

ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL

**THE ROLE OF MURALS IN URBAN SPACE AND THEIR EVALUATION
THROUGH COGNITIVE MAPPING EXAMPLING OF KADIKÖY-
YELDEĞİRMENİ**



M.Sc. THESIS

Buse ERKAN

Department of Urban Design

Urban Design Programme

FEBRUARY 2026

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**Buse ERKAN
(519221001)**

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Thesis Advisor: Assoc. Prof. Dr. Mehmet Emin ŞALGAMCIOĞLU

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İSTANBUL TEKNİK ÜNİVERSİTESİ ★ LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ

**KENTSEL MEKANDA DUVAR RESİMLERİNİN ROLÜ VE BİLİŞSEL
HARİTALAMA YOLUYLA DEĞERLENDİRİLMESİ KADIKÖY-
YELDEĞİRMENİ ÖRNEĞİ**

YÜKSEK LİSANS TEZİ

**Buse ERKAN
(519221001)**

Kentsel Tasarım Anabilim Dalı

Kentsel Tasarım Programı

Tez Danışmanı: Prof. Dr. Mehmet Emin ŞALGAMCIOĞLU

ŞUBAT 2026

Buse ERKAN, a M.Sc. student of İTÜ Graduate School student ID 519221001, successfully defended the thesis/dissertation entitled “THE ROLE OF MURALS IN URBAN SPACE AND THEIR EVALUATION THROUGH COGNITIVE MAPPING EXAMPLING OF KADIKÖY-YELDEĞİRMENİ”, which she prepared after fulfilling the requirements specified in the associated legislations, before the jury whose signatures are below.

Thesis Advisor : **Assoc. Prof. Dr. Mehmet Emin ŞALGAMCIOĞLU.....**
İstanbul Technical University

Jury Members : **Prof. Dr. Ervin GARİP**
İstanbul Technical University

Assoc. Prof. Dr. Fitnat Cimşit KOŞ
Gebze Technical University

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To my father,



FOREWORD

Throughout my thesis work, I would like to express my sincere gratitude to my dear Thesis Advisor, Assoc. Prof. Dr. Mehmet Emin ŞALGAMCIOĞLU, who valued every idea I had, was always by my side during this challenging process, and enabled me to continue my work with pleasure, taking further steps forward. Finally, I would like to thank my esteemed jury members, Assoc. Prof. Dr. Fitnat CIMSIT KOS and Prof. Dr. Ervin GARİP, who enabled me to present my entire work and shared their valuable insights with me until the very last day. I would like to express my sincere gratitude to all the professors who contributed to my education throughout my undergraduate years, and especially to my dear Assist. Prof. Dr. Can BOYACIOĞLU, who patiently listened to all my ideas and further broadened my horizons.

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February 2026

Buse ERKAN
(Architect)



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ABBREVIATIONS

AAT	: Getty Art & Architecture Thesaurus
APA	: American Psychological Association
IBE	: International Bureau of Education
OED	: Oxford English Dictionary
VGA	: Visual Graph Analysis





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THE ROLE OF MURALS IN URBAN SPACE AND THEIR EVALUATION THROUGH COGNITIVE MAPPING EXAMPLING OF KADIKÖY - YELDEĞİRMENİ

SUMMARY

From past to present, humans have established cyclical dynamics with urban spaces. These cyclical dynamics create various formations that strengthen the interaction between humans and urban spaces, reframe the urban environment, and convey different environmental behavior potentials. While urban spaces are designed by people, individuals also shape their environmental behaviors in response to the characteristics of urban environments. Each person's experience of urban space is unique. This is because, while experiencing an urban space, individuals filter it through their own perceptual lens and represent it mentally. The interaction between natural and built environmental factors and human behavior in urban space is ongoing. The totality of spatial relationships formed by natural and built environments constitutes the physical environment. In fact, when a person explores or experiences an urban space, they begin to define it in their perception through a connection with the physical environment and this process continues. The more intense the factors that make an urban space unique, the more strongly a person mentally retains and begins to make sense of that city.

Built and natural environmental elements may hold varying degrees of significance and priority within an urban space. At the same time, the subcategories of physical environmental components may form different classifications in human perception. This concept is highly open to change and development. While experiencing the physical environment, humans employ all five senses in combination with their cognition and individual perception. In perceiving urban space, the synthesis of human perception and cognition drives the process. During this process, the physical environment may undergo transformation. Simultaneously, human perception may also shift depending on the frequency of experience. The perception of a constantly experienced urban space differs in intensity and cognitive positioning from that of a rarely visited or newly encountered environment. This leads to varying levels of salience in the human mind depending on the nature of the experience.

