them and then improve the design method for the coming projects. After these three steps, substantive benefits could be seen and an improved, cleared idea can contribute for the future planning and design.

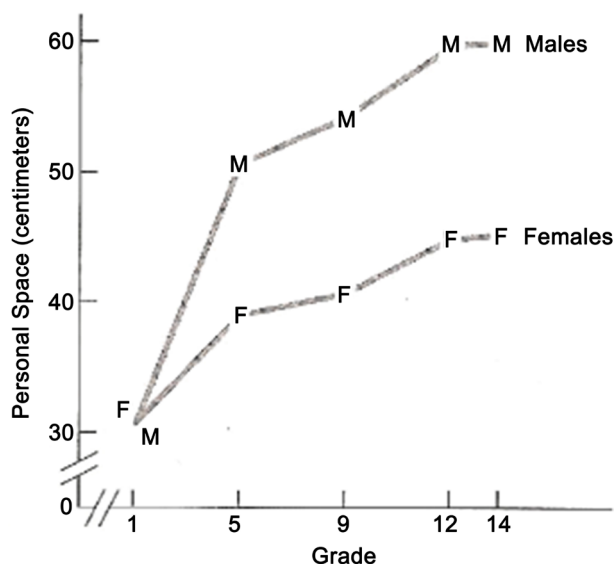


Figure 10. Personal space increases with the age and gender.

¹Picture from *Environmental psychology: principles and practices*, Robert Gifford, 2002.

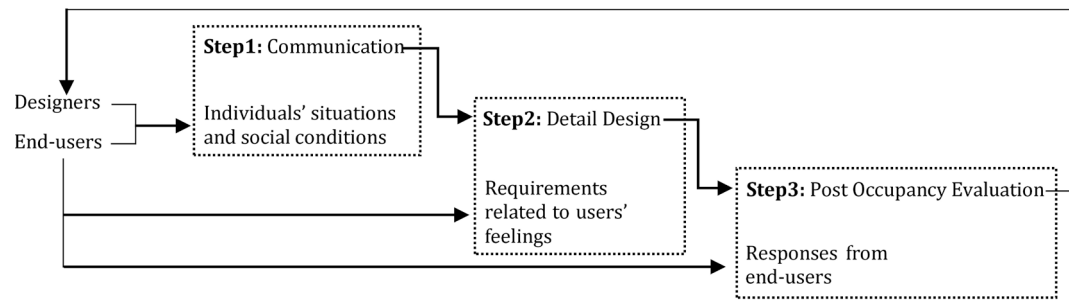


Figure 11. Three steps processing designs with environmental psychology.

6. Design with Space, Emotion and Memory: Peter Zumthor's Thermal Bath as a Case Study

In 1990, Peter Zumthor designs the Thermal Bath Vals in Switzerland, in his book *Peter Zumthor Works: buildings and projects 1979-1997* (1999), he writes, “*Right from the start, there was a feeling for the mystical nature of a world of stone inside the mountain, for darkness and light, for the reflection of light upon the water, for the diffusion of light through steam-filled air, for the different sounds that water makes in stone surroundings, for warm stone and naked skin, for the ritual of bathing.*”. Indeed, this stone-made building provides us a comprehensive understanding of design associated with applications of environmental psychology.

6.1. Senses from Thermal Bath

“*The rays of light falling through the openings in the starry sky of the cupola illuminate a room that could not be more perfect for bathing: water in stone basins, rising steam luminous rays of light in semidarkness, a quiet relaxed atmosphere, rooms that fade into the shadows; one can hear all the different sounds of water, one can hear the rooms echoing. There was something serene, primeval, meditative about it that was utterly thrilling.*”. Sigrid Hauser & Zumthor (2007) uses his beautiful words to describe this wonderful architecture. In other words, the water, stones, and light in the Thermal Bath give us a multi-sensory experience.

Water in Thermal Bath has two forms: one is vapour, and the other is water itself. The water steam with the help of refraction and reflection creates a psychedelic visual effect which relaxes people in a gentle atmosphere. While the spring water in stone basins is clear and fresh; together with different temperatures and colours in different pools, the water offers different senses of touching, smelling, and sighting. Due to the strong connection between skins and water, activities in pools always make water move in basins; the intimate relations between water and stone basins with the water movements always produce sounds. Hereby, water also performs a role of acoustic tasting.

