

SPACE SYNTAX: A DIALECT OF ARCHITECTURAL DESIGN RESEARCH

M.E. Şalgamcıoğlu¹

Department of Architecture
Istanbul Technical University
Taskisla Cad. 34437 Taksim, Istanbul
salgamcioglu@itu.edu.tr, <http://faculty.itu.edu.tr/salgamcioglu>
<http://www.researcherid.com/rid/I-5335-2013>

Abstract

The aim of this study is to discuss the contribution of space syntax theory and space syntax research methods to various disciplines including the design research. In the broader area of design-based researches, space syntax can be seen as a dialect of design research with its contribution to not only the fields of urban design, urban planning, architecture and interior architecture, but also to interdisciplinary design including urban and architectural design fields' relationship with social sciences such as geography, psychology, anthropology and ecology. Moreover, various research fields including archeology, landscape design, transportation, and information technology are also using the space syntax approach and methods. In the context of transitions to sustainable societies, space syntax related research's contribution to both syntactic and semantic point of view is crucial for interpreting design research and policy for changing lifestyles and communities.

This paper will examine the theory of space syntax in relation with Social Logic of Space (Hillier and Hanson, 1984) and the nature of the concepts in space syntax related with spatial design research. The way of perception in space syntax theory is spatial recognition and Social Logic of Space is discussing the relationship between the social forces and the outside affects that are producing the shapes around us. According to the architectural theories' point of view, space syntax is contributing to a better understanding of the relationship between social constraints and shape possibilities with its methods examining design characteristics and organizations of spaces on both architectural and urban design scale. This point of view is also important for designing research and policy for the changing lifestyles. The social logic of space is also supporting a discussion about the obstacles on our way to a better design of the environment for all scales. In this context, one of the most important obstacles is the difficulty of understanding the sensitive nature of the relationship between social life and spatial organizations. Space syntax is suggesting a method to analyze the spatial pattern of the social content and the social content of the spatial pattern at the same time, which is crucial to make a research about the morphological relations of design especially in architecture.

In the context of space syntax, syntactic and semantic dimensions are producing the spaces that we design, live and analyse all together rather than acting separately in spatial formations.

Keywords: Space syntax, spatial organization, architectural design, design research, isovist.

1. INTRODUCTION

This study is examining the contribution of space syntax theory and space syntax research methods to various disciplines including the design research. In the broader area of design-based researches, space syntax can be seen as a dialect of design research with its contribution to not only the fields of urban design, urban planning, architecture and interior architecture, but also to interdisciplinary design including urban and architectural design fields' relationship with social sciences such as geography, psychology, anthropology and ecology.

The way of perception in space syntax theory is spatial recognition and Social Logic of Space is discussing the relationship between the social forces and the outside affects that are producing the shapes around us. According to the architectural theories' point of view, space syntax is contributing to a better understanding of the relationship between social constraints and shape possibilities with its methods examining design characteristics and organizations of spaces starting from urban scale to interior design scale. The social logic of space is also supporting a discussion about the obstacles on our way to a better design of the environment for all scales. In this context, one of the most important obstacles is the difficulty of understanding the sensitive nature of the relationship between social life and spatial organizations. Space syntax is suggesting a method to analyze the spatial pattern of the social content and the social content of the spatial pattern at the same time, which is crucial to make a research about the morphological relations of design especially in architecture.

The key definitions of space syntax theory and methodology such as isovist (Benedikt, 1979; Hillier and Hanson, 1984), and convex space (Hillier et al., 1987) should also be introduced for a better understanding of the concepts of space syntax. Isovist is a concept of spatial recognition that defines any particular viewpoint in a space with its visibility field and viewpoint's visibility field can also be called as the isovist field. Convex space is also a fundamental definition in space syntax theory, which can be conceived as the space where, no line between two of its inside points goes out of its perimeter. Convex spaces are the basis of space syntax analysis.

