# Development of a Model of Perceptual Persistence in Architecture Using the Grounded Theory Method

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## ABSTRACT

Nowadays, the need for eternity in contemporary architecture is one of the most important issues that attract architects. Many of the architectural works do not reach timelessness and eternity, even if accepted at a certain period. Although in recent years some conferences and congresses on architecture have tried to find out how to create an eternal work in the field of architecture by examining eternal architectural works, there is still a lack of a suitable model for studying how to achieve eternity and persistence in architectural works. Since in architecture, persistence can be examined in two aspects: physical persistence and perceptual persistence, the present study aims to provide a practical solution to this problem by studying perceptual persistence and how to achieve it, in order to provide spaces that meet the spiritual and internal needs of human beings positively at all times, and communicate with a wide range of people. To explain the research problem, the grounded theory method is used. The findings of the study result in the development of a theory of perceptual persistence in the form of a coding pattern and the relationships between codes. The results of the study are also based on the important point that using patterns common among eternal works is a prerequisite for perceptual persistence in architecture, but not a sufficient condition. What keeps common patterns alive is the use of meaning and attention to human nature in the form of code and symbol, which are present in the building body under the influence of the two factors of culture and spirituality.

**Keywords:** Persistence, Perception, Perceptual Persistence, Grounded Theory, Architecture.

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## 1. INTRODUCTION

Man desires infinity and this desire was placed in his nature based on the wisdom of divine creation. The desire of the eternity strangely manifests itself in all layers of human life, especially in architectural works, because man sees eternity as power, and architecture is the embodiment of that power, by which it saves itself from being unable. An architectural masterwork shows the interest of human beings in timelessness and permanent novelty, i.e. those works that seem to be created now and live in a timeless dimension. These works have various features that distinguish them from other similar works.

"The term eternity and its concept have been used with the meanings of "infinity" and "immortality" in philosophical and theological studies. Intellectually and philosophically, it is found that infinity and persistence are indefinitely the prerequisite for eternity" (Daryani, PourJafar, & Ghobadi, 2015, p. 34). Accordingly, it can be said that "persistence" is a more general concept than eternity, because the persistence of a phenomenon can occur only at a certain time, but if this persistence lasts forever, the "eternity" has occurred. Now, in the present study, the more general concept, i.e. "persistence", is considered to present a model to show both how an architectural work can be persistent at a given time, and how it can remain persistent forever. To address this issue, in architecture, persistence can be examined in terms of two aspects: physical persistence and perceptual persistence to infinity. The persistence of an architectural work depends on simultaneous attention to these two aspects because paying attention to just physical persistence does not lead to eternity and the work will become a historical sculpture although it preserves the structure over time. The role of perceptual persistence in eternity is such that sometimes, architectural masterworks have been mentioned for years and are cited as a model for future works although their structures have changed over time. In the modern world, the advancement of construction technologies makes it easier to achieve physical persistence than in the past, but what is important here, and has been less addressed, is to achieve perceptual persistence in architecture, and this is what any architect must look for in his design in order to put his/her work on the path of timelessness and eternity. In general, perceptual persistence means that the passage of time cannot change the outstanding and obvious features that must be designed in the spatial perception of the building. Accordingly, the present study seeks to answer the following question: How can perceptual persistence be achieved in architecture? This paper aims to develop a model of perceptual persistence in architecture using the grounded theory method. In this paper, the steps of the grounded theory are separately followed for the issues of persistence in architecture and mental perception, and finally, coding patterns and the theories obtained from them are adapted to achieve the theory of perceptual persistence.

## 2. LITERATURE REVIEW

Considering the literature review, it can be said that there are a few studies on how to achieve persistence and eternity in architectural works. Christopher Alexander, for example, in his book entitled "Architecture and the Secret of Immortality; The Timeless Way of Building" (2013), after defining "timeless way" and "nameless quality", introduces concepts such as "pattern language" and "alive patterns", and talks about the method of design and construction in architecture. According to Alexander, find the timeless way, first, we must know nameless quality. Nameless quality refers to the main basis for the soul of every human being, city, building, or wilderness. Also, Abdolhamid Noghrehkar et al., in their article entitled "Eternity Secret of Architectural Works (In Modernism, Post Modernism and More Inclusive View)" (2009), stated that to make a work persistent, it is necessary to simultaneously pay attention to all human aspects raised in the field of architecture such as man, artist, society, history, nature, and God, so that both artist (from elite-oriented view) and society (from public-oriented view) are considered human beings in relation to the other two aspects, i.e. nature and God, who approach unity and can create eternal works. About perception in architecture, Juhani Pallasmaa, in his book entitled "The Eyes of the Skin: Architecture and the Senses " (2005), with a different view, discusses the definition and position of different senses. He expresses the need of senses to each other, and about architecture, he says that an architectural work unites and mixes physical and mental structures. He also talks about the conflict between the senses of sight and touch and says that in today's architecture, a balance in each of them must be looked for. According to Pallasmaa, what has been forgotten in today's architecture is to pay attention to the ontological meaning of each of architectural elements, i.e. each of which hides what purpose and concept in itself, and the architect must apply them according to their natures.

Other studies on this subject, which are available in references, or presented in conferences and congresses, have often addressed the definition of eternity, description, analysis and criticism of the eternal and past architectural, and there is still a lack of a structured and practical method of designing buildings with persistence and eternity. Accordingly, in the present study, it was attempted to address the issue of "perceptual persistence" by reviewing other studies. So far, no specific research has been carried out on perceptual persistence.

## 3. METHOD

The present study is applied and qualitative research which was carried out using the grounded theory method. In this study, the data were collected by using the library research method, documents and preparing fiches from reliable books and articles. The grounded theory is one of the most important qualitative research strategies. In the present study,

this strategy was used aiming at developing a theory of perceptual persistence in architecture, which was done inductively. To do this, first, researchers divided the issue of perceptual persistence into its two components, namely persistence, and mental perception, and then followed the steps of grounded theory for each of them separately, and presented a theory for each in the form of an axial coding pattern, based on Strauss and Corbin' "coding paradigm" model. At this step, the core phenomenon was placed in the center of the process studied, and then the related categories were connected to it. These categories included "causal conditions",