Stone is the material of Thermal Bath. Peter Zumthor (1999: p. 156) describes his building as a “large porous stone” from the exterior and a “geometric cave system” from the interior space. Thus, we can say this “stone” is built of stones. The uniform of this building including the ceilings, walls, and floors are deter-

mined by a conscious series of natural stones strata: layer upon layer of the Vals gneisses (**Figure 12**). The profile, destiny, and texture all strengthen the sense of reality and weight performance. Through touching the rough surface, we can feel both the history of the place and artificial power.

Light differs from main entrance to the central bath until the rest places or exterior bath in the Thermal Bath. From the entrance to the changing rooms, there are no windows, no view permissions towards exterior; only artificial lights are provided (**Figure 13(a)**); in the central indoor bath, there is no window too, but dim natural sunlight through the glass-covered fissures in the ceiling together with the artificial lights (**Figure 13(b)**) offer the luminous environment; in the terraces (**Figure 13(c)**) or the outdoor bath (**Figure 13(d)**), there are all natural sunlight. Varieties of lightings, in this wise, give guests in the Thermal Bath different luminous experiences: natural light and artificial light, semidarkness and bright, even shadows, which are all visual senses.

6.2. Thermal Bath and Psychological Experiences

Actually, besides the feeling of calmness and massiness from horizontal layers of stones; the pithiness and intimacy from the simple architectural form—block



Figure 12. Layers of Vals gneisses (Zumthor, 1998).

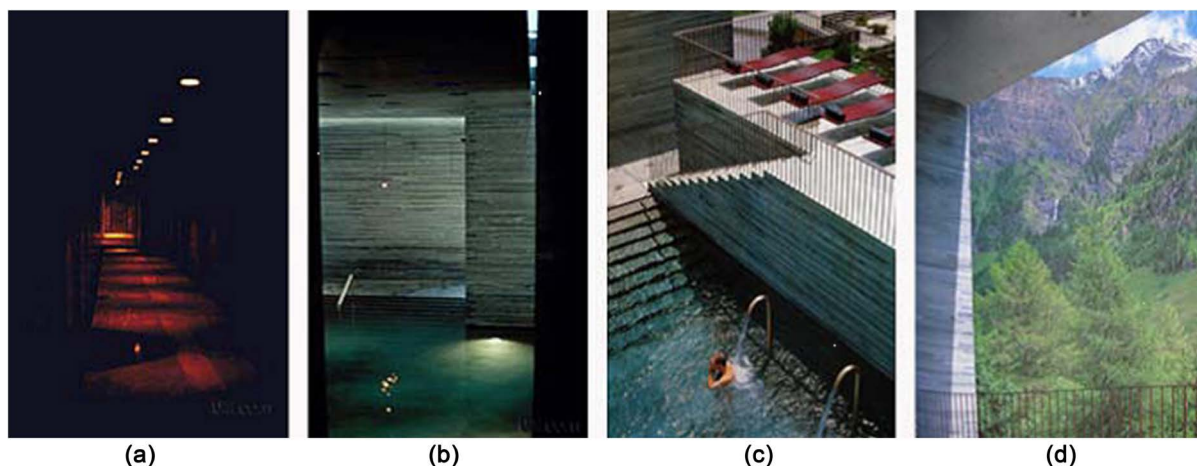


Figure 13. Light-differing line: from the main entrance to main bath until exterior bath or terraces. A: from the entrance to the changing rooms; B: in the central indoor bath; C: in the terraces; D: in the outdoor bath.

structure and local materials, the most significant experience and psychological responses are from the light, including natural light and artificial light. Natural light consists fissure-light in the ceiling and light from windows. A network of six centimetres glass fissures in the stone ceiling brings light to the baths and adds to the sense of fluidity of overall space; these straight light lines indicate the direction in narrow spaces and illuminate the material (**Figure 14**); the shadows on the stone walls are somewhat like the marks left by the spring water (**Figure 15**).

According to the functions and different sizes, some windows bring light and beautiful landscape into the building to provide a bright space for activities; the others restrict the input of light to create a semidarkness environment for relaxing (**Figure 16**).

Artificial light include different colours. For example, the orange light means the route of circulation; the blue light indicates the places next to the water (**Figure 17**).