2. EXAMINATION AND RELATIONS ON SOCIAL STRUCTURE OF SPACE AND SPACE SYNTAX BASED THEORIES

In order to understand the nature of space syntax and space semantics relation, descriptions regarding understanding the social structure of the space, the space syntax theory should be reviewed. The relationship regarding space and architectural design connection with the contribution of other disciplines will be tried to be questioned on the basis of space syntax theory. In that sense the changing order of space that we can call the changing syntax of space will be discussed to grasp the opportunities that is hidden in this context and the importance of space syntax as a dialect of especially architectural design research. First of all, "Spatial Recognition" should be embraced as the perception style about space syntax. Space Syntax scrutinizes the state of perceiving the space in fragments by people who experience a space and of bringing those fragments together in brain, narrates the fragments into representation and reveals them as cognizable, measurable expressions.

If we consider the space syntax based theories, the space syntax emerges as a theory and method used for definition of structural environment. It was first asserted by Hillier and Hanson (1984) in their book "The Social Logic of Space" as the existence of relations among the external influences producing the patterns and social forces. From the point of view of architecture theory, space syntax contributes to better understanding of the interaction among design features and targeted objective, and social constraints and formal possibilities. According to Hillier, the key concept in The Logic of

the Space is the concept of spatial configuration (Hillier, 2007); this concept narrates the state of a relationship covering the other relationships in a complex. Whereas Hillier mentions how this state can pioneer a new theory for architecture in his book "Space is the Machine", he reveals a research on how this analytical theory will gather the improvement of understanding and design (Hillier, 2007).

According to Hillier and Hanson (1984), our biggest obstacle for making better designs originates from our not completely understanding of the delicate nature of the relationship between the social life and spatial organization. The interdisciplinary literature between space and society shall also be more attentively analyzed in order to achieve this. The main target of the research on social logic of the space is to put forth a theory and method that will contribute to the pursuit of society-space relationship starting from architecture in order to overcome the difficulties regarding understanding, research, designing within this context. One of the questions that shall be investigated within the scope of this theory is what the relations of social content of spatial texture or reciprocally spatial texture of social content are. As a method intended for analyzing the spatial texture, the emphasis, accentuation of the relations of local morphological relations and global texture highlights another dimension.

The book "The Social Logic of Space" (Hillier and Hanson, 1984) which is placed at the base of space syntax theory examines the definitive theory of spatial texture, and afterwards, its analysis methods. Importance of research on social logic of housing is also emphasized in pursuance to examination of this theory.

The research "A Pattern Language" written by Christopher Alexander (Alexander et al., 1977) in Berkeley in 1977 can be shown as the basis of the method and theory that Hillier and Hanson (1984) put forth, however, Alexander's approach is rather at a summery level. Alexander's (1966b) article "A City is not a Tree", on the other hand, approaches more non-hierarchical abstract concepts of spatial relations at its background. As for Stiny and Gips's (1978) shape grammars, it is in closer proximity with the "spatial syntax" concept with its configuration on the grounds of basic principles forms, however, it is an appeal developed by extensively refining over more abstract emergence and production circumstances of spatial textures. In the Social Logic of Space (Hillier and Hanson, 1984), on the other hand, the "syntactic generator" concept and explanation of forms of syntagmatic emergence of space are approached in a simpler way than "shape grammar" (Hillier and Hanson, 1984).

The contributors to addition of geometric elements into morphology come up from Thünen (Thünen and Hall, 1966), who was taken as reference from 1826 among the geographers who made appeals with rather formal and traditionalist approach, to Christaller (1933) and Lösch (1954). The most important point to emphasize here is the assertion of distance and location concepts concordantly.

Both cultural identity and semantics are concepts built on the circumstances of function and significance within this context. In continuation of this situation, their appearance of accepting the proper functioning of buildings is also an important aspect of culture.

In addition to this, it would be a deceptive definition to say that the buildings seem in their artifactual, totally physical state. Creation of vacant spatial volumes and transformation of their layout from the state of a physical object to a texture dimension is important. The purpose of buildings is to put the space in an order, in brief, to enable its consideration along with an order concept, to approximate the spaces (Hillier and Hanson, 1984).

The organization of inter-spatial relations, their hierarchy is associated with the order and hierarchy

among the relations of people. Society is intervened in the form and basic nature of buildings. In this state, buildings are important visual symbols of the society (Hillier and Hanson, 1984). Systems of spatial relations are also important along with the objects of the buildings.