"strategies", "context and intervening conditions", and "consequences". The result of this process is a diagram, called a "coding pattern". Then, the two obtained coding patterns, and the resulting theories were adapted to each other in order to achieve the theory of perceptual persistence. The results of this adaptation would lead to the formation of a coding pattern for the core phenomenon of perceptual persistence, and finally, the theory of perceptual persistence and how to achieve it in architectural designs were described by developing the obtained relationships in the new pattern. Figure 1 shows the research process.
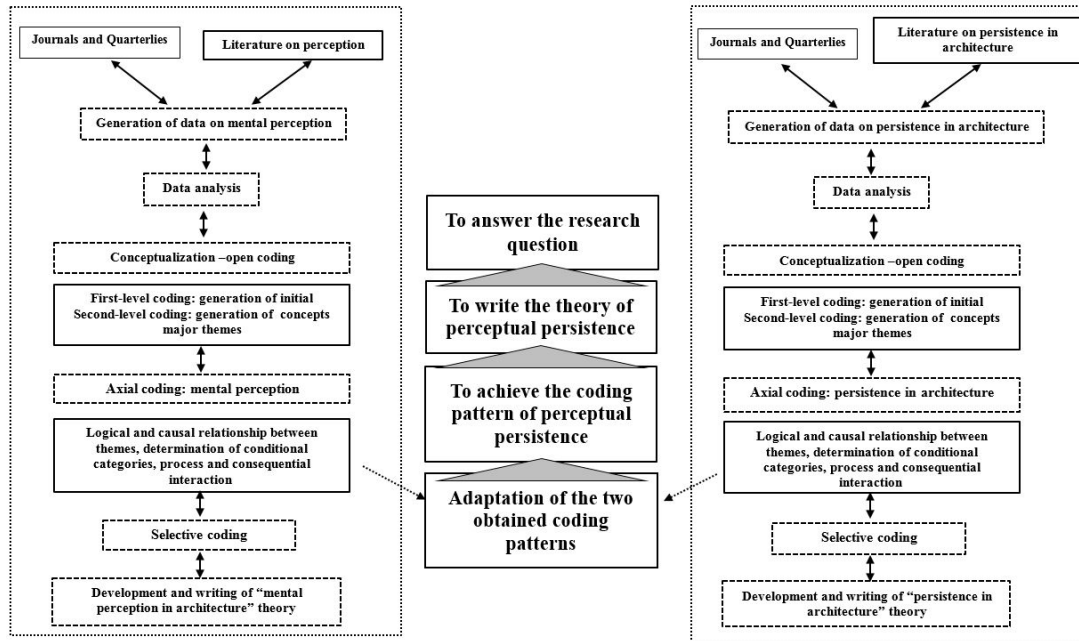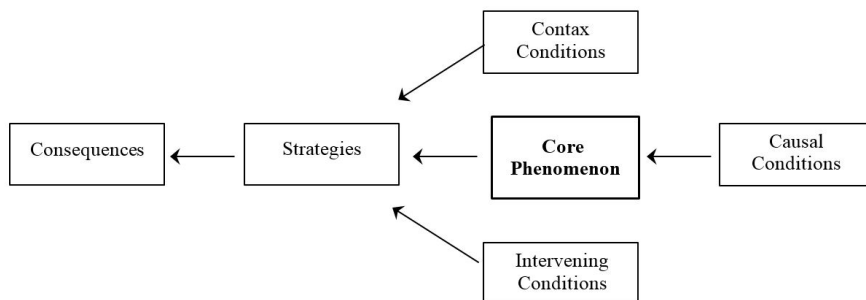


**Fig. 1. Research Process**



**Fig. 2. Axial Coding Pattern Based on Strauss and Corbin' Coding Paradigm Model**
(Creswell, 2005, p. 401)

## 4. DATA DESCRIPTION AND ANALYSIS

According to the grounded theory method used in the present study, grounded theorists use a procedure requiring simultaneous and successive data collection and analysis (Danaeifar & Emami, 2007, p. 10). Moreover, in this method, the analyst decides what data to collect and where to find them in the future to improve his or her theory until it emerges (Danaeifar & Emami, 2007, p. 11). Therefore, in this section, data are described and analyzed simultaneously. According to this method, first, the obtained data were examined in

two general categories of persistence in architecture and mental perception and then each of them was analyzed at two steps of open coding and axial coding using the grounded theory method and the results obtained from the analysis of each of them became a theory at the selective coding step. Then, the theories and coding patterns of the core phenomena of persistence as well as mental perception were combined with each other, and finally, the coding pattern of perceptual persistence and the resulting theory were obtained. This pattern can help the architect to achieve an eternal design.

## 4.1. Description and Analysis of Persistence in Architecture

In this section, using the grounded theory, the data extracted from the literature on persistence and eternity in architecture are categorized and analyzed to describe how to achieve persistence in architecture, and finally, relevant data are selected and integrated.

### 4.1.1. First Step: Open Coding

This step consists of two parts:

### A. First-Level Coding (Generation of Initial Concepts)

At this step, the contents on persistence were reviewed line by line and the key points and themes were encoded. These codes are in the form of concepts, which were derived from the texts on persistence in architecture. By examining and studying the data, 116 sentences related to the subject were extracted from the texts, then the contents with repeated codes were removed and finally, 36 encoded sentences listed in Table 1 were collected (the data related to "persistence in architecture" are referred with the letter (A)).

**Table 1. Generation of Initial Concepts from Data on Persistence in Open Coding**

| Id | Data | Concept (Code) |
|---|---|---|
| A1 | Alive architecture is considered as a factor for the persistence and immortality of today's architecture (PourJafar & Ghobadi, 2013, p. 33). | Being Alive |
| A2 | Attention to culture, the use of eternal archetypes and the ability to attract the audience can be expressed as other differences between sustainable and eternal architecture (Ibid, p. 33). | Archetypes and Culture |
| A3 | Examining eternal and persistent buildings in architecture and finding the geometry and patterns commonly used in these buildings can be effective in achieving persistence in the building (Ibid, p. 33). | Geometry and Common Patterns |
| A4 | In the article "Eternity in Urbanism with a Look at the City of Rome", what is presented as the symbol of eternity is the presence of the element of spirituality (Ibid, p. 34). | Spirituality |
| A5 | A prerequisite for achieving alive and eternal spaces is to achieve common patterns, which do not belong to a particular place, but are immortal everywhere in the world (Alexander, 2011, p. 87). | Universal Common Pattern |
| A6 | Persistence means what can remain and continue (Pakzad, 2000, p. 108). | Continuity |
| A7 | According to Lynch, immortality is the degree to which elements of a city are resistant to fatigue and have the ability to operate over a long period of time (Pakzad, 2004, p. 109). | Resistance and Activity Continuity |
| A8 | The durability of the body is related to its structure, physical body and statics (PourJafar & Ghobadi, 2014, p. 35) | Structure and Statics |
| A9 | Architecture requires its own specific meaning to become eternal (Ibid, p. 35). | Specific Meaning |
| A10 | According to Seyyed Hussain Nasr and professor Abolghasemi, what makes buildings persistence and eternal in Iranian architecture is attention to meaning and spirituality along with attention to culture, climate and design context (Ibid, 2014, p. 38). | Climate and Design Context |
| A11 | Persistence is the timelessness of a work, which affects the mind of the user and becomes eternal in his mind (Alexander, 2007, p. 8). | Timeless |
| A12 | Frank Lloyd Wright considers the term identity to be the secret of persistence and immortality of the architectural work (Noghrekar, HamzeNejad, & Foruzandeh, 2009, p. 42). | Identity |
| A13 | The eternity of a phenomenon, in addition to its characteristics, affects how it deals with subsequent periods as well as the surrounding conditions (PourJafar & Ghobadi, 2014, p. 36). | Attention to Surrounding Conditions |
| A14 | Spiritual ideas can create a memorable and desirable mental image for the individual and create a sense of belonging to the environment and space (Ibid, p. 39). | Beliefs and Rituals |
| A15 | Spiritual meanings and ideas strengthen social relationships and interactions and lead to the emphasis on public and spiritual interests, and not personal interest, and ultimately pay attention to the values of society, and this is an important factor for the persistence and eternity of space (Ibid, p. 51). | Attention to the Values of Society |