The experience and perception of urban space by individuals constitute the starting point for a range of psycho-environmental behaviors. In this context, numerous syntactic and semantic methods have been employed in the literature. From past to present, these methods have been developed, sustained, and enriched through interdisciplinary efforts. Since both urban spaces and humans are dynamic concepts, the foundational elements that connect them will continue to evolve as long as urban environments and people exist. One of the primary methodological approaches that bring together urban space and human perception is the Cognitive Mapping method, originally introduced by Edward Tolman in 1948, rooted in the discipline of psychology. Today, cognitive mapping has become a widely used method in the fields

of architecture and urban design. It plays a crucial role in enabling individuals to find their way within urban environments and to express the meanings and legibility of these spaces through the mental maps they construct. Through the data gathered, it is possible to perform syntactic and semantic analyses and interpretations of the factors influencing urban spatial perception. The subfields of psychology have consistently contributed to understanding the perception of urban space and continue to do so. Subdisciplines such as social psychology, human psychology, urban psychology, and environmental psychology all play a significant role in shaping discussions and practices in urban design and architecture.

In light of all these concepts, murals an integral component of urban spaces play a significant role in the legibility of the city and their position within human perception. Murals, often located on building façades and executed on a large scale, can be defined as urban markers that emphasize specific areas in human cognition and contribute to making urban spaces more distinguishable. In the context of an individual's urban experience, murals may serve as supportive references that aid in better spatial perception and environmental understanding. Prior to and throughout the thesis study, an extensive interdisciplinary literature review was conducted. The evolution of interrelated concepts such as environmental psychology, place and space, wayfinding, environmental perception, and environmental cognition continues to develop in the literature today. Guided by past research and studies, the initial steps of this research aimed to establish a strong theoretical framework by defining key concepts and interpreting their historical development. Foundational studies in the fields of environmental cognition, perception, wayfinding, and spatial syntax have laid the groundwork for this study. Yeldeğirmeni Neighborhood in Kadıköy, Istanbul, to strengthen the theoretical basis. In addition, spatial syntax integration, axial mapping, and visibility graph analyses were carried out using spatial analysis software to evaluate the legibility of the urban space based on syntactic values. Finally, a cognitive mapping study, selected as the main methodological approach, was conducted with voluntary participants in the sample area.

As the final stage of the study, the cognitive mapping exercise was conducted with participants selected according to the same criteria and profiles. In order to fully achieve the aim of the research, the mapping was carried out with voluntary participants who had either very limited prior experience or no experience at all with the area in question. The reason for selecting individuals with minimal or no prior experience was based on the idea that, when experiencing an urban space for the first time, the most prominent representations of the physical and natural environment in human perception could be more clearly identified thus making the study more robust. As a result of this research, it is suggested that in future efforts aimed at improving the legibility and perception of urban space, the role of murals as urban markers may hold greater potential and become even more influential in shaping the meanings of urban environments.

As the study area, Kadıköy Yeldeğirmeni neighborhood, located in the Kadıköy district of Istanbul, was selected due to its relatively high number of murals, despite not being homogeneously distributed, and its medium-scale urban characteristics. The sample area is situated between regions of the city that experience intense circulation. It is within walking distance to key transportation hubs such as Ayrılıkçeşmesi Marmaray Station, Kadıköy Altıyol bus stop, Kadıköy coastal bus terminals, Kadıköy metro, and ferry pier. In general, circulation into the neighborhood predominantly occurs along the axes of Halitağa Street and Bahariye Street. In terms of topography,

although pedestrian access from the city's coastal area is technically possible, the steep slope of the terrain makes this route less favorable. Another heavily used access point has been observed to be Ayrılıkçeşmesi Marmaray Station. In summary, accessibility to the area tends to be preferred along east-west and south-north axes.

From a typomorphological perspective, it is observed that most of the buildings consist of historically significant and protected structures built with wood and stone materials, often incorporating courtyard-based architectural systems. The neighborhood has preserved its unique cultural identity from the past to the present. In today's context, considering current socio-cultural profiles and conditions, the area maintains a more cult-like urban identity compared to central Kadıköy districts such as Moda and Caferağa. In addition to the interaction between building façades and the natural and built environment, the presence of murals significantly enriches the urban identity and offers a diverse experiential landscape. No start or end point instructions were given to the participants who contributed to the study. The general boundaries of the neighborhood were described, and they were asked to begin and end at any point they preferred. A total of 14 participants contributed to the study. After participants freely wandered around the area for 30 minutes without any directive, a two-stage cognitive mapping study was conducted. Each stage of the mapping process lasted 5 minutes, completing the entire activity in 10 minutes. In the first stage, participants were asked to draw on a blank A4 paper using a black pen. In the second stage, they were asked to switch to a red pen. The reason for conducting these two stages was to better identify the frequency values of prominence order in the mental representation of the urban space experienced by the participants.

It was considered that a clearer identification could be achieved by categorizing all the representation products obtained. By examining the clearly identified streets, commercial buildings, schools, parks, and mural depictions, the main objective of the study was revealed through the question of which streets are more clearly defined in the human mind and whether there are murals along these street axes. In general, based on the results obtained, it was interpreted that the perception formed on a building facade by the natural and built environment, the facades of certain commercial buildings, murals, and wooden houses hold a prominent place in human perception. In another stage of the study, space syntax analysis was conducted in order to obtain numerical results from the data of the sample area. Emphasizing the relationship between the locations of murals and their intelligibility is important for the scope of the study. To fully capture the intelligibility values, integration, visual graph analysis (VGA), and axial map analyses were performed. These spatial syntax analyses were conducted using the DepthmapX software developed by Alasdair Turner. In the final stage of the study, a synthesis of these concepts and data was carried out through regression analysis using SPSS. Based on the threshold and frequency values generated, it is considered that the murals located in urban space not only contribute to the overall visibility values of the urban area but also cause significant changes in the visibility values of the specific locations in which they are situated.

