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Investigating the Role of Time Signs in Analyzing Architectural Works

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ABSTRACT

In the face of an architectural place, the user's sense is associated with spatial continuity (placeness) and sequence (temporality). For this, understanding the role of the concept of time in creating place dependence is of great importance, because a place is a situation that preserves a sequence of events to assist the user gain a full perception of his existence. In this connection, adapting architectural concepts to time semiotics basics to explore the concept of time in architecture represents an effective step to promote architectural analysis styles. This study uses the signification system analysis at one or more points in time, and one of the types of semiotics analysis of the syntagmatic dimension. Thus, it uses the role of time signs in spatial continuity and their relationships with architectural physical elements to study the effects of time patterns on architectural works as in an analytical method. According to the basics of semiotics as the selected approach of the study, understanding the role of time creation in architectural analyses is made by identifying the relationship between the concepts of time signs and traditional architectural examples. Theoretically, this study aimed to expand previous theories, fill theoretical gaps, and enrich the literature of the semiotics analysis of architectural works, thus practically helping understand how the concept of time was introduced to analyze architectural works using time sign rules. The conceptualization of time signs by the space fabric can, through analyzing place sign systems, add the concept of time to the realm of architectural analysis, which is carried out using the "conceptual analysis" of the transformation and sequence of the concept of time along with place. Methodologically, the study used significant literature on architectural semiotics and collected and analyzed data by reviewing documentary and library studies. To organize data and develop a conceptual framework and expand the architecture literature, the descriptive-analytical method and logical reasoning strategies were used.

Keywords: Semiotics, Architectural Analysis, Time Signs, Conceptual Analysis, Syntagmatic Relation.

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1. INTRODUCTION

As the main goal of the study, introducing the key presence of the concept of time in the architectural place analysis by understanding the expressive means and semantic significationrequires utilizing intellectual and philosophical basics via an analytical approach.To Rapaport (2004), one of the most important methods to investigate meaning with these characteristics in artificial environments is semiotics, because concepts are not represented except through the process of productionandinterpretation of signs, which serves as "means/tools" to convey and express concepts; semiotics regards all things (fabrics) and actions (conducts) with meanings in a culture to be "signs", and deals with identifying internalized processes producing meaning in a culture (Culler 2001,35). The knowledge of the semiotics process and understanding the architectural fabric signification on the concept of time can help effectively understand this concept in architecture.

Analyzing an architectural place using time concepts or the significant introduction of time signs into place as a sign system, which adds the concept of time to the user's analytical-perceptual realm, indicates the meaning of the concept of time, thus bringing about such feedback as analyzing the continuous presence of the user in place, attracting more users over time, and forming spatial continuity by way of time sequence. Since "sign concepts not only enrich design methods but also manners of describing and analyzing architectural meanings" (Brad Bennet 2010), this study also used time signs to provide an architectural analysis. Because the analysis of architectural works is nowadays founded on the classification of commonalities of historical and geographical periods and physical components of architectural works, and because the nature of these classifications is, by itself, dependent on meanings, including the concept of time, the method used by this study to analyze the works was one that identified common criteria and used classifications based on time and place semiotics in an architectural place; this method, compared to other analytical methods, can indicate how relations and commonalities are analyzed in architectural works. Thus, this study used factors affecting the role of time signs in architecture to investigate the semiotics of time in architecture basedon a system of signs represented in the fabric of the place. Accordingly, the main study questions are as follows:

- How is place temporality analysis performed?
- Which rules can be used to provide an expressive realization of time in an architectural place?
- How does time semiotics affect the rules and system of an architectural place analysis?
- How do the semiotic concepts of time sequence affect the spatial order and continuity of place?

2. RESEARCH LITERATURE

Concerning semiotics in architecture and the interaction of these two in analyzing various architectural concepts, various papers have been introduced, some of which are given in the table below.

Table 1. Research Regarding the Interaction between Semiotics and Architecture

Researchers	Research Subject (Semiotics and Architecture)
Foroughmand-Arabi 2016; Amiri- Khoshkar Vandani 2016; Umaraei 2014; Vaskah and Mansouri 2016; Ghaffari and Falamaki 2016	Relationship between semiotic concepts and the theoretical basics of architecture without examples and in the form of general issues
Falahat and Nohi 2012; Rahimi Anani et al. 2018; Bagheri and Einifar 2013; Fayyaz et al. 2011	Describing the characteristics of semiotic analysis and relevant similarities and differences in reading architectural works
Raisi and Noghrehkar 2011; Sekhavat-Doust and Alborzi 2017; 2018; Bamanian et al. 2013; Sohaili and Mohajerpour 2015; Nejad Ebrahimi et al. 2018; Ghanbari and Soltanzadeh 2016; Avide-Talai and Farah Habib 2018	Semiotic reading on part of a building (e.g., entrance), a building (e.g., mosque or tomb), or a special function (e.g., residential function)
Hamejani et al. 2017	The interaction between semiotics and an approach of qualitative research by evaluating a special region
Roshan and Sheibani 2015; Vaezi et al. 2018	Describing the semiotic thinking of a theorist in analyzing the architectural totality
Raisi et al. 2014	A general view of Islamic architecture and its semiotic status
Hosni Mian Roudi et al. 2017; Majedi and Saeida-Zar Abadi 2010; Daneshpour et al. 2012; Torkashvand and Majidi 2013	Investigating semiotics in case studies in urban designs

As seen, none of the above studies have concerned the conceptual relations between time signs and architectural places analyses, as well as the semiotics of time in architecture. Also, some other studies have been conducted in the field of time in architecture. In this regard, articles entitled "The role of meaning in space and time in artistic creation" by Mohammad Mansour Falamaki, "Place continuity over time in interaction with humans" by Effat Sabouhi, Mohammad Masoud, and Driush Moradi-Chadegani, and "Concept of time and its effects in architecture" by Ida Taghizadeh and Arash Mohammadi-Fallah can be mentioned. The first article concerns the effects of time and mind on senses and perception in a real and virtual space; the second article analyzes how place perception is transformed over time and deals with its continuity in interaction with humans, and the third article analyzes the relationship between space and time and movement to deal with the category of time continuity in the space-time concept along with temporal movement inside space. In the articles, no reference has been made to the interaction of semiotics and the effects of time on the architecture.