| Id | Data | Concept (Code) |
|----|------|----------------|
| A16 | Spiritual meaning and ideas are one of the ideas making space eternal, increasing the sense of belonging to space (Ibid, p. 39). | Spiritual Meaning and Ideas |
| A17 | If human and the hidden dimensions of his existence are known, it is possible to create a desirable architecture, as an artistic work that has the ability to become eternal, based on this knowledge (Golabichi, 2012, p. 1). | Knowledge of Human and the Hidden Dimensions of his Existence |
| A18 | Praising and attracting the audience is timeless and permanent when the artist is not content with what people want at the time, but also opens a horizon that is always and at all times needed by the people and leads them to higher levels of time and space (Noghrekar, Hamze Nejad, & Foruzandeh, 2009, p. 36). | Timeless and Placeless |
| A19 | Having archetypes is not the reason for the persistence of the building, it should be noted that in eternal buildings, both culture and religion have been considered, and those dependent on divine religions and have many followers are more eternal (PourJafar & Ghobadi, 2014, p. 41). | Religion |
| A20 | Spiritual and sacred patterns and their role in persistence can play a role in architecture (Ibid, p. 41). | Spiritual and Sacred Patterns |
| A21 | What is expressed as persistence in architecture is the existence of an alive and dynamic architecture that is not limited to a specific time, but is permanent and eternal throughout history (Ibid, p. 46). | Alive and Dynamic |
| A22 | Persistence is considered as a kind of historical and cultural continuity, along with being alive of the building (Ibid, p. 46). | Historical and Cultural Continuity |
| A23 | Attention to eternity in space design creates a persistent mental image in the audience (Izadi, 2015, p. 8). | Persistent Mental Image |
| A24 | Architecture can be stable if it is in harmony with nature, with time, flexible and dynamic, and its creator's capital is used properly (Izadi & Haghi, 2015, p. 6). | Being with Time, Changeability, in Harmony with Nature |
| A25 | The short life span of today's buildings can be the separation of their qualities from the eternal qualities (Ibid, p. 6). | Attention to Eternal Quality |
| A26 | Those buildings become eternal that the reason for their eternity are beyond physic and matter. The reason for their eternity is soul that is blown into these buildings (Abbakhshaei & Turkaman, 2013, p. 35). | Soul of Building |
| A27 | Being Islamic is not a prerequisite for eternity, but Islamic identities have cultivated eternity because they are divine in nature (Zare, 2015, p. 11). | Being Divine |
| A28 | Rudolf Arnheim sought to discover the secret of eternal visual composition throughout history. He considers the center to be the most effective concept in achieving this goal, and introduces the two principles of centrifugalism and centripetalism as the key to the puzzle of visual composition (Nadimi, Mangari, & Mohammadi, 2013, p. 117). | Eternal Common Patterns (Centrifugalism and Centripetalism) |
| A29 | Stable and responsive spaces are not constructed unless communicating with a deeper or more important concept is considered (Schultz, 2000, p. 112). | Deep and Important Concept |
| A30 | In Iranian architecture, what makes the building eternal is the attention to the spiritual dimensions in architecture and the manifestation of the beliefs and culture of people in architecture that evolves with human presence and becomes immortal beyond time (PourJafar & Ghobadi, 2014, p. 40). | Manifestation of Beliefs and Culture |
| A31 | Meaning, value, concept and message (rational and emotional) are a phenomenon and one of the dimensions of persistence (Pakzad, 2004, p. 71) | Value, Concept and Message |
| A32 | In fact, the meaning, function, and body of a phenomenon cannot be separated, persistence can be examined in all three of them (Pakzad, 2000, p. 108). | Function and Body |

| Id | Data | Concept (Code) |
|---|---|---|
| A33 | In general, persistence has two dimensions: meaning and concept and body. Its body is its durability (PourJafar & Ghobadi, 2014, p. 35). | Physical Durability |
| A34 | According to Lynch, space must have a perceptible identity and also be recognizable, memorable, and visible in order to create a sense of place (Kashi & Bonyadi, 2013, p. 45). | Sense of Place |
| A35 | The importance of understanding meaning and spirituality, and how they manifest and continue can lead to the creation of a new cultural identity in line with the beliefs and culture of Iranian society (PourJafar & Ghobadi, 2014, p. 38). | Cultural Identity |
| A36 | The reason for the persistence of historical monuments has been the use of meaningful spatial language by their architects (Lawson, 2012, p. 26). | Meaningful Spatial Language |

## B. Second-Level Coding (Generation of Major Themes)

After finding the concepts related to persistence in architecture, they are categorized. "Theme is the classification of concepts. These themes are discovered when concepts are compared and seem to be related to similar phenomena. In this way, concepts are categorized in a higher order. The theme is a concept that is more abstract than other concepts" (Danaeifar & Emami, 2007, p. 13). The categorization method used in this research is cumulative categorization, in which while working on the contents, if a new concept is observed in Table 1, a new class is formed and those concepts similar to the new class are organized under it. Table 2 shows the concepts of each of the data extracted from the text and their classification. Accordingly, 44 concepts extracted from 36 examined sentences listed in Table 1 were categorized into 9 themes.

**Table 2. Concepts and Themes Related to Persistence**

| Id | Concepts (Codes) | Themes (Components) |
|---|---|---|
| A1+A11+A18+ A24+A21 | Being + timelessness + timeless and placeless + being with time + changeability (flexibility) | Dynamism |
| A8+A33+A7 | Structure and statics + physical durability + fatigue resistance | Physical durability |
| A7+A32+A6 | Continuity of activity + function | Continuity of function |
| A16+A20+A19+ A27+A25+A17+ A26+A4 | Spiritual ideas + sacred patterns + religion + being divine + attention to eternal qualities + knowledge of man and his hidden dimensions + soul of building | Spirituality |
| A22+A30+A35+ A12+A15+A2+A14 | Historical and cultural continuity + beliefs and rituals + cultural identity + values of society | Culture |
| A10+A13+A24 | Attention to the surrounding conditions + climate and design context + adaptation to nature | Attention to nature |
| A3+A28+A2+ A5 | Geometry and eternal common patterns+ archetypes + universal common patterns | Attention to archetypes |
| A31+A29+A9+ A36 | Value and message + concept (deep and important concept) + special meaning + meaningful spatial language | Meaning |
| A35+A23 | Sense of place + persistent mental image | Sense of belonging |