When we move to another starting point for space syntax, we can come across with concave designed villages by structuring moving from the center on in South America, Africa or in Ukraine in B.C. 4th century (Piggott, 1965). With reference to this example, architecture and spatial form can be assumed to be organized under the influence of some external factors such as climate, technology, topography, however, space resists being explained by such simple external factors. Levi-Strauss (1967) could observe the opportunity provided by working with an approach which handles the social and reasoned processes in space as unbiased and strained projections of external factors, but in this case, it is also difficult to associate the social structure and spatial configuration structure. Whereas space can provide us with plenty of data in social sense in some cases, sometimes it provides as with very little data. Within this context, the need for a spatial theory that can explain the process of moving from disorder to order and meaninglessness to meaningfulness better emerges (Hillier and Hanson, 1984; Hanson 1999).

Privacy, territoriality and defensible space theories, all regarding the defense of a given area, or a pattern of behavior that defines and defends a territory of the space as a distinct expression of social reality have affected architecture at many stages such as understanding, designing and altering the space. With the Altman's (1975) style of approaching, privacy emerges as an organizing mechanism that designated the interpersonal interaction. Proshansky, Ittelson and Rivlin (Proshansky et al., 1970; Proshansky et al., 1976) stated that privacy increases the freedom in choices associated to behavior to high level.

Individuals acting upon designated instincts for claiming and defending an explicitly marked space are emphasized in Oscar Newman's (1972) defensible space theory. The approach that can be addressed regarding cognition based theories is also not solely sufficient in order to make a start for the social logic of space (Hillier and Hanson, 1984), but Kaplan's (1987) studies stand on a milestone to be emphasized in terms of being able to understand the relation of cognition based theories and physical environment. Kaplan acquired findings towards the possibility of a low awareness leveled kind of cognitive state that we think fast to affect our assessments about the space by obviating our judgments. This situation reveals the place of perception-cognition-physical environment relation in structuring, defining and development of environment.

Buildings express social meaning with their appearance and planning. Spatial syntax theory tries to demonstrate this social relation by handling the association of space with its physical relations (Hillier and Hanson, 1984). As for Hillier and Leaman (1973), they discuss in "The Man-Environment Paradigm and Its Paradoxes" that the artifactual physical world is already a social behavior along with its grip on the spatial organization.

While the physical state, physical denomination of the spatial setup is handled by the spatial syntax, the social meaning is the total of the dynamics constituting the semantic dimension of the space. It is important to accept that the physical and semantic dimensions not separately, but collectively constitute the space. The rules, constraints of the space, at the same time, help us define the relations required to make sense of the space and they lead us to associate this meaning among one than one space cells. Syntax, which can be used to explain the interspatial relations along with the singular spaces which can randomly develop in different forms, processes, the objects in the space, other physical creations, shall be approached together with the meaning of creation of space. Within this context, syntax and semantics are of characteristics of being each other's continuation, far from

being each other's antithesis.

The best way to express the social meaning of the space is by discussing on their physical relations. This situation shows us the integration of "spatial syntax" and "semantics". Pursuant to this discussion, it is not erroneous to express the "spatial syntax" concept as "an imperfect mathematics of the artificial" (Hillier and Hanson, 1984). Every type of artificial creation, which uses syntax, can be named as "a dialect pertaining to form or shape". This dialect pertaining to form can be any creation group organized by syntax and this situation generates the "social knowables". Space defines a dialect pertaining to form and every "community" establishes its ethnic terrain, space by organizing according to certain principles. In this case, social relations also express a dialect pertaining to shape at the same time.

Reducing the structure concerning shape into integrated principles means reducing it into principles of knowability. In order to explain the spatial states which have potential of changeability by time, and which change by the different needs and effects of people, it is required to understand the "integrated principles" generating these states. According to Hillier (1984), these integrated principles are the syntax, itself.

What can be known about the physical spatial state of a dialect at any time is its syntax. Syntax also allows the revelation of the systematic similarities and differences of the orders generated by these spatial states. Spatial syntax analyses also enable comparison of different styles on the same quantitative base (Kim, 1999; Penn, 2003). According to Hanson (Hanson, 1994), configurative analyses of the architectural plans can be perceived and accepted as the archeology of the space, and within this context, spatial syntax can be used to investigate the form-function relation for housing. Isovist and visibility graph analyses constitute an important base in these analyses. Benedikt (1979) suggests that isovists are the most basic element which is used for spatial analysis of small scale environments and their spaces and which can be determined. The studies of Montello (1993), with his study on explanation of spatial features of environmental spaces by extending across a certain observation point, and Turner et al. (2001), with his visibility graph analyses which enables computer-aided integrated analysis of multiple positions in association with each other of multiple points which are prorated on a certain environment, are important (Franz and Wiener, 2008). Hillier, Hanson and Peponis (Hillier et al, 1987) also made important contributions to the space syntax method and theory with their studies regarding isovist.