Other studies have examined the semiotic interaction of time and place in works of art, such as the article entitled "Semiotics of time and the passage of time; a comparative study of verbal and illustrative works" by Farzan Sojoudi, which explores time, its passage, and the conceptualization of time from the view of Lakoff and the expressive realization of time in verbal and illustrative texts, such as painting.

The article "Analyzing the narrative structure in the painting of Zahhak's death based on Greimas's action pattern" by Ashraf Al-Sadat Mousavi-Lor and Gita Mesbah analyzes the structure of narrative elements and the time relations governing paintings and demonstrates the time sequence and sequential synchronic relations in converting time relations into place relations.

Some other studies have addressed the categories of time, place, and narrative from a philosophical point of view. These studies include "Semiotics of time and place in Leibniz's philosophy" by Mohammad Javad Safian and Abdullah Amini who investigated the subjectivity and relativity of time and place in Leibniz's philosophy, and also explained the time and place ontological adaptation over external phenomena and their relationships with users' subjective relations.

The article "Time and place from the view of Ouspensky using the perspective of Organon III" by Mojtaba E'tmadi Nia deals with the subjective nature of time and place and defective human perception of the integrity of place to investigate the origin of the sense of time from humans' subjective power limitations in time perception.

Another study "Time, identity, and narrative: how to understand time in the imaginary narratives of the West and Iran" by Sina Jahandide-Kouhi investigates the forms of time in imaginary narratives, which serve as the highest structures that introduce the human's existential time, thus revealing the metaphor of time, represented by transition, repetition, and place. He also suggests that time-based narratives both constitute identity and are affected by identities.

As noted, although previous studies were somehow dealing with architectural domains, they were not related to architecture, and on the other hand, had nothing to do with the role of time signs in the analysis of architectural works, which is the goal of the present study. For this, this present study is a novel one in this regard.

3. THEORETICAL FOUNDATIONS

Semiotics is the study of how semantic signification (relations between sign components) are formed and refers to the mechanism of exchange (production, transfer, and interpretation) of meaning basedon sign systems. According to Guiraud'sdefinition, a sign refers to a stimulus whose subjective image is associated with another stimulus subjective image; this association is formed using the first stimulus reference subjective process (objectivity) to the second stimulus (objectivity/subjectivity), with the function of the first stimulus being to motivate a second stimulus aiming to establish a relationship (Guiraud 2001, 39). A sign is a physical, albeit significant subject (Chandler 2008, 21). This denotes that each sign should be materially represented to be perceived by the senses, as being a sign requires a material form and a reference to something other than itself (Hall 2019, 104). Jonathan Culler also argues that "the expression of no meaning or concept is possible without the intermediation of sign systems and its material representation" (Sojoudi 2011, 108). If an architectural fabric bears some sign qualities, it will serve as an intermediary to be revealed and to express its concepts, since the existence of a sign hinges upon "time" and is influenced by the presence of a user (Eco 1986, 16). Thus, the present study aimed to search for the semiotic indicators of the concept of time in the architectural fabric.

Since architecture as a physical being has a time and place scale in the form of a sign system, this abstract concept is conceptualized using physical and structural signs in a place (e.g., movement, source, target, etc.), thus it can introduce into the realm of meaning and place analysis.In other words, the concept of time semiotics in architecture is exemplified by the association of the concepts of continuity (diachronic), sequence (synchronic), and movement within the place fabric; the user should also move in space (fabric) as a route towards perceiving time to understand the concept of place and its sign systems, and consequently understand his existence. This movement, however, requires time and the passage of time. The expression of time representation by time for the user in the place depends on meanings and their levels, as noted in Table 2.

Table 2. Representation of Meaning Levels of Place and Time

Meaning Representation	Time Duration	Meaning Levels
Gradual (time sequence)	More Time	Implicit Meaning (semantic depth)
Facilitative (no time sequence)	Less Time	Explicit Meaning (semantic level)

4. STUDY METHODOLOGY

The present study extracted concepts by reading time signs and their relationships between each other and time; thus, the study approach fell under qualitative research and its nature was explorative. The study subject enjoyed significant literature, which helped collect data. Also, library and documentary methods were used to describe and classify the time basics, semiotics, and architectural realms.

Then, to "organize data", develop a conceptual framework, and expand study basics to the architectural domain, the descriptive-analytical method was used. In the descriptive section, the semiotic concepts and perspectives of time, basic concepts, and an elaboration of theoretical necessities were extracted and summarized. In the analytical section, to understand the analysis of time signs in architecture, the study's conceptual framework was explained based on the specialized literature of time semiotics, and new relations about place and time analysis were formed by linking theories between the two areas and their interactive analysis. These analyses were provided in the form of initial models.