## 4.1.2. Second Step: Axial Coding

In the grounded theory method, it is attempted to discover the obtained themes and the relationships between them, and to connect theme in a new way and not in the conventional way (Mehrabi, Khanifar, Amiri, & Zarei Matin, 2011, p. 11). Therefore, at this step, the core phenomenon, namely "persistence in architecture", was placed at the center of the process studied, and then, the themes obtained in Table 2 were placed in Strauss and Corbin's coding paradigm model and connected to each other proportional to their types of relationship with the core phenomenon. The final result of this step is a diagram, called "coding pattern".
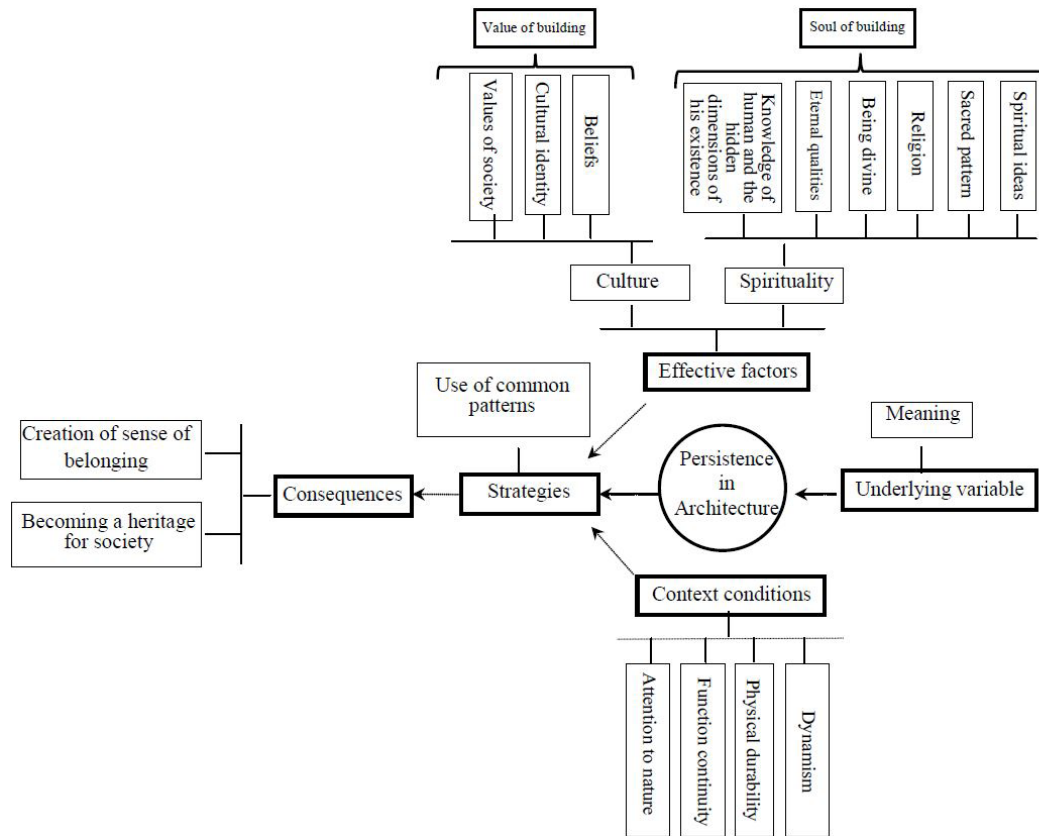
**Fig. 3. Coding Pattern of "Persistence in Architecture" Phenomenon**

### 4.1.3. Third Step: Selective Coding

According to the previous coding steps and data review, it can be said that meaning is the underlying variable of persistence. In other words, a specific meaning in space and environment is a factor making an architectural building persistent. Since any semantic manifestation in the body cannot be persisted, a pattern common among eternal architectural buildings must be reached by examining them. This common pattern shows us how to incorporate our semantic information into the form of an architectural structure so that semantic continuity is obtained. On the other hand, since these common patterns have been successful in terms of persistence throughout history, they can be considered a strategy for persistence in contemporary buildings. However, the important point is that to obtain semantic continuity, first, the structure and its function must become persistent. The obtained common patterns must be applied in the durable structure (physical durability in terms of statics and structure) which is in harmony with the surrounding nature, otherwise, they will disappear and cannot reach eternity in the face of unpleasant events throughout history. Therefore, the structure and continuity of the activities within it provide the context conditions for creating meaning in the form of common patterns in the building. On the other hand, as abovementioned, these patterns are strategies for persistence. However,

there are various factors influencing these strategies. The more influential the factors, the structure will more confidently become persistent. According to the study and analysis of data, the factors affecting persistence in architecture are categorized into two general groups of culture and spirituality. Spirituality is what blows the soul in the building and culture is what values the building. If in these common patterns, spiritual ideas, sacred patterns, religion, and eternal qualities are found, the soul will be blown into the building, and if beliefs, cultural identity, and values of society are found, the building will be valuable. Thus, spirituality and culture lead common patterns to permanence and eternity by influencing them. Finally, it can be said that attention to persistence in space design increases the sense of belonging to space. The eternal works carry a lot of semantic information of the culture and religion of society and can transfer it to future generations and thereby, preserving the values and ideals of that society.

### 4.2. Description and Analysis of Mental Perception in Architecture

According to research reviewed, in general, two types of perception can be considered for human beings:
1) perception through the senses (sensory perceptions), 2) perception through intelligence (mental perceptions). Many studies have examined sensory perceptions in various ways, but what is intended in this study is

mental perception, which results in the creation of a mental image in the individual. In the present study, it is attempted to regularly develop a theory in this regard based on data analysis using the grounded theory method.

### 4.2.1. First Step: Open Coding

This step consists of two parts:

### A. First-Level Coding (Generation of Initial Concepts)

At this step, according to studies on perception, especially mental perception, 118 sentences related to the topic were extracted from the texts and encoded by studying the data line by line. Then, contents with repeated codes were removed, and finally, 44 encoded sentences listed in Table 3 were collected (the data related to "perception in architecture" are referred with the letter (B)).

**Table 3. Generation of Initial Concepts from Data on Perception in Open Coding**

| Id | Data | Concept (Code) |
|---|---|---|
| B1 | One of the most important perceptual processes is "recognition". These characteristics are including "shape, size, color, fabric, and position" (Jalali, 2001). | Color, Fabric, and Position |
| B2 | By separating form and context, objects are separated from each other (Ibid, 2001). | Contrast |
| B3 | Meanings, by creating an inner perception of space, are of factors creating identity, beauty and enjoyment of the built space (Falahat, 2006, p. 58). | Meaning |
| B4 | Both inheritance and education affect perception (Jalali, 2001). | Inheritance and Education |
| B5 | In fact, perception is the interpretation of sensory information to make sense of it (Cooper, 2009, p. 31). | Sense-making of Sensory Information |
| B6 | In social perception, people deal with those characteristics that are not directly observable and should be inferred, such as: intelligence and personality (Jalali, 2001). | Intelligence and Personality |
| B7 | The Physical light can be used to transmit messages and perceive space (Kazemi & Khalil Abad, 2011, p. 44). | Light |
| B8 | The use of geometric patterns provides ideas in human perception to realize the connection between material and spiritual aspects (Ibid, p. 44). | Geometric Pattern |
| B9 | Colors are used as tools for transferring messages in the spiritual perception of space (Ibid, p. 44). | Color |
| B10 | Some of factors affecting perception are including individual psychological factors (sadness and happiness), individual motivation, cultural factors, and previous sensory experiences, each of which in turn affects an individual's perception of environment (Barati & Soleiman Nezhad, 2011, p. 22). | Cultural Factors, Previous Sensory Experiences and Personal Motivation |
| B11 | Gender, personality traits, and personal motivations also lead to different perceptions of environment (Kazemi & Khalil Abad, 2011, p. 44). | Gender and Personality Traits |
| B12 | The observer's expectations of environment and space, which are the result of his/her repeated environmental experiences in the past and derived from his cognitive memory, greatly affect the process of perception (Pakzad, 2004, p. 29). | Past Experiences |
| B13 | Tangible facts are identified by sensory perceptions, and perceived after interpretation. The evolution of perception leads to the recognition of phenomena (Mortazavi, 2001, p. 67). | Tangible Facts |