Another point that shall be considered for space syntax analyses is the fact that our visual field is not totally 360 degrees if the relation between movement and cognitive representation is important in our research. Distinct differences occur among forward movement, edge-to-edge movement and the movements made by turning the head (Penn, 2003). The state generated by these differences shall definitely be evaluated as a parameter in the researches and space analyses.

Regarding the space syntax, the discussion on possibility of cognitive space concept not being a metric space concept at all, but being rather qualitative concept and whose state is not changeable by certain geometric variables, a rather basic concept such as topological space or even more prior concept of it, may be a simpler space concept stands out (Penn, 2003).

In the space syntax researches, sometimes it may be claimed that the individuals who use the space and the motivations these individuals have, their use of the space do not reside in the space concept; according to Penn (Penn, 2003), motivations of individuals and clues in the essence of their cognitive states may already exist in the space syntax theory itself and its analyses, thus, theory and analyses may contribute to better understanding of individual level mechanisms by excluding these. In the space syntax theory as a social theory, this state of exclusion is a method for better understanding of

mechanisms. In the meantime, with its aspects representing the spatial texture and rendering it countable, spatial syntax analyses have shown us that the observed movements of pedestrians are strongly associated with spatial configurations (Hillier, Burdett, Peponis and Penn, 1987; Hillier, Hanson, Peponis, Hudson and Burdett, 1983; Hillier, Penn, Hanson, Grajewski and Xu, 1993; Peponis, Hadjinikolaou, Livieratos and Fatouros, 1989; Read, 1999; Penn, 2003). In addition to this situation, the conclusion that spatial integration is associated with observed movements was drawn in Kim's (Kim, 1999) PhD research on configuration, cognition and behavior relation; an escalating relationship is observed in more integrated spaces (Penn, 2003).

As examples of researches handled based on method and theory of space syntax, many researches can be shown from researches scrutinizing the relationships of line analyses and crimes at the downtown neighborhoods (Ünlü et al., 2001a) to evaluation of social interaction spaces in university buildings (Ünlü et al., 2001b); from generation of space syntax based emergency exit models of hospitals (Ünlü et al., 2005) to scrutinizing of comparative design strategies of metro systems (Ünlü et al., 2007); from syntactic comparison of interfaces between the inner and outer spaces of architecture schools (Ünlü et al., 2009) to spatial syntactic, semantic comparison of conventional shopping places of different geographies and cultures (Edgü et al., 2012).

A system constituted by spaces can be approached as a system of syntactic relations and can be syntactically analyzed. Analyzing with most basic principles, relations such as symmetry – asymmetry, distributedness – non-distributedness has this meaning. Among these concepts, depth also stands out as an important concept in the plan systems which are asymmetric and which move by passing from one cell to another. Assessment of spaces as deep or conversely shallow spaces as a result of the analyses involves important data regarding interaction, integration of spaces. It is observed that the integration of deep spaces is generally weaker, and that of shallow spaces is generally stronger.

The two space types constituting the base of space syntax are briefly denominated as concave, inward expanding spaces, space whose inward margins continue its relations by constituting the exterior surface of the space they define and convex, outward expanding spaces, space whose outward margins continue its relations by constituting the exterior surface of the space they define. Convex space type is equivalent of a formal expression approached during spatial syntax calculations and in this space reduction, when any two points drawn within the space boundaries are connected, the line connecting these points never gets out of the space boundaries, whereas in the concave space it does. Convex spaces constitute the basis of space definitions of determined analysis space counts and especially line analyses in the spatial syntax analyses such as integration, depth analysis.