In the second stage, the study dealt with the interrelatedness of the semiotic concepts of time and place to analyze architectural works. Hence, to validate the findings collected, access a logical system, and investigate how various dimensions are involved in the semiotics basics of time in forming the architectural analysis, the "logical reasoning" method was used. Because the logical reasoning method and the acceptance of a system being logical in a cultural domain has the same semantic system, conceptual case studies in traditional Iran's housing area were examined to a relative consensus.

5. DISCUSSION AND ANALYSIS

In time signs-based architectural analyses, understanding the what and how of time continuity and sequence are made possible by understanding the semiotic structure of time in an architectural place as "sign systems". These sign systemsare the objective representation of code networks or common and familiar cultural-social contracts within the two synchronic and diachronic relation approaches. The synchronic relation approach results from the "syntagmatic" place components (fabric, activity, and signification) as "sign units", with each formed based on the aforementioned "paradigmatic" codes; before dealing with the what and how of the conceptual analysis of time in architectural works, it is critical to concern the alignment of the specialized semiotics, time semiotics, and architectural terminologies, given in the form of Table 3.

Table 3. The Alignment of Semiotics, Time, and Architectural Terminologies

Semiotics	Time Semiotics	Architectural Domain
Codes	Semantic Domains	Common Cultural-Social Contracts (e.g., privacy)
Sign Systems	Sign System	Place
Sign Units	Same-Domain Units	Place Components: (fabric, activity, and signification)
-	-	Place Component Factors: (spaces, elements, and components)

Time relationship analyses in an architectural place fall under two structural (time transformations based on time continuity) and conceptual (time meaning based on time sequence) structures. Table 4 below briefly gives the elements of "conceptual analyses" of time and their applications.

Table 4. Elements of the Conceptual Analysis of Time in Place

Type of Analysis	Aspects of Analysis	Components of Analysis	Use of Analysis
Conceptual Analysis (time sequence)	Commonality Analysis	The synchronic and diachronic analysis of same-domain units	Sequential place analysis

Type of Analysis	Aspects of Analysis	Components of Analysis		Use of Analysis
Conceptual Analysis (time sequence)	Relationship Analysis	Syntagmatic (Combined signification) Paradigmatic (sequential signification)	Part-whole relationship of sequential structures Reading distinction	The analysis of place sign relationship The analysis of place sign signification
	Narrative Analysis	Place Synchrony Time Synchrony	Conceptual relationship Place relation Sequential relation	The analysis of the relation of signs with each other (Relationship between physical components) The analysis of the relationship between signs and concepts (Relationship between fabric and place content)

5.1. Conceptual Analysis

This type of analysis focuses on relationships where signification systems are not present at certain moments (past, present and future), but are applied to the typologies and classifications of place components (as sign units) based on the concept of time in architectural works, which include time-based concepts analysis at one- or several-time sections. These analyses include the following:

1. Determining components of a sign system
2. Determining the relationship of the components of a sign system

The conceptual analysis of time signs includes three categories of "commonality analysis", "relationship analysis", and "narrative analysis". This classification is in a content relationship with each other.

5.1.1. Commonality Analysis

The understanding of the what and how of commonality analysis depends on understanding same-domain sign units; same-domain units are a semantic system that, due to common conceptual characteristics in the time category, are mutually interrelated, and are thus considered a "semantic domain". Accordingly, two necessary and sufficient conditions are required to perceive the meaning of a phenomenon in this category of analysis: the necessary condition is the "meaning condition" of a phenomenon, and if it distinguishes the signification of that phenomenon from other concepts, it will be called the sufficient condition or the "distinct semantic condition" of that phenomenon. The commonality in the necessary (meaning) conditions helps classify the sign units in a semantic domain (Safavi 2016, 189). For example, in traditional housing, halls, Panj-Dari and Se-Dari fall under one single semantic domain for having a common "space" quality; on the other hand, since Panj-Dari and Se-Darihave a "closed space", they are regarded as the members of a semantic domain, which a hall is not a member of (Table 5).

Table 5. Examples of Semantic Domains in Iran's Traditional Housing

Semantic Domain	Members of a Semantic Domain (same-domain units)
Space	Hall, Panj-Dari, Se-Dari
Closed Space	Panj-Dari, Se-Dari

The relationship analysis between same-domain units can be performed from two "diachronic" and "synchronic" perspectives (sequential and combined relationships).

A) Diachronic Analysis of Semantic Domains: This perspective analyzes the commonality between same-domain units over time or semantic domain commonalities in architectural works at two time periods. The transformation of same-domain units "over time" causes the value of semantic domain system units to transform.

A (1) "Transformation" of Unit Concepts over Time: This analysis reveals a system of concepts shared by same-domain units to describe six categories of "the transformation of semantic domains" and "conceptual relationships between domains" in the form of three types of "change, addition, and deletion" over time, as suggested by Table 6 (Ibid, 195).

Table 6. Transformation of Same-Domain Concepts in Traditional Iranian Architecture

	Same-Domain Units	Conceptual Relationships of Same-Domain Units	Example (same-domain unit transformation-single value transformation)
1	No Change	No Change	-

	Same-Domain Units	Conceptual Relationships of Same-Domain Units	Example (same-domain unit transformation-single value transformation)
2	No Change	Change	Replacing Baladiyyah with Shahr-Dary
3	Change	No Change	Housing, apartment
4	Change	Change	Ashpazkhaneh instead of Matbakh
5	Addition	Change	Adding parking lot, elevator, etc. to the housing literature
6	Deletion	Change	Omitting wind tower, cellar, etc. from the housing literature

A (2): "Conversion" of Unit Concepts over Time: These analyses investigate the "historical semantics" of sign unit's based on their concepts and area of application. Thus, no sign unit is added to or deleted from the semantic domain; rather, it constitutes a set of units that create in a semantic domain a hierarchy of a positive (emotional) semantic load (or emotional) and a negative (emotional) semantic load (Safavi 2016, 189).