| Id | Data | Concept (Code) |
|---|---|---|
| B14 | Using our sensory receptors, we become aware of the realities of the outside or inside world, and then this feeling leads to perception after interpretation (Barati & Soleiman Nezhad, 2011, p. 21). | Sensory Receptors and Interpretation of Feeling |
| B15 | An organism is able to distinguish two weak stimuli from each other, when the stimulus intensity is such that the organism shows sensitivity to it (Panahi, 2012). | Stimulus Intensity |
| B16 | Architecture, like language, conveys messages. These messages reach us through physical dimensions of the building and their senses are made in our minds. When this information makes sense in our mind, a perception of the building is created in us (Behbudi, 2012, p. 43). | Meaningful Messages |
| B17 | Grutter divides the information obtained from phenomena in general and from architecture in particular into two groups: a) aesthetic information (attention to the affective aspect), b) semantic information (Grutter, 2008, p. 9). | Aesthetic and Semantic Information |
| B18 | According to most philosophers, there are two main types of perception: a) sensory perception (obtained by external senses), b) rational perception (obtained by inner perceptions in completing sensory data) (Naghizadeh & Ostadi, 2014, p. 4). | Inner Perceptions and Rational Perceptions |
| B19 | Factors affecting perception in environmental psychology are divided into two groups: a- External factors such as: time, viewing angle, movement speed, environment and its qualities; b- Internal factors such as ethnicity, values, social norms, history, age, gender, education and occupation, language and personal-value factors such as: worldview and beliefs, personal values and norms, ideals and beliefs, self-knowledge, insight and attitude (Ibid, p. 4). | Time, Viewing Angle, Movement Speed, Ethnicity, Values, Social Norms, History, Age, Gender, Education and Occupation, Language, History, Age, Personal Values, Education and Occupation, Language, Ideals and Beliefs, Self-Knowledge, Worldview |
| B20 | Perception is a purposeful process and depends on the culture, attitudes, and values governing an individual's thoughts (Salami & Sohangir, 2013, p. 7). | attitudes, and Values Governing thoughts |
| B21 | Factors affecting the human perception of environment in addition to his senses are including: the natural environment, the social environment, the economic environment, the cultural environment (Ibid, p. 10). | Social-Economic and Natural Environments |
| B22 | The most important environmental and architectural factors specially affecting the individual's behavior in the workplace are including: noise, weather and climatic conditions, population density, green space, color, space form, furniture, odor, building form (Ibid, p. 12). | weather and Climatic Conditions, Green Space, Population Density, Odor, Building Form, Noise |
| B23 | The proper intensity of light increases power of sight and lead to more accurate perception and better color recognition (Ibid, p. 12). | Lighting and Sight |
| B24 | Proper form provides a better visual perception of space and has a positive effect on human activity and increases employee efficiency (Ibid, p. 13). | Proper Form |
| B25 | The culture of the society in which a person is formed affects his perception of environment around him (Ibid, p. 13). | Society Culture |
| B26 | Furniture decorations and space colors provide a more appropriate perception of space (Saremi & Bazuvand, 2014, p. 7). | Furniture Decorations |

| Id | Data | Concept (Code) |
|---|---|---|
| B27 | Movement is effective in understanding connections and spatial hierarchy (Ibid, p. 6). | Movement and Perception of Spatial Hierarchy |
| B28 | Appleyard divides perceptual information into three categories, one of which is inferential information, which is the basis of systems encrypting environmental elements (Lang, 2009). | Inferential Information |
| B29 | To achieve more careful perception, the sensory organ must be healthy (Panahi, 2012). | Healthy Sensory Organ |
| B30 | Affective state is another factor influencing perception. If affection acts, perception is affected (Salami & Sohangir, 2013, p. 15). | Affective States |
| B31 | One of the factors influencing perception is attention or consideration. The causes of this attention are in the stimuli or within us. Factors of consideration can be internal or external. External factors are including: size, intensity, movement, contrast, repetition, change, and continuity. Internal factors are including: physical needs, mental readiness, learned lessons and desires (Panahi, 2012). | Repetition, Change, Continuity, Physical Needs, and Mental Readiness |
| B32 | Attitudes, interests, desires and aspirations make a person perceive the objects that he is interested in (Jalali, 2001). | Interests and Desires |
| B33 | According to Fritz Steele, the most important physical factors influencing perception include the shape and size of space, degree of enclosure, proportion, human scale, smell, sound, and visual diversity (Mirkarimi & Isham, 2015, p. 72). | Shape and Size of Space, Degree of Enclosure, Proportion, Human Scale, and Visual Diversity |
| B34 | Perceptions and mental images are not formed spontaneously; and they are the product of environmental conditions and components (Mazlomi, 2011, p. 136). | Environmental Components |
| B35 | The senses arise from the momentary perception of human and are directly effective in the perception of space (Saremi & Bazuvand, 2014, p. 6). | Momentary Perception |
| B36 | Every perception begins with sensory comprehension and ends with the sense-making in the mind, but the basic point is the interpretation of findings that the emergence of any meaning inevitably requires it (Kazemi & Behzadfar, 2013, p. 76). | Interpretation of Findings |
| B37 | In every perceptual process, sense-making occurs (Ibid, p. 77). | Sense Making |
| B38 | The code or symbol is the perceptual and intuitive expression (Sattari, 1997, p. 67). | Symbol and Code |
| B39 | The task of the senses is to perceive the external world and objectives (Saremi & Bazuvand, 2014, p. 8). | Perception of Objectives |
| B40 | The information obtained from environment by a person has symbolic and semantic properties (Moghen, 2014). | Symbolic Properties of Information |
| B41 | Ernest Cassirer says "the human brain structure is designed in a way that it can understand through symbols" (Moghen, 2014). | Symbol |
| B42 | Perception is the process by which we select environmental stimuli to achieve meaningful experiences and organize and interpret them (Barati & Soleiman Nezhad, 2011, p. 22). | Meaningful Experiences, Organization and Interpretation |
| B43 | According to philosophers, the steps of perception are: sensory perception, imaginary perception, illusory perception, rational perception (Naghizadeh & Ostadi, 2014, p. 10). | Sensory Perception, Imaginary Perception, Illusory Perception, Rational Perception |
| B44 | In architectural literature, meaning exists in architecture and is encrypted. When this message is decrypted by the observer, it is referred to as "perception" (Behbudi, 2012, p. 44). | Decryption of Meaning |

## B. Second-Level Coding (Generation of Major Themes)

After finding the concepts related to perception, they were categorized, as shown in Table 4. As stated earlier, the categorization method used in the present study is a cumulative categorization method, in which while working on the contents, if a new concept is observed in Table 3, a new class is formed and those concepts similar to the new class are organized under it. In Table 4, 73 concepts extracted from 44 examined sentences listed in Table 3 were categorized into 12 themes.