As conclusion, if we try to make syntactic explanation of spaces, every space possesses the features of a syntactic space regardless of being convex or concave, having a distributable structure or not, either symmetric or asymmetric; and these features can conveniently be used to define it. Representing a structure pertaining to form, spatial syntax is also the focal point of the theories based on social structure of space. It contributes to understanding of space along with its many physical and semantic parameters by the concepts it reveals; it constitutes a strong systematic and basic analysis relationships by enabling the analysis of change of space in time, and of space types which are different in terms of location and time on the same quantitative basis through its analyses.

When we look into the core of the spatial syntax based theories, spatial syntax is a theory and method used in order to be able to define the structural environment. In the theory first asserted by Hillier and Hanson (1984), it is put forth that there are relationships among the external factors generating the forms and the social powers. From the point of view of architecture theory, space syntax contributes to better understanding of the interaction among design features and targeted

objective, and social constraints and formal possibilities.

3. CONCLUSION AND DISCUSSION REGARDING THE SPACE SYNTAX AND SEMANTICS RELATION

As a result, the relations affecting the development of space in terms of architectural design are physical organizations such as technological development, environmental factors, zoning state or a set of changes, developments in sociological organizations related to human ecology by time. The framework regarding the conceptual infrastructure and the aim of understanding space syntax and space semantics relation as a design dialect that is open to many other relations with different disciplines including interior design can be constituted in five main sections via scrutinizing the relations also with many other theories, within this context. Ecology based theories; culture related theories; environmental perception and cognition based theories; semantics based theories; space syntax theories. Especially space syntax theories has formed the grounds of this study. Configuration of space is a result of the reciprocal relationship of the factors emphasized in this mainly theoretical study.

The issue deliberated in this sense is that the semantic relations of house with the theoretical infrastructures at different contexts affect the architectural planning along with physical, sociological, psychological, cultural many environmental dimensions in reciprocation with its meaning. The contextual ground in this study shall be considered in the examination of the change in the space associations, planning and organization of the architectural space.

Beyond this framework in the context of ecology-based theories, it is important that organization, environment and technology components of human ecology are the most important components when change and development of space is at stake in terms of design. Behavior setting theory (Barker, 1968) that is shaped by the physical components and effects of our senses to our perception, as well as the action patterns in a space shall be considered. Whereas Moore (1985) states that one of the most important reasons of formation of behavior setting is the physical elements existing at spaces, perception of these physical elements by our senses and the reactions emerging in this process are significant. Affecting the configurations of architectural spaces and their association levels, the physical elements are also determinants of the milieu generated as a result of the behavioral modes, which are created due to our intra-residential needs regarding daily life and as a consequence of various requirements. Spatial behavior consists of interaction of mentality, intellectual cognition, all of the temporal, social and physical dimensions regarding the identity, social and cultural status. Behavior setting theory reveals that the spaces in a plan of an architectural design and every point in these spaces will have a physical and semantic value, will constitute a milieu at the point of change and specialization of the space. The feeling of belonging of the people in the living spaces approached as physical environment affects the behavior, configuration and usage level regarding these spaces.

Within the contextual framework addressed within the context of culture based theories, Altman's (1975) emphasize of the structure of privacy which reveals, designates also the interspatial interaction and order via its designating, controlling state of interpersonal interaction stands out. Via this dimension, it has an important role in creation of spaces and inter-spatial relations, and afterwards, their change. Aiello and Thompson (1980) and Altman et al. (1980) tried to assert the personal space and spatial behavior relation considering the cultural phenomena. In addition to this, culture always directly or indirectly effects the change and development of space. According to Michelson (1977), people move to a new environment due to necessity. Parallel to the statement of this situation, desire to change an existing environment due to necessity may also be encountered as another consequence. Alexander (1966a) also approached the culture association by classifying the

habit of cultures to generate forms into two fundamental points.

Within the context of environmental perception and cognition-based theories, effects of cognitive schemata along with cognition on the uses and changes of housing space can contribute to this study. In this context, if Lynch's (1960) theory that addresses the reference points within the context of environment is approached with a different point of view, it can be encountered that a television in a house plan (as an example) becomes a reference point at space scale or the areas whose syntactical integration value increases become a reference area is important. Kaplan (1987) states the position of perception-cognition-physical environment relation in structuring, definition and development of environment. As one of the pioneering theoreticians for addressing the perception within socio-cultural context, Rapoport (1977) distinguishes with his studies on perception changes in structural environment, emphasizing the structuring of space according to physical, temporal and social arrangements.