This hierarchy includes four characteristics of "restriction, widening, and narrowing" of meaning:

Semantic Narrowing (specialization): At one point in time, the concept of two sign units is equal to each other and, over time, because of the restricted application domain of one of the units, that unit could enjoy a semantic narrowing (or vice versa); for instance, in the past, due to some restricted application, the semantic restriction of "court" only included the atrium; however, today, a court space embraces all its types.

Semantic Widening: Over time, a sign unit goes from one domain into another one and has its meaning expanded, as in the introduction of the semantic unit of the hall from the "cultural semantic domain" (porches in mosques) or the introduction of the semantic unit of wind tower from the "climatic semantic domain" (cellar wind tower) into the semantic domain of housing.

B) Synchronic Analysis of Semantic Domains: This analysis deals with the commonalities of same-domain units at one point in time or commonalities of semantic domains at a period. As for a semantic domain, there is a fundamental semantic commonality between sign units of architectural places, which could lead to their collocation. Collocation is due to the common characteristic that links sign units of two places at a period in time.

B (1): Synchronic (combined) Collocation: This type of analysis examines the occurrence of sign units of common foundations on a synchronic axis; for example, in architecture, the concept of pause with space, elevation with the wall, and sense of place and skylines with facades fall under the synchronic collocation (Table 7).

Table 7. Formal and Conceptual Synchronic Examples in Architecture

Title (signification) Formal Synchrony	Function (applied domain) Conceptual Synchrony	Collocation
Space (name)	Pause (verb)	Pause Space
Space (name)	Privacy (adjective)	Private Space

In other words, what refers in the synchronic concept of "bordering" in a horizontal direction is the element of the wall, while what renders in the synchronic concept of bordering in a vertical direction is the element of the ceiling; here, the wall and the ceiling fall under the synchronic collocation based on the fundamental and common quality of bordering (vertical and horizontal) (Table 8).

Table 8. Examples of Synchronic Collocation in Architecture

Synchronic Collocation	
Fundamental Common Qualities	Units
Separator, Structure, Enclosure, Bordering, Area Separation	The Elements of the Wall, Ceiling, Space

B (2): Paradigmatic (sequential) Collocation: This type of analysis examines the collocation of sign units based on qualities that put them in a semantic domain; for example, in architecture, dome, arch, and semi-arch fall under the semantic domain of space covering, while Se-Dari, Panj-Dari, and Haft-Dari come in the semantic domain of enclosed spaces (Table 9).

Table 9. Examples of Paradigmatic Collocation in Iran's Architecture

Paradigmatic Collocation	
Units	Semantic Domain
Dome, Arch, Semi-arch, Se-Dari, Panj-Dari, and Haft-Dari	Space Covering Type of Space (Here, enclosed)

This collocation occurs in two forms: first, a sign unit falls under various collocations in terms of presence in different semantic domains; e.g., it falls under sequential collocations with Se-Dari and Panj-Dari units (semantic domains of spaces), on the one hand, and falls under sequential collocations with basement and springhouse units (semantic domains of summer-resting spaces), on the other hand. Second, the expanded semantic association takes place using various semantic domain relationships with each other through common units (in several domains), e.g., in traditional housing, the semantic domains of space and summer-resting spaces relate to each other using the common unit of the hall.

5.1.2. Relationship Analysis

- Syntagmatic and Paradigmatic Meaning-Making Opposites: Relationships affect the significant analysis of opposites and contrasts (Culler 1975, 14); examples of major contrasts in "time signs" are before-after, past, future, etc. It is the same contrast in the sequence of architectural "place fabric" events, serving as the signifier that forms their components and relations in signs. According to Saussure, these contrasts, but not their similarities, help form the "meaning of place". These meaning-making contrasts in the place fabric are characterized by two types of time-based syntagmatic and paradigmatic relations; these relationships are by themselves a sub-set of aforementioned relations, i.e., "synchronic" (the study of a place structure at one point in time), which together with "diachronic" relations (the study of place changes over time), deal with the "temporality of sign systems". Time relations constituting contrasts, along with syntagmatic relations (on the horizontal axis), deal with intra-textual relations and other signifiers present in the text, and also the way the elements are placed along each other (with the possibility of the presence and combination of the signifiers); paradigmatic relations (on the vertical axis) deal with inter-textual (inter-cultural) relations and the signifiers not present in the text (Saussure 2000, 122), and also analyze the way the elements replace each other (with the possibility of the selection and absence of the signifiers); time syntagmatic relations offer means for combination, but paradigmatic relations include an analogical analysis of architectural elements in time (Fig. 1).