**Table 4. Concepts and Themes Related To Perception in Open Coding**

| Id | Concepts (Codes) | Themes (Components) |
|---|---|---|
| B1+B2+B7+ B8+ B9+B24+B22+B27+B33 | space form and size + geometric pattern + color + fabric + light + contrast + proper building form + position + degree of enclosure + scale (human scale) + movement and perception of spatial hierarchy | Physic and Body (stable factors in perception) |
| B15+B19+B31 | time + viewing angle + movement speed + stimulus intensity + repetition + change and continuity | Dynamic Factors in Perceptions |
| B22+B26+B33+B34 | environmental components + population density+ Visual diversity + odor + sound ( Environmental noise) + furniture decorations | Environmental Qualities |
| B10+B19+B20+B25 | cultural factors + ethnicity + history + attitudes and values governing thoughts + beliefs + beliefs and ideals + worldviews | Culture and Beliefs |
| B21+B22 | plant diversity and green space + weather + climatic conditions | Natural Environment |
| B19+B21 | economy + social values and norms | Socioeconomic Environment |
| B3+B5+B16+ B17+ B37+B42 | meaningful experiences + meaningful messages + sense-making of sensory information + semantic information + sense-making | Semantic Information |
| B4+B6+B11+ B12+ B19+B29+B31 | past experiences + gender + age + education and occupation + physical needs + mental readiness + intelligence and personality + inheritance and education + language + healthy sensory organs | Personal Traits |
| B10+B19+B30+B32 | personal motivation + previous sensory experiences (sadness and happiness) + emotional states + interests and desires + type of attitude + self-knowledge + personal values and norms | Individual Psychological Characteristics |
| B44+B28+B36+B38+ B40+B41 | decoding of the meaning + interpretation of findings + symbol + inferential information + symbolic properties of information | Symbol and Code |
| B13+B14+B17+B23+ B35+B39 | sight + sensory receptors + aesthetic information + tangible facts + perception of objectives + momentary perception | Sensory Perceptions |
| B18+B14+B42+B43 | interpretation + organization + inner perceptions + imaginary, illusory and rational perceptions | Mental Perceptions |

## 4. 2. 2. Second Step: Axial Coding

At this step, the core phenomenon, i.e. "mental perception", was placed at the center of the process studied, and then, the themes obtained in Table 4 were placed in Strauss and Corbin's coding paradigm model and connected to each other proportional to their types of relationship with the core phenomenon. The final result of this step is a diagram, called "coding pattern." Given that the present study intended to examine mental perception in architecture, in Figure 4, only the "body and environment" factor was considered as the factor influencing mental perception in architecture.
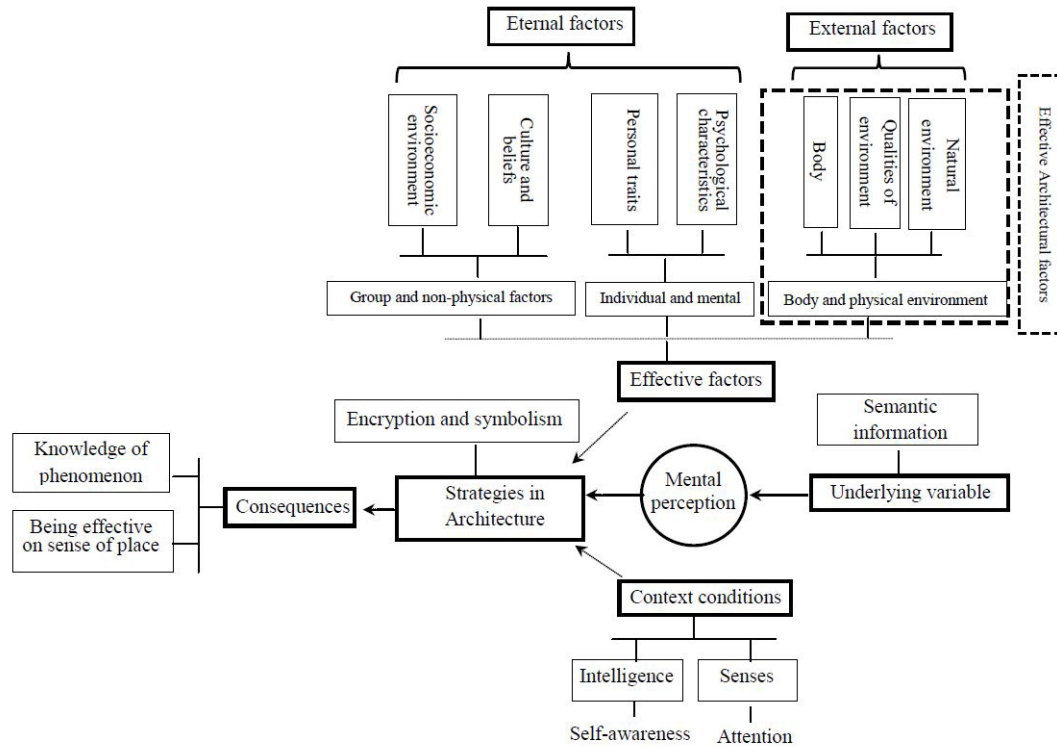
Malakavarzamani, A. et al.