Spatial changes are also an important factor in the process leading us to formation of mental schemas and existence of reciprocation between the processes effecting the spatial changes and mental schemas shall definitely be re-emphasized. In a research of Kaplan (1989), whereas openness emerged as the strongest variable affecting the preferences regarding environment and enabling the creation of predictions, ease of locomotion and smoothness remained at rather weak variables ranking second and third. While the unknown and object of interest space variable (mystery) emerged to be strong, coherence, complexity, legibility are emphasized as weaker variables.

Within the context of semantics based theories, that is also important for its relations with space syntax in this study, the emphasis of Gifford et al. (2000) on aesthetic theory that the examination of the outstanding objective features of the structured environment is a direct prediction, determinant of ex-ante aesthetic evaluation stands out. At yet another research of Kaplan (1983), the definitions of supportive, controllable and restorative environments are addressed within human-environment and space relationship context. A supportive environment has high legibility, at a structure providing information and also different alternatives to render preferences possible. Controllable environment stands out as an environment providing the sentiment of progress in the mechanism and order out of human control rather than personal control, providing the hint of its order via the flow of its organization. Targets of a supportive environment are emphasized to be more humane and practical in comparison with the controllable environment. There is an emphasis on the restorative environment to have a sentimental value based on intuition.

A body of constraints is always effective on space designs. If this situation is addressed in a small scale, an important distance will be taken in order to understand the factors, dynamics underlying configuration of living spaces with various social, semantic and physical rules. All of the spaces are generated as a result of various constraints and tried to be understood. The relations of the dynamics constituting the space with one another form an important milestone in order to understand that space (Hillier, Hanson 1984). Within this context, the changes in the physical and social meanings, their co-transformation due to the changes in the space associated with technology, zoning, plot structure and construction understanding will be addressed by this view in designs. An important expression in the extension of space syntax can be emphasized as, "the order, hierarchy of the interspatial relationship in buildings is actually in association with the order and hierarchy of the interpersonal relationships".

The shortest summary of the contextual structure of this study regarding space syntax is stating that the best way to express the social meaning of the space is by discussing on their physical relations. This situation shows us the integration of "space syntax" and "semantics". Apparently, syntax and

semantics are of characteristics of being each other's continuation, far from being each other's antithesis. Isovist and visibility graph analyses form a fundamental ground for the researches of this study. Representing a structure pertaining to form, space syntax is also the focal point of the theories based on social structure of space. It contributes to understanding of space along with its many physical and semantic parameters by the concepts it reveals; it constitutes a strong systematic and basic analysis relationship by enabling the analysis of change of space in time. It is possible to compare different forms on the same quantitative basis via space syntax analyses.

In this entire theoretical infrastructure, hints regarding the change of the space can be obtained by considering the relations of materials, techniques, needs, climate, food and many other factors as such with their opposites (Mugerauer, 1994). Dialectic apprehension is important as it can be understood from this context. "The relationship patterns consisting of opposites involve balanced associations; the tension among them brings dynamism to the structure (Mugerauer, 1994)." An example of this relationship pattern is the importance of the tension between the global and local values, and their position for providing the integral balance. The space-time compressions encountered in today's cities (Harvey, 1990), semantic shifts, detachment of urban spaces from humane values, alienation of humans from their environment gradually are situations having effects on space level.

Within the scope of the study, it will be appropriate and obvious to scrutinize space syntax with space semantics in order to understand this dialect of architectural design and research.