6.3. Behaviours Control in Thermal Bath

Peter Zumthor made a space with stones to create a dynamic, maze-like space



Figure 14. Fissure-light in the ceiling.



Figure 15. Light, shadow and the marks of spring water.



Figure 16. Big windows and small windows.

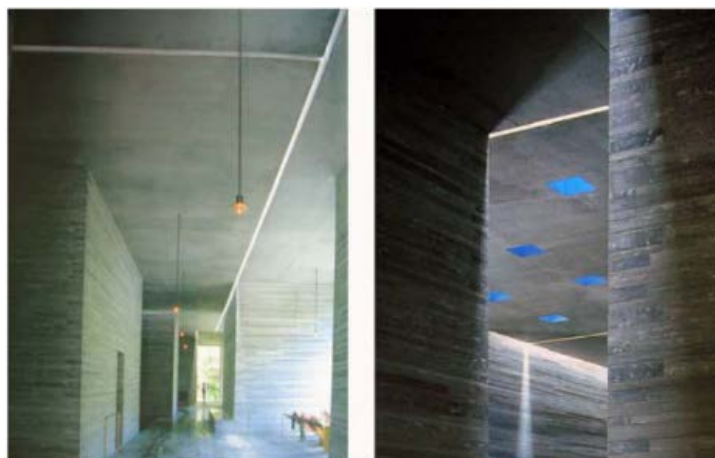


Figure 17. Orange light and blue light.

which evokes curiosity in cavern spaces; meanwhile, he used stones walls, block structures, even the ways of lighting to control the access to self-behaviours.

According to the spaces and functions, the plan of the building utilizes two contrasting space types: inside or outside the structural blocks (**Figure 18**). Inside the blocks, we can see from **Figure 19**, they are all private places which include changing rooms, make-up rooms, shower rooms, special baths, and therapy rooms. However, the spaces outside the blocks are public places: the meander serves the central space for circulation, permitting the access of the baths and other private places; one of baths is interior and the other is exterior; the terraces provide the places for rest. These approximate circle-shaped public spaces around the private blocks promote movements in the building.

Moreover, what we have talked about is there is a light-differing line, from the entrance to terraces or to exterior bath. With more and more natural light is introduced, the degree of privacy is weakened.

From what have been exhibited, we can see the Thermal Bath is a building providing satisfactions with multi-senses, behavioural control and plenty of experiences. It takes psychological impacts into account and contributes a template of design with applications of environmental psychology.

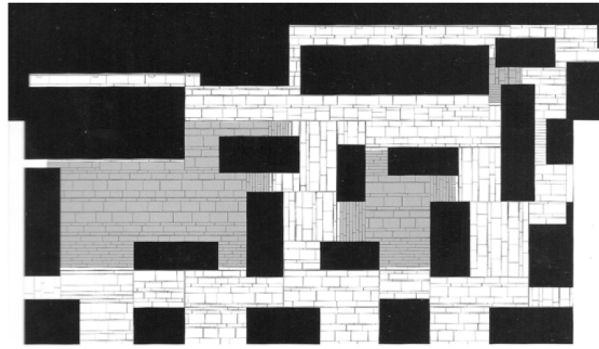


Figure 18. Structure blocks, bathing level.



Figure 19. Floor plan, bathing level.

7. An Approach for Architectural Design

7.1. Design and Planning for Senses

In the book *Sensory Design* written by Joy Monice Malnar and Frank Vodvarka (2004: p. 151, p. 152), it is said that, “*the real world is complex, sending out millions of information signals, we can only be aware of a small portion of them. This information is experienced and recorded as differentials of colour, heat, motion, sound, pressure, direction, and whatever else is present and within the range of senses.*” (Figure 20). Thus, for strengthening the feeling of the real world, especially the feelings of buildings we talk about, we have to create sensory components, forms and places to induce activities such as touch, smell, and hearing and encourage people to sending themselves into the activities, then enhance the information-communicating with nature and built environment, as well as enrich the senses experience.