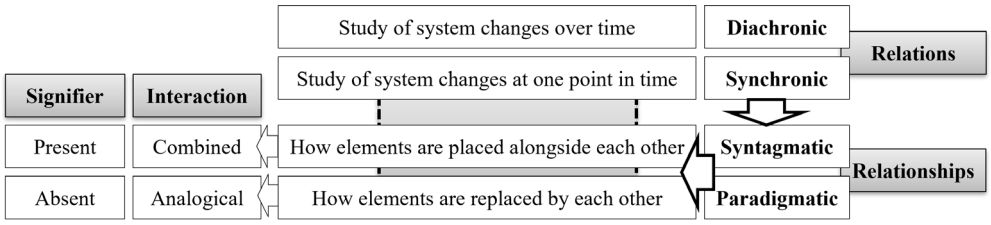

Fig. 1. Definitions of Diachronic and Synchronic Relations in Terms of Time Signs

To clarify the subject and the initial closeness of these concepts with architecture, Saussure offers a considerable example: from the paradigmatic (associative) and syntagmatic (syntactic) perspectives, a sign unit is similar to the elements of an architectural work, like a beam and column; one the one hand, the column is especially related to a beam placed on it (it has a syntactic relationship with it). In other words, the arrangement of the two architectural elements in space suggests a syntagmatic relation. On the other hand, if this column is of a Doric style, it provides a subjective comparison of other absent styles (Ionic, Corinthian, etc.), whereas there are no such components of this style in space. In other words, the paradigmatic relation depends on association (BroadBent 2010, 85).

- Syntagmatic Relations: In analyzing an architectural work, syntagmatic relations include "place relationships", i.e., "combination and continuity" of units, and "time relationships", i.e., "sequence" of sign units. These features organize a set of signs in the form of codes (common and familiar contracts), and treat sign units as a part of the whole sign system; the significance of sign units depends on the totality of codes (e.g., privacy) and sub-codes (e.g., configuration). In other words, there are always larger (whole) units made of smaller units, whose interdependence keeps them along with each other (Saussure 2000, 127). These interrelated relationships are as follows:

"Part-whole relationships": They are a set of syntagmatic (components) structures, constituting

a regular combination of related signifiers, which construct a significant whole and are created in a framework of syntactical rule (e.g., architectural spaces are structures composed of "elements", which are themselves made of "components").

"Sequential structure relationships": The structure of all architectural spaces is organized by sequential (consecutive, continuous, and time-based) relationships.

"Reading distinction relationships": The similar spaces repeating at two times when faced with sequential spaces are each time read differently from the previous time. In other words, in sequential structures. Two similar (before and after) spaces are read differently at two different times.

5.1.3. Narrative Analysis

Syntagmatic Relations and Types of Spatial Narrative: Relationships are based on discourse, and an expression of the concept is organized and narrated not based on individual signs or components (sign units) but on a group of signs and the whole (sign systems) in complex combinations (Ibid). An analysis of syntagmatic relations suggests that the production and interpretation of meanings and the significance of place are influenced by contracts or rules of combination and the sequence of place components; using a syntagmatic structure (and preferring it over other structures of a sign system) is a factor that affects meaning production (Chandler 2008, 133). Various types of syntagmatic relations in the narrative analysis are: "place syntagmatic" (the configuration of sign units and the syntax of space, elements, and components) and "sequential syntagmatic" (time-based) (Ibid, 134). The latter is the clearest form of a narrative syntagmatic analysis structure. Table 10 gives the characteristics of a commonality analysis in syntagmatic relationships, while figure 2 illustrates an example of the syntagmatic relations of the sign units of the hall, Do-Dari, and Panj-Dari of Yazd's Rasoulian House as sequential spaces in the traditional housing.

Table 10. Type and Use of Syntagmatic Relationsin the Commonality Analysis of an Architectural Place

Syntagmatic	Use (action)	Type of Relationship	Place Analysis Manner	Type of Signification	Function (manner of action)
Place	Configuration	Spatial Continuity	Requires Passing by the Place	Combined	Spatial Organization
Time	Narrative	Spatial Sequence	Requires the Passage of Time	Sequential	Spatial Precedenceand Following

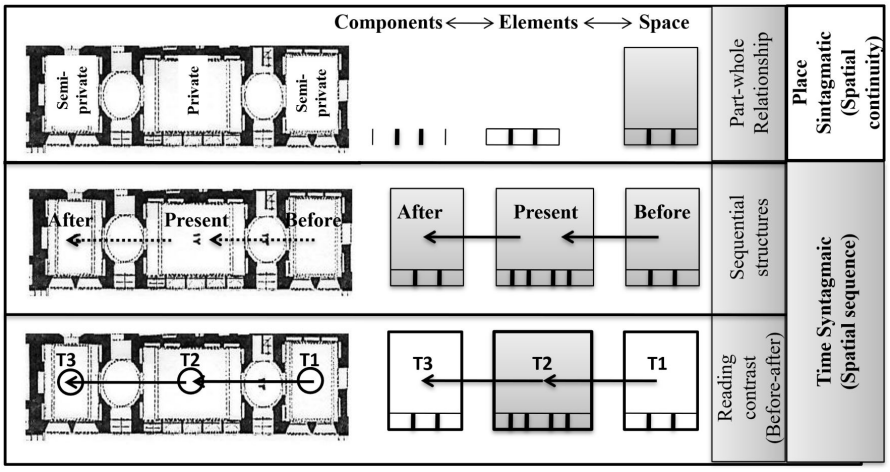

Fig. 2. Syntagmatic Relations of the Relation and Commonality Analyses in Traditional Iranian Housing

A) Place Syntagmatic: These relations can be analyzed and identified by two signs of "orientation" and "center-margin'', which can involve a combined signification with place concepts and a sequential signification with time concept:

A(1): Orientation Signs: Some examples of orientation in the concept of time are: high/low, back/front, right/left, north/south, and east/west, each having a different qualitative concept. Potentially, right or left elements in a space or façade contain before (past) and after (future) time signification. These metaphors are also dependent on "cultural concepts" (Lakoff and Johnson 1980). For example, the east is related tosunrise, birth, and life, while the westrelates to the end. Similarly, vertical configurations in the high and low orientations of a place as signifiers contain implicit signification, associations, and different references over cultural signified, as highsignifysuch concepts as dominance, privacy, etc., and low signifies under privacy, under domination, etc. Also, as regards the implicit signification of high and low in the formation of structural concepts in a vertical direction, higher and lower sections indicate ideal and real contrasts, respectively (Kress and Leeuwen 2006, 193-201).