4. REFERENCES

- Aiello, J. R., Thompson, D. E. Personal Space, Crowding And Spatial Behavior in a Cultural Context. In I. Altman, A. Rapoport, J. F. Wohlwill (Eds.) *Environment and Culture* (pp.107-178). New York: Plenum Press, 1980.
- Alexander, C., A city is not a tree. *Design magazine*, 206, 46-55, 1966b.
- Alexander. C., Ishikawa. S., Silverstein. M., *A pattern language*. New York: Oxford University Press, 1977.
- Altman, I., *The environment and social behavior: privacy, personal space, territory, crowding*. Monterey, CA.: Brooks/Cole Publishing, 1975.
- Altman, I., Rapoport, A., & Wohlwill, J. F., *Human behaviour and environment: advances in theory and research, environment and culture vol 4*. New York: Plenum Press, 1980.
- Barker, R., *Ecological psychology: concepts and methods for studying human behavior*. Stanford CA.: Stanford University Press, 1968.
- Benedikt, M., To take the hold of space: isovists and isovist fields. *Environment and planning b: planning and design*, 6, 47-65, 1979.
- Christaller, W., *Central places in southern Germany*. (Trans. C.W. Baskin, in 1966 from original edition) New Jersey: Englewood Cliffs, 1933.
- Edgü, E., Ünlü, A., Salgamcıoğlu, M. E., Mansouri, A., Traditional Shopping: A Syntactic Comparison of Commercial Spaces in Iran and Turkey. In M. Greene, J. Reyes and A. Castro (Eds.), *Proceedings: Eighth International Space Syntax Symposium*, Chile: Santiago de Chile, January 3-6, 2012.
- Franz G., Wiener, J. M., From space syntax to space semantics: a behaviorally and perceptually oriented methodology for the efficient description of the geometry and topology of environments. *Environment and planning b: planning and design*, 35, 574-592, 2008.
- Gifford, R., Hine, D., Muller-Clemm, W., Reynolds, W., D'arcy, J., Shaw, K. T., Decoding modern architecture: a lens model approach for understanding the aesthetic differences of architects and laypersons. *Environment and behavior*, 32 (2), 163-187, 2000.

- Hanson, J., *Decoding homes and houses*. Cambridge: Cambridge University Press, 1999.
- Harvey, D., *The condition of postmodernity*. Blackwell, 1990.
- Hillier, B. ve Leaman, A., The man-environment paradigm and its paradoxes. *Architectural design*. August Issue, 1973.
- Hillier, B. ve Hanson, J., *The social logic of space*. Cambridge: Cambridge University Press, 1984.
- Hillier, B., Burdett, R., Peponis, J., Penn, A., Creating life, or, does architecture determine anything? *Architecture and behavior/Architecture et comportement*, 3, 233-250, 1987.
- Hillier, B., Hanson, J., Peponis, J., Syntactic analysis of settlements. *Architecture et Comportement/Architecture and Behavior*, 3 (3), 217-231, 1987.
- Hillier, B., *Space is the machine: a configurational theory of architecture*. [UCL Discovery Version]. http://eprints.ucl.ac.uk/3848/1/SpacelsTheMachine_Part1.pdf, 2007.
- Kaplan, S., A model of person-environment compatibility. *Environment and behavior*, 15 (3), 311-332, 1983.
- Kaplan, S., Aesthetics, affect, and cognition: environmental preference from an evolutionary perspective. *Environment and behavior*, 19 (1), 3-32, 1987.
- Kaplan, S. ve Brown, T., Environmental preference: a comparison of four domains of predictors. *Environment and behavior*, 21 (5), 509-530, 1989.
- Kim, Y.O., *Spatial configuration, spatial cognition and spatial behaviour: the role of architectural intelligibility in shaping spatial experience* (Yayınlanmamış Doktora Tezi). University College London, Londra, 1999.
- Levi-Strauss, C., *Structural anthropology*, (Vol. 1). Garden City, New York: Anchor Books, 1967.
- Lösch, A., *The economics of location*. New Haven, Connecticut: Yale University Press, 1954.
- Lynch, K., *The image of the city*. Massachusetts Institute of Technology, Cambridge, Massachusetts, and London, England: The MIT Press, 1960.
- Michelson, W.H., *Man and his urban environment: a sociological approach*. Reading, Massachusetts: Addison-Wesley Publishing Co., 1977.
- Montello, D. R., Scale and multiple psychologies of space. *Spatial information theory: a theoretical basis for GIS* içerisinde, (pp.312-321). Berlin: Springer, 1993.
- Moore, G. T., Environment and Behavior Research in North America: History, Development and Future Prospects. In D. Stokols, I. Altman (Eds.), *Handbook of Environmental Psychology*. New York: John Wiley and Sons, 1985.
- Mugerauer, R., *Interpretations on behalf of place*. New York: Suny Press, 1994.
- Newman, O., *Defensible space*, New York: Mac Millan, 1972.
- Penn, A., Space syntax and spatial cognition, or why the axial line? *Environment and behavior*, 35 (1), 30 – 65, 2003.
- Piggott, S., *Ancient europe*, Edinburgh: Edinburgh University Press, 1965.
- Proshansky, H. M., Ittelson, W. H., Rivlin, L.G., *Environmental psychology: man and his physical setting*. New York: Holt, Rinehart and Winston, 1970.
- Proshansky, H. M., Ittelson, W. H., Rivlin, L. G., *Environmental psychology: people and their physical settings*. New York: Holt, Rinehart and Winston, 1976.
- Rapoport, A., *Human aspects of urban form: towards a man-environment approach to urban form and design*. Oxford: Pergamon Press, 1977.