7.2. Design and Planning for Experiences

As we have seen materials, lights, colours, architectural forms as well as other ambient environments all have great impacts on our psychological responses

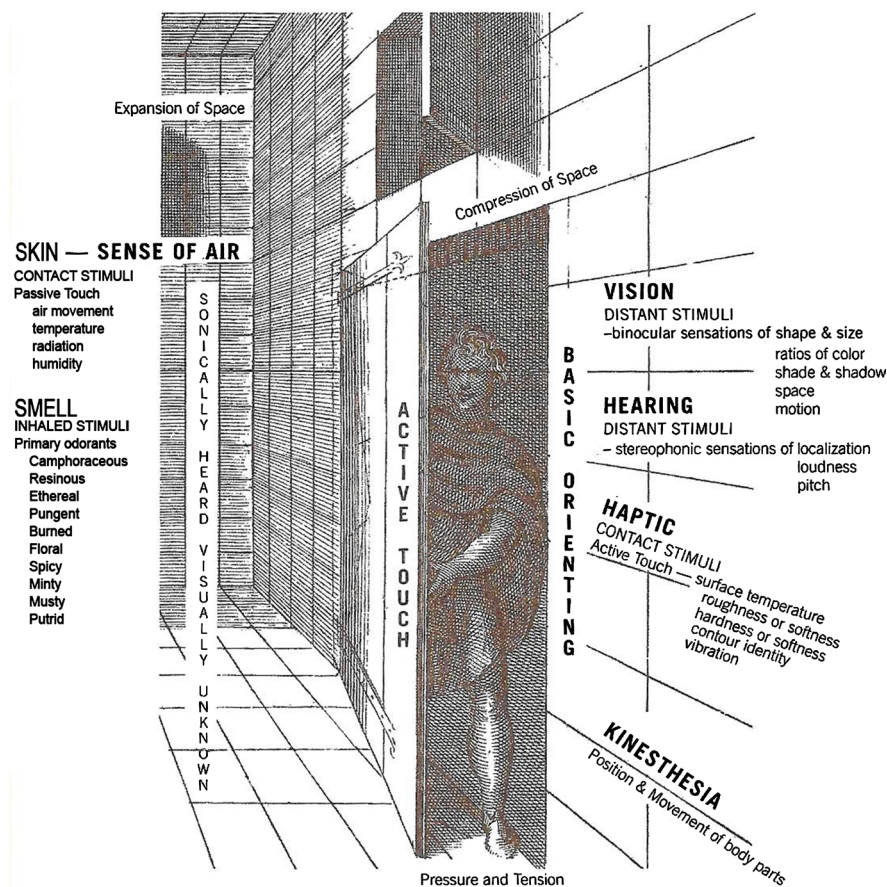


Figure 20. Ranges of senses (Malnar & Vodvarka, 2004).

and experiences. If these factors cannot match the individuals' needs or requirements, they may cause detrimental influences on human emotion, work performance, even mental health. Thus, we have to understand the meaning of every element of the space, and use them in combination with clients' requirements properly. Too much or too less employment of the architectural elements are unbecoming; too much use may cause stress and discomfort; too little may not take effect. Although at times it is intelligible that some architects, for preventing negative consequences, may just use the simplest architectural forms to shape a building, however, particular buildings, such as temples, cathedrals, and other religious or memorable constructions, need to be enhanced by the specified building elements. For example, particular types of light can create a sense of mystery and awe; and vertical architectural form suggests an overpowering grandeur which can enhance human experience and behaviour in religious spaces.

7.3. Design and Planning for Behaviours

We have known that personal space, territoriality, crowding, and privacy are interrelated and interdependent aspects. They can decide and explain most of our behaviours in or around the buildings. For a better behavioural environment, we have to think about them and find an effective way. It is said that one of the most

significant approach is “control of access to the self” (Cassidy, 1997: p. 178). It is strange but evident that everybody has two faces: one face is people want to be in participation of social interactions to seek opportunities of communication and social support; the other is, sometimes, people need to withdraw the busy and noisy conditions and enjoy a quiet place belonging to themselves solely to be certain of they are holding their personal space, territory, and privacy. Thus, the most importance of control of access to the self is to provide a place in which people can control over the choices of being alone or participating in social communication. This method of choosing-control is more useful in crowded building environment, such as prisons, offices and dealing with communities and neighbourhoods in residential complexes.

8. Conclusion

As has been discussed, the fact is that besides the Architectural History, Theory, Structure and Technology, the studies on psychological impacts from architectural forms have been considered as an integral and mandatory part of architectural design. Also it is one of the dynamics of formatting architectural forms.