The key point is that combined place signification in vertical direction configurations does not just pertain to the relationship between two signifiers or two fabrics in architecture (e.g., one as higher and the other as lower); rather, the relations between signifiers, i.e., form (fabric) and content (activity and perception) are also effective in orientations.

A (2): Center-Margin Signs: This sign in sequential signification is famous as the "inside-outside" metaphor. What is in the center serves as the indicator's core that embraces all other affiliate elements (Ibid, 196-198). In the sequential signification of architectural spaces, the element of the center is an organizing one and precedes the user's time perception, while the element of the margin is an organized one and follows the user's time perception. This time perception distinction (precedence and following) is proportionate to Gestalt's psychological principles and depends on the perceptual distinction between form and ground (Chandler 2008, 141).

B) Time Syntagmatic: Movement from place syntagmatic elements towards time syntagmatic (sequential) elements leads the analysis of works towards narration as a "situation pattern" in architectural places. Narrative analysis is a major branch of semiotics classified into three general categories of "narrative pattern, narrative interaction, and narrative function".

B (1): Narrative Pattern: In time analyses of architectural works, it is the narration of spaces that creates or classifies the events formed in each place. Each narrative has a beginning and an end (Metz 2017, 17). Thus, in narrative syntagmatic, a "linear time pattern" is of great importance that combines three stages of "balance-peak-balance"; a spatial event chain conforms to the "beginning, middle, and ending" of sequential spaces; with the primary space events serving as the middle cause of the spatial events and the middle space events serving as the cause for the spatial event ending.

B (2): Narrative Interaction: According to Roland Barthes, space analyses and the time analogy of different works at different times are based on the interpretability or the interaction between events in these spaces, which categorize the interpretations into three groups of "inter-place" (other-self), "inter-temporal" (self-other-self), and "inter-cultural" (other-self) (Barthes 1977, 79). Barbara Stern (1988) also argued that forms can represent in any media (e.g., an architectural work) that establishes a link between two points in time with a time sequence. Figure 3 illustrates the pattern and interaction of narrative with a conceptual model concerning the exemplary model of Yazd's Rasoulian House spaces.

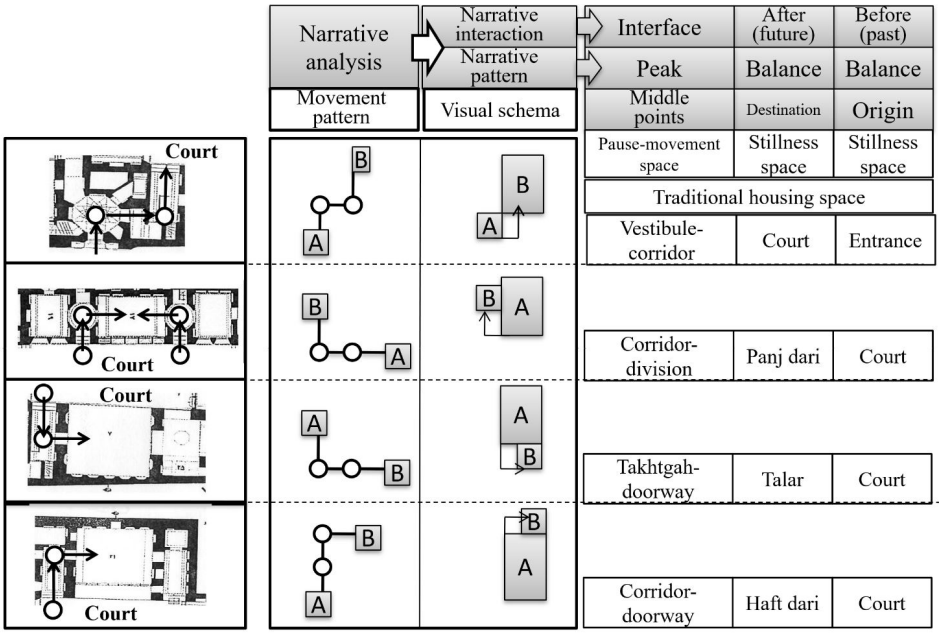

Fig. 3. Conceptual and Exemplary Model of the Narration Patterns and Interaction in Traditional Housing Architecture

B (3) Narrative Function: In space narrative analysis, their functions constitute the "structurability, predictability and coherence" of place, and are thus patterns for situations, created by spaces based on time in an architectural place. The conversion of "types of experience" or situations in lived architectural spaces into "types of narrative" (or the transference of subjective images into sign systems) in time units by the users is one of the main features of the human's motive to produce meaning in an architectural place. This conversion (transformation of forms of experience into narrative forms) of spaces within the socialization process is learned in line with cultural expressiveness methods, (Bruner 1962, 45-80), and is

of special significance in conceptual time analysis,in terms of social-cultural characteristics of each work.