**Fig. 4. Coding Pattern of "Mental Perception in Architecture" Phenomenon**

## 4.2.3. Third Step: Selective Coding

According to the axial coding process and data analysis, it can be said that the data obtained from architecture, including aesthetic information, is first perceived by the human senses, which is called sensory perception. If this sensory information carries meaningful messages, it will be perceived and inferred by human intelligence. Therefore, the senses and intelligence as the tools of perception in human beings are both considered as the underlying factors of mental perception and without them, no perception will occur. On the other hand, in architecture, the meaning can be expressed just through the face. Therefore, to achieve mental perception in architecture, the body and physical environment must carry semantic information, i.e. that information which is beyond the basic sensory and tangible meanings and has a value and symbolic meaning. The code and symbol are responsible for this task in architecture. In other words, encryption and symbolism are strategies for solving this problem in architecture, because they have both an appearance and an internal meaning, i.e. a meaning that enters the mind to infer and perceive, and it is perceived after being decrypted by the audience. Here, body and physical environment are a factor affecting the perception of the meaning of codes and symbols. Codes and symbols can be present in various forms in the body, and this depends on the architect's creativity, i.e. how he/she use them in the body, so that they have an aesthetic sense and also, convey semantic and value information to the audience correctly. Of course, here, the main point is the interpretation of codes and symbols that is required for the emergence of any meaning in the mind. Now, if the mental perception occurs correctly and evolves, the knowledge of the desired phenomenon will be obtained. Moreover, mental perceptions will directly influence the dimensions of sense of place.
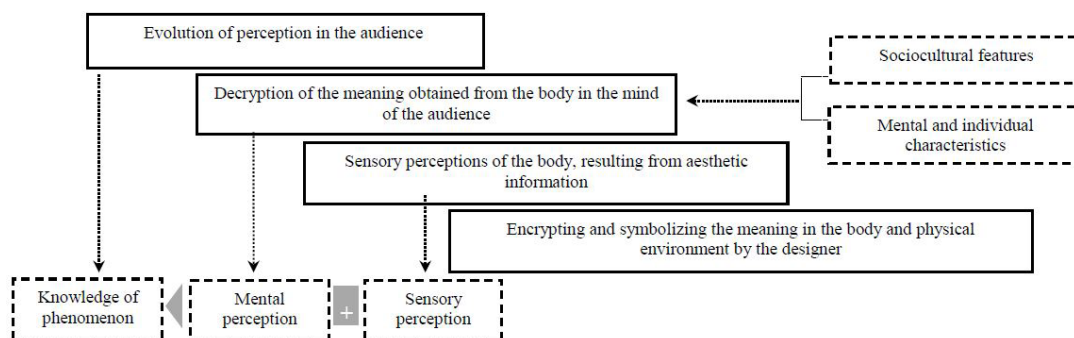


**Fig. 5. Analyzed Process**

# 5. DEVELOPMENT OF THE PATTERN AND THEORY OF PERCEPTUAL PERSISTENCE IN ARCHITECTURE

After separately examining the two concepts of persistence and mental perception according to the previous steps, in this section, the two obtained coding patterns (Figs. 3 & 4) are adapted to study and analyze perceptual persistence in the form of a new coding pattern. Finally, developing a theory according to the coding pattern of perceptual persistence will be the answer to the main question of this article.

**Table 5. Adaptation of the Two Coding Patterns of "Persistence in Architecture" and "Mental Perception in Architecture"**

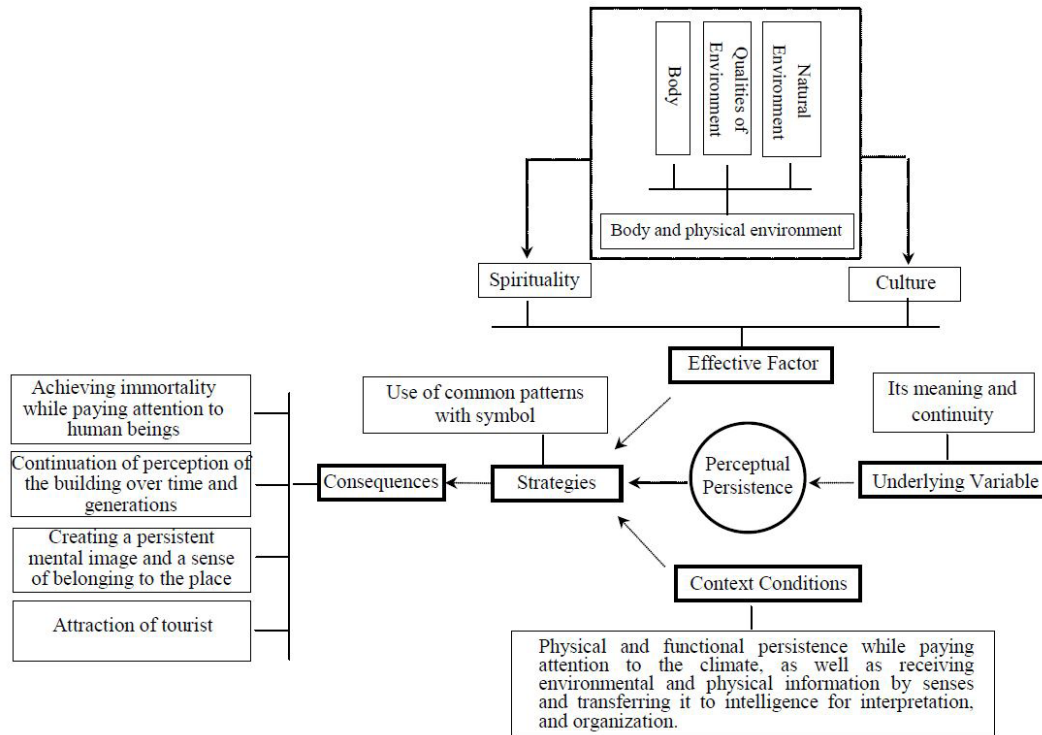| Core phenomenon | Underlying Variable | Contextual Factors | Effective Factors | Strategies | Consequences |
|---|---|---|---|---|---|
| Persistence | Meaning | Physical durability (structure and statics), function continuity, attention to climate, nature and dynamism | Culture and spirituality | Use of common patterns | Creation of a sense of belonging and becoming a heritage for society |
| Mental Perception | Semantic information | Senses and intelligence | Physical body and environment | Encryption and symbolism | Recognition of phenomena |



**Fig. 6. Coding Pattern of the Core Phenomenon of Perceptual Persistence**

## 5. 1. Theory of Perceptual Persistence in Architecture

According to Figure 6, which was obtained by adapting the two coding patterns of "persistence in architecture" and "mental perception in architecture" (Figs. 3 & 4), it can be said that meaning and its continuity are the underlying factors of perceptual persistence, in other words, the special meaning and its continuity in space and environment are a factor creating a persistent perception of the architectural building over time. Before being understood by the audience, meaning must first appear in the building body. In fact, with the

continuity of the body in architecture the continuity of meaning occurs. Obviously, if the body is not structurally and statistically stable and was designed ignoring the climatic conditions of its region, it cannot reach eternity in the face of unpleasant events occurring throughout history. The body is the first thing the audience encounters to understand the meaning. He first receives information on the building body and environment through his senses and then transmits it to his intelligence. The more appropriate the information on the building body and the more aesthetic information there is, the more attention, which is one of the most

important perceptual processes, it will attract and the more complete and accurate sensory perceptions will occur in the audience. Therefore, the eternal body, human senses, and intelligence are the fundamental factors for achieving persistent perception. The persistent body must now carry semantic information. However, any semantic manifestation in the body cannot become persistent, so by finding common patterns of eternal buildings, it is possible to achieve how this semantic manifestation is in the body. Common patterns show us how architecture meets human needs and what meanings have always been pleasant to human beings over time. On the other hand, symbols and codes are a strategy for understanding the meaning of the architectural body, and according to Ernest Cassirer, the human brain structure is designed in a way that it can understand through symbols (Cassirer, 1925, p. 174). Codes also have very high capabilities for creating persistent perceptions in architectural works, because code is not a phenomenon, which is explained once and for all, but repeatedly opened. In fact, it creates an endless birth of symbol and meaning in the mind. These characteristics of code and symbol make architectural work not to become obsolete in perception and meaning over time. Therefore, meaning must be present in the body in the form of common patterns and in a symbolic way, and this is a strategy for perceptual persistence in architecture. However, there are various factors affecting this strategy, and the more effective they are, the structure will be more confidently on the path to persistence. These factors are culture and spirituality, which affect the common patterns with the symbol and code and show themselves in the form of a specific body and physical environment. Finally, as long as the common patterns are accepted by the audience, the building will not become obsolete in perception over time. Such a persistent structure can transfer the values, beliefs, ideals, and culture of the society to future generations by becoming a heritage for society, and with the prosperity of the tourism industry and attraction of tourists, it can introduce itself to the whole world and people, and remain alive and persistent not only throughout history but also in the minds.