The primary focus in this paper is the interaction between architectural form and psychological effects on human, which consists of three aspects; the first one is the effects from the cognitive and affective senses on the built environment conditions; the second one is the influences from specified architectural form; and the third one is the individual psychological requirements. The relationships between architecture and human have been explored through a series of theoretical studies in investigating architectural psychological behaviours and illustrating cases. With the help of the case study of Thermal Bath from Peter Zumthor, a design and planning approach for reflecting human senses, experiences and behaviours in the realm of environmental psychology has been summarised.

The whole case-study strategy provides multiple source of architectural form. The illustrating cases and case studies in this paper are drawn from famous architects, whose architectures, Pallasmaa (2005a) describes, clearly favour sight and incorporate strong tactile experiences in the forceful presence of materiality and weight. It helps to analyse the concrete and complex situations, and the benefit of using the case study is more clear and straightforward. However, the collected case studies and related pictures are from different architectural types, and the coherence and connectivity between theories and those case studies are difficult to be consistent. More cases are needed for future research development.

Acknowledgements

This work is supported by “the Fundamental Research Funds for the Central Universities” (DUT19RW113).

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

- Arnheim, R. (1977). *The Dynamics of Architectural Form*. Berkeley, CA: University of California Press.
- Bell, P. A., Green, T. C., Fisher, J. D., & Baum, A. (2001). *Environmental Psychology* (5th ed.). Belmont, MA: Wadsworth Group/Thomson Learning.
- Bristol, K. G. (1991). The Pruitt-Igoe Myth. *Journal of Architectural Education*, 44, 163-171. <https://doi.org/10.1080/10464883.1991.111102687>
- Cassidy, T. (1997). *Environmental Psychology: Behaviour and Experience in Context*. Hove: Psychology Press.
- Frampton, K. (1995). *Studies in Tectonic Culture: The Poetics of Construction in Nineteenth and Twentieth Century Architecture*. London: MIT Press.
- Gifford, R. (2002). *Environmental Psychology: Principles and Practices* (2nd ed.). Boston, MA: Pearson Custom Publishing.
- Hall, E. (1969). *The Hidden Dimension*. New York: Doubleday.
- Hauser, S., & Zumthor, P. (2007). *Peter Zumthor: Therme Vals*. Zurich: Verlag Scheidegger and Spiess.
- Holl, S. (1994). *Questions of Perception: Phenomenology of Architecture*. New York: Princeton Architectural Press.
- Jarmusch, A. (2003). *Mind-Set: Research Project Will Study Architecture's Impact on Brain*. http://biology.ucsd.edu/about/news/article_050503.html
- Judd, D. (1994). *Some Aspects of Colour in General and Red and Black in Particular*. New York: Artforum International Magazine.
- Lau, B. (2007). The Poetics of Sacred Light: An Investigation of the Luminous Environment in the Monastery of La Tourette. In *The 24th Conference on Passive and Low Energy Architecture*. PLEA Conference Paper No. 0532.
- Malnar, J. M., & Vodvarka, F. (2004). *Sensory Design*. Minneapolis, MN: The University of Minnesota Press.
- Norberg-Schulz, C. (1963). *Intentions in Architecture*. Cambridge, MA: MIT.
- Pallasmaa, J. (2005a). *The Eyes of the Skin: Architecture and the Senses*. Chichester: John Wiley & Sons.
- Pallasmaa, J. (2005b). Touching the World—Architecture, Hapticity and the Emancipation of the Eye. In *The 8th Meeting of Heads of European Schools of Architecture* (pp. 34-41). Chania, Greece: European Association for Architectural Education. <http://www.eaae.be/wp-content/uploads/2017/04/20051073.pdf>
- Weston, R. (2003). *Materials, Form and Architecture*. London: Laurence King.
- Zumthor, P. (1998). *Peter Zumthor = Pītā Zuntō*. Tokyo: A + U Publishing.
- Zumthor, P. (1999). *Peter Zumthor Works: Buildings and Projects 1979-1997*. Basel: Birkh.user.
- Zumthor, P. (2006). *Atmospheres: Architectural Environments, Surrounding Objects*. Basel: Birkh.user.