6. STUDY FINDINGS

As stated above, one type of conceptual analysis of time signs in architectural works is the analysis of the relationship. The relationship analysis or the time analysis of conceptual relations of sign systems arises from "synchronic relations" and is formed by two types of distinct relationships based on "time", i.e., "syntagmatic" (syntactic (combined signification)), and "paradigmatic" (associative (sequential signification)). A study of these two distinct meaning-making types of place components or architectural sign units helps reveal "sign relations" and "place meanings". In analyzing and classifying architectural works, this type of relationship organizes a set of signs in the form of "codes" (common and familiar social-cultural contracts) or semantic domains, and thus classifies the sign units (fabric, activity, and signification) of architectural work as a part of the whole place sign system, which is parallel with Charles Morris's Sign Dimensions (syntax, function, and meaning).The significance of sign unit components (spaces, elements, and components) is interdependent on the totality of codes(e.g., cultural codes of privacy) and sub-codes (e.g., space resiliency) in a pertinent semantic domain. Figure 4 illustrates the semantic interaction of same-domain architectural units (sign units of fabric, activity, and signification) using the cultural codes of privacy and sub codes of resiliency in time-conceptual commonalities.

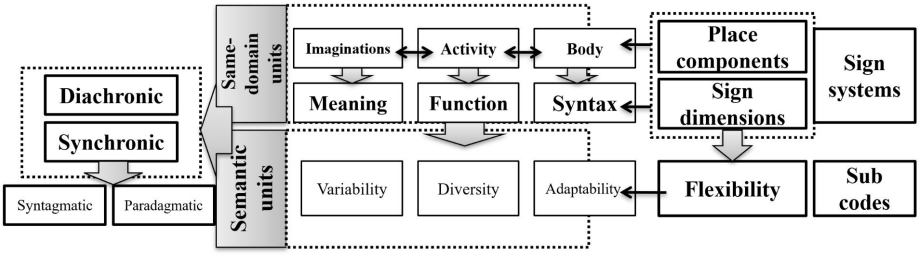

Fig. 4. Semantic Interaction of Same-Domain Units using Conceptual-Time Commonalities in Architecture

In other words, one of the most important cultural codes in the semantic domains of Iranian architecture are the codes of privacy, which along with various sub-codes (e.g., privacy, spatial realms, and resiliency), organize the components of place sign systems; one of these sub-codes is the resiliency of architectural spaces that refers to predicting future and alterable needs of users in place based on time signs. This sub-code includes three types of "adaptability", i.e., adapting spaces to various activities occurring in several spaces and diachronically. Meanwhile, "diversification" refers to diversifying spaces for activities performed in one space and synchronically, while "variability" refers to varying spaces for various activities occurring in one space and diachronically. Accordingly, the concept of resiliency has the features of "narrative patterns" through "narrative analysis", i.e., it involves an analysis of events sequence in space based on the space patterns of the beginning, the middle, and the ending; in this pattern, any of the previous space, if the time system is observed, is the cause of the next space, which includes the patterns of "narrative functions"; in other words, the classification of time-based events in place will enjoy the ability to predict future times based on their special structurability (continuity) and coherence(sequence). According to the structural analysis patterns of time signs, the following diagram illustrates a "relationship analysis"-based analytical pattern by taking into account the time semantic domains (Fig. 5).

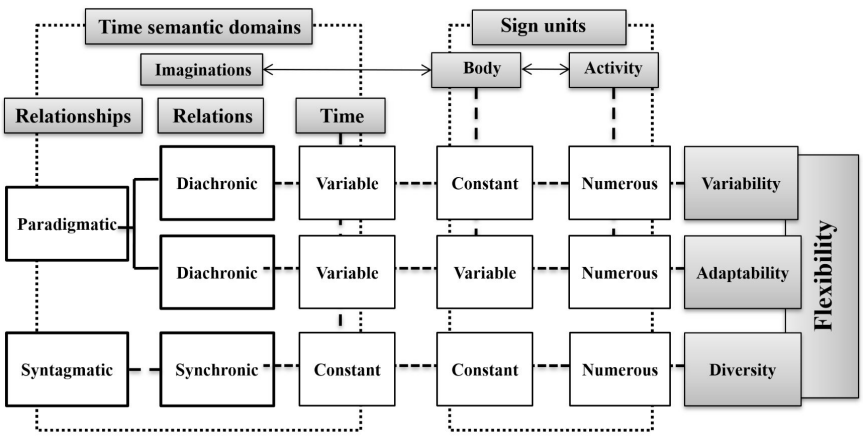

Fig. 5. Relationship Analysis in the Temporal Conceptual Domain of the Sub Code of Resiliency in Architecture

7. CONCLUSION

In architectural works, the conceptual analysis of time signs or the "analysis of sequential places" is performed by three categories of "commonality analysis, relationship analysis, and narrative analysis" in a content relationship. "Commonality analysis" or the time analysis of sign system commonalities depends on understanding place components in the form of "same-domain" sign units or units that interact with each other due to time-conceptual commonalities. In this type of analysis, two conditions are key for understanding the meaning of time in architecture: "significance condition" and "semantic distinction condition"; the fact that place components share the condition of significance helps place the components within a "semantic domain", and this "commonality" assumes value due to the "distinction" of let's say two components with a third one.