Stiny, G. ve Gips, J., *Algorithmic aesthetics*. Berkeley, CA.: University of California Press, 1978.

Thünen, J. H. ve Hall, P., *Von thünen's isolated state: an english edition of: der isolierte staat*. Oxford: Pergamon Press, 1966.

Turner, A., Doxa, M., O'Sullivan, D., Penn, A., From isovist to visibility graphs: a methodology for the analysis of architectural space. *Environment and planning b: planning and design*, 28, 103-121, 2001.

Ünlü, A., Edgü, E., Özden, T., Özener, O., Axial Lines and Crime Relationship in Central Neighbourhoods. In J.Peponis, J.Wineman, S.Bafna (Eds.), *Proceedings of 3rd International Symposium on Space Syntax*. Atlanta, USA: College of Architecture, Georgia Institute of Technology, 2001a.

Ünlü, A., Özener, O., Özden, T., Edgü, E., An Evaluation of Social Interactive Spaces in A University Building. In J.Peponis, J.Wineman, S.Bafna (Eds.), *Proceedings of 3rd International Symposium on Space Syntax*, (pp.46.1-46.8). Atlanta, USA: College of Architecture, Georgia Institute of Technology, 2001b.

Ünlü, A., Ülken, G., Edgü, E., A Space Syntax Based Model in Evacuation of Hospitals. In Akkelies van Nes (Ed.), *Proceedings of 5th International Space Syntax Symposium*, (pp.161-173). Netherlands: Delft University of Technology, 2005.

Ünlü, A., Edgü, E., Comparative Space Syntax Analysis of Design Strategies for Istanbul Underground System. In Ayse Sema Kubat (Ed.), *Proceedings of 6th International Space Syntax Symposium*, (Vol.2, p.74, 01-10). Istanbul: Istanbul Technical University, Faculty of Architecture, 2007.

Ünlü, A., Edgü, E., Cimşit, F., Şalgamcıođlu, M. E., Garip, E., Mansouri, A., Interface of Indoor And Outdoor Spaces in Buildings: A Syntactic Comparison of Architectural Schools in Istanbul. In D. Koch, L. Marcus, J. Steen (Eds.), *Proceedings of 7th International Space Syntax Symposium*, (p.132). Stockholm, Sweden: KTH Royal Institute of Technology, 2009.

Mehmet Emin Şalgamcıođlu is an Architect and Assistant Professor in Istanbul Technical University. He is working on architectural design and morphology field and has papers internationally. He worked in architectural and urban design projects in Turkey including Urban Planning Projects for Uskudar Municipality of Istanbul, also has experience in architectural design area with various projects including competitions international and nationwide. He was awarded with a team project for Organization of Islamic Conference Headquarters' Architectural Design Competition in Jeddah, Saudi Arabia in 2006; honorary mention for Gökçeada High School Campus Project in 2014. He also holds an award in publication category of national architectural critics competition organized by Chamber of Architects, Turkey in 2006. His award of success from Istanbul Technical University is in 2003.

He was a Visiting Scholar at University of Michigan, A.Alfred Taubman College of Architecture and Urban Planning, Ann Arbor, Michigan, US, in 2010; completed his PhD study in Istanbul Technical Univ. Institute of Science and Technology, Architectural Design in 2013; MSc. Istanbul Technical University, Institute of Science and Technology, Arch. Design in 2005; Bachelor of Architecture, Faculty of Architecture, Istanbul Technical University, ITU in 2003. He is a current member of IAPS and Union of Architects, Chamber of Turkey.