## 6. CONCLUSION

In this article, it was attempted to provide a model for achieving the path of continuity and persistence in the process of architectural design to achieve the way of construction of those buildings clearly responding to time and not deteriorating at a certain time.

According to the model obtained from the research, it was concluded that the use of common patterns of eternal buildings can be a prerequisite for perceptual persistence in architecture, but not a sufficient

condition. It has been observed that despite the use of these patterns, some buildings remained only as historical sculptures and did not become eternal. What keeps common patterns alive is the use of meaning in the form of symbols and codes, as well as attention to the role of man in the architectural space. In other words, it can be said that according to the model obtained for perceptual persistence in the Islamic world, the meaning should be of the spiritual and sacred meaning, because according to Titus Burckhardt, Islamic art is a sacred art. This spiritual meaning in Islam has a heavenly root, and therefore there are sacred patterns, which are present in the form of sacred codes in the building. But the attitude to these transcendental realities, the way they are encrypted and their implications are influenced by factors such as Islamic culture and tradition, and with the architect's creativity, they are placed in the physical body and environment in a way that they are appreciated by each religious audience. These buildings will remain alive and eternal as long as the beliefs and values of society follow Islam and its rules. Otherwise, they will only physically remain as a historical sculpture. On the other hand, if the aim is to achieve a universal perceptual persistence, it must be attempted to look for a meaning that is familiar and perceivable to all human beings at all times. In other words, the architecture makes it universal based on human commonalities. What is common to all human beings is their innate nature. The innate nature is the fixed, timeless, and placeless order of human beings and can be a fixed and same element of the audience by the meanings appearing in architecture. Innate nature refers to what is fundamental and eternal in man. Therefore, if the inbred meaning is considered the underlying variable in the obtained model, the strategies of common patterns and codes and symbols will be due to innate nature. Archetypes have such a feature and are stored in the collective unconscious memory of human beings, which is also called innate nature in Islam. Archetypes are the same eternal forms, which do not potentially have any shape and are formed in the symbol (Ershad, 2007, p. 52). So, by using the archetypes in the architectural design, common universal patterns can be achieved in accordance with the climate, culture, and religion of the region in question. Therefore, archetypes are a prerequisite for perceptual persistence in the world and can communicate with a wide range of human beings. In fact, if the common patterns have a symbol resulting from the inner and innate needs of man, the building will have a new and perceivable perception and meaning as long as the human race exists, because human nature does not change over time, so, a building becomes eternal and timeless whenever human and his inner needs are considered. On the other hand, since

human and his inner needs are considered as the main axis in achieving perceptual persistence and design is performed according to his perception, space becomes a recognizable and perceivable identity, so that the audience's mental image of persistence is formed, and this provides the ground for creating a sense of belonging to the place.
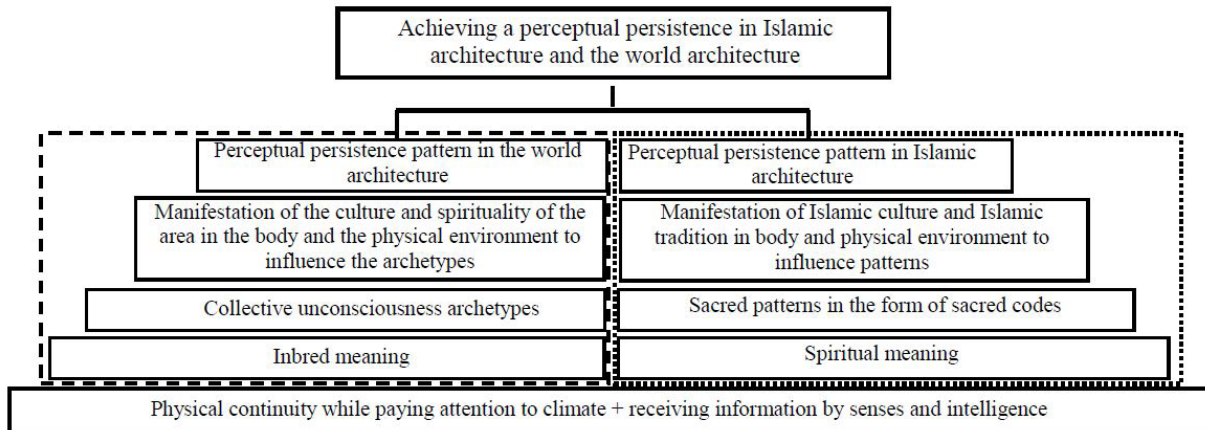
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┌─────────────────────────────────────────┐
│  Achieving a perceptual persistence in   │
│  Islamic architecture and the world      │
│  architecture                            │
└─────────────────────────────────────────┘

┌──────────────────────────┐  ┌──────────────────────────┐
│ Perceptual persistence   │  │ Perceptual persistence   │
│ pattern in the world     │  │ pattern in Islamic       │
│ architecture             │  │ architecture             │
├──────────────────────────┤  ├──────────────────────────┤
│ Manifestation of the     │  │ Manifestation of Islamic │
│ culture and spirituality │  │ culture and Islamic      │
│ of the area in the body  │  │ tradition in body and    │
│ and the physical         │  │ physical environment to  │
│ environment to influence │  │ influence patterns       │
│ the archetypes           │  │                          │
├──────────────────────────┤  ├──────────────────────────┤
│ Collective               │  │ Sacred patterns in the   │
│ unconsciousness          │  │ form of sacred codes     │
│ archetypes               │  │                          │
├──────────────────────────┤  ├──────────────────────────┤
│ Inbred meaning           │  │ Spiritual meaning        │
└──────────────────────────┘  └──────────────────────────┘

┌───────────────────────────────────────────────────────┐
│ Physical continuity while paying attention to climate + │
│ receiving information by senses and intelligence        │
└───────────────────────────────────────────────────────┘
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**Fig. 7. How to Achieve Perceptual Persistence in Islamic Architecture and World Architecture Based on the Coding Pattern of Perceptual Persistence**

Malakavarzamani, A. et al**.**

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