The presence of time in architectural works deals with the "diachronic" relations (the study of place structure at several points in time) to "understand a system of common concepts" in the form of "addition, deletion, and alteration" of unit meanings through semantic "narrowing" and "widening", as well as with "synchronic" relations (the study of place structure in one point in time). The goal of analyzing architectural works from the "diachronic" perspective is to investigate the transformation of concepts in commonplace components (e.g., the component of fabric) or sign units of a semantic domain (same-domain units) between several "similar architectural places" (e.g., mosque architecture) as a result of common concept transformation (e.g., fabric order) of those components "over time (e.g., several different architectural periods). This perspective studies the "transformation" and "conversion" of unit concepts over time. The goal of analyzing architectural works in the "synchronic" perspective is to investigate the basic semantic commonalities of place components or common sign units in a semantic domain (same-domain units), called "collocation. "Collocation" links sign units of an architectural place together due to their commonalities at one point in time.

"Relationship analysis" or the time analysis of the structural relationships of sign systems originates from "synchronic" relations, analyzed by two patterns of distinct "synchronic" (combining place components in one point in time) and "paradigmatic" relations (sequence of place components in several points in time). When analyzing architectural works, the totality of signs is organized in the form of "codes" of semantic domains or social-cultural contracts, and thus components of sign units, i.e., space, elements, and components of architectural work are analyzed in an interactive relationship with the totality of codes and sub-codes of time-based semantic domains. This conceptual interaction includes the analysis of architectural work in the form of "part-whole/sequential structures and reading distinction" relationships.

"Narrative analysis" emerges from "synchronic" relations, and synchronic elements in an architectural work include two aspects of "place synchronic", i.e., combination and continuity, and "time synchronic", i.e., sequence of sign units of place.

"Place synchronic" can be analyzed by two metaphors of "orientation" and "center-margin" dependent on cultural concepts.

"Time synchronic" in architectural analyses can be divided into "narrative patterns, narrative interaction, and narrative functions".

"Narrative pattern" analyzes the sequence of events in an architectural space, and this analysis is based on a linear time pattern in the form of "the beginning (balance), the middle (peak), and the ending) (balance)" where any previous space is the cause of the next space due to spatial continuity and sequence.

"Narrative interaction" produces and interprets place meanings and is influenced by the combination and order rules of place components. The analysis of spaces and time analogies of different works in different periods is based on narrative interpretation and interaction, and these interactions are analyzed based on the three types of "inter-place" (other-self), "inter-temporal" (self/other-self), and "inter-cultural" (other-self).

Narrative functions deal with the "functions" of spaces and are divided into three concepts of "structurability, predictability, and coherence" in place.

In sum, considering the role of time in the continuity of place functions, the preservation of coherence and continuity, i.e., the sequence of events in architecture helps investigate the concept of time in the user's perceptual domain, and consequently the continuous preservation of place quality.

While a physical and functional phenomenon, architecture is a relationship and signification process and hence can express structure and concepts via signs. Table 11 gives the relationship and characteristics of the three-time analyses, i.e., commonality, relationship, and narrative analyses, and indicates their function in architectural analysis.

Table 11. Relationships and Characteristics of Commonality, Relationship, and Narrative Analysis and their Functions in Architectural Analyses

Commonality Analysis			
Use: Place component classifications (sign units) based on the agent of time in architectural works			
Diachromic Analysis Semantic Domains	Transformation of Unit Concepts Over Time	Change, no change, addition, deletion	
	Explaining Unit Concepts Over Time	Semantic narrowing	
		Semantic widening	
Synchronic Analysis Semantic Domains	Paradigmatic (sequential) collocation		
	Paradigmatic (combined) collocation		
Relationship Analysis			
Use: The analysis of the opposite significance and meaning-making contrasts (e.g., spatial configuration) in place			
Synchronic Analysis	Paradigmatic Relations		
	Paradigmatic Relations	Place relationships (combining place components) Time relationships (sequence of place components)	Part-whole relations; Sequential structures; Reading distinction
Narrative analysis			
Use: Classifying codes or combination and sequence rules of place components over meaning production and interpretation (place significance)			
Syntagmatic Relation	Place Synchronic	Orientation metaphors; Center-margin metaphors	
	Time Synchronic	Narrative pattern: Beginning-ending; Balance-peak-balance	
		Narrative interaction: Inter-place narration (other-self); Intertemporal narrative (self/other–self); Intercultural narrative (self-other)	
		Narrative function: Structurability (spatial continuity); coherence (spatial sequence); predictability	

Understanding the presence of time in an architectural place is made possible by explaining place characteristics as a sign system, while the semiotic analysis of conceptual structures such as time-in-place dimensions is performed by focusing on the nature and working of sign structures of the time. If an architectural fabric bears some sign characteristics, it serves as a "means/vehicle" to reveal and express concepts. For this, the present study aimed to search for the semiotic indicators of time in an architectural fabric.

Organizing an environment is made possible using four factors of place, concepts, relations, and time while organizing place relations depends on the continuity and coherence of time relations, and vice versa; these relations have patterns and structures that can be systematically classified due to time semiotics. As a result, they offer a type of architectural analysis related to the time orientations of signs. That said, this study aimed to meetthe following objectives:

1. Comparative investigation of time and place: How a time expression is made possible in an architectural place analysis
2. Investigating the structures of architectural places based on time concepts of signs (time signs)

In sum, the study aimed to reveal how the concept of time helps analyze the semiotics of architectural works through the physical presence of place; the significant introduction of time signs into the analysis of place sign systems, which adds the concept of time to the sphere of architectural analyses, is made possible using the "conceptual analysis" of the development of the concept of time with the place.

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