As a result of the study, the physical environment plays a significant role in how an urban space is cognitively defined in the human mind. It can be interpreted that the presence of murals considered urban indicators makes the surrounding environment more legible and defined. In summary, this study concludes that large-scale murals in urban areas have substantial influence not only in terms of urban aesthetics but also in the contexts of urban memory, wayfinding, and environmental behavior.



KENTSEL MEKANDA DUVAR RESİMLERİNİN ROLÜ VE BİLİŞSEL HARİTALAMA YOLUYLA DEĞERLENDİRİLMESİ KADIKÖY- YELDEĞİRMENİ ÖRNEĞİ

ÖZET

İnsanlar geçmişten bugüne; kentsel mekanlar ile döngüsel dinamikler kurmaktadır. Bu döngüsel dinamikler insan ve kentsel mekanlar arasında etkileşimleri kuvvetlendiren, kentsel mekânı yeniden çerçevlendiren, farklı çevresel davranış potansiyellerini aktarmayı sağlayan çeşitli oluşumları var etmektedir. Kentsel mekanlar insanlar tarafından tasarlanırken, insanlar da zaman zaman kentsel mekâna göre çevresel davranışlarını tasarlamaktadır. Her insan kentsel mekân deneyiminde biriciktir. Çünkü insan; bir kentsel mekânı deneyimlerken kentsel mekânı kendine özgü çevresel algı filtresinden geçirerek zihninde temsil etmektedir. Çevresel davranış setlerinin farklılıklarına göre algı da değişir. Bir insan için yapılı çevre daha baskın iken, başka bir insan için doğal çevre etmenleri daha etkili rol oynamaktadır. Hatta doğal ve yapılı çevrenin alt faktörlerinin de baskınlığı değişim gösterebilmektedir. Doğal ve yapılı çevre faktörleri ile insanın kentsel mekandaki davranışları etkileşim içinde kalarak sürekli olarak devam etmektedir. Doğal çevre, yapılı çevre mekânsal ilişkilerin bütünü fiziksel çevreyi oluşturmaktadır. Aslında bir insan bir kentsel mekânı keşfederken, deneyimlerken fiziksel çevre ile bir bağlantı kurarak algısında o mekânı tanımlamaya başlamaktadır ve bunu devam ettirmektedir. Bu süreçte kentsel mekânın özgünlüğünü oluşturan faktörleri ne kadar yoğun ise; insan, zihninde o derece yoğunlukta kalıcı olarak kenti temsil eder ve anlamlandırmaya başlamaktadır.

Yapılı ve doğal çevre unsurları, bir kentsel mekânda farklı derecelerde ve önem sıralamalarına sahip olabilmektedir. Aynı zamanda fiziksel çevre unsurlarının alt başlıkları insan algısında farklı sınıflandırmalar oluşturabilmektedir. Bu kavram oldukça değişime ve gelişime açıktır. İnsan, fiziksel çevreyi deneyimlerken 5 duyu organı ile bilişi aynı zamanda kendi biricikliğinde algısını kullanmaktadır. Kentsel mekânın algılanmasında insanın algısı ve bilişi birbiriyle sentezlenerek süreç ilerlemektedir. Bu süreçte fiziksel çevre değişime uğrayabilmektedir. Aynı zamanda insan algısı da deneyim sıklığına göre değişim gösterebilmektedir. İnsanın sürekli olarak deneyimlediği kentsel mekandaki algısı ile seyrek aralıklarla ya da ilk kez deneyimlediği bir kentsel mekânın insan algısındaki ve zihnindeki konumu baskınlık açısından farklılıklar oluşturabilmektedir. İnsanın kentsel mekânı deneyimlemesi, algılaması bir tür psiko-çevre davranışlarının başlangıç noktası olmaktadır. Bu konuda, literatürde birçok farklı sentaktik ve semantik yöntemler kullanılmaktadır. Geçmişten bugüne bu yöntemler disiplinler arası kendini var eden, geliştiren ve destekleyici çalışmalarla var olmaktadır. Kentsel mekân ve insan, dinamik kavramlar olduğu için kentsel mekanlar ve insanlar var olduğu sürece bu yapıtaşları da dinamik şekilde kendini var etmeye devam edecektir. Kentsel mekân ve insan algısını bir araya getiren başlıca çalışma yöntemlerinden biri olan ve geçmişten bugüne farklı disiplinlerde bir kaynak yöntem olan Edward Tolman tarafından 1948 yılında tasarlanan Bilişsel Haritalama yöntemi psikoloji disiplininin temel alınmaktadır. Bilişsel haritalama çalışmaları günümüzde mimarlık ve kentsel tasarım alanlarında

çokça yer edinen bir yöntem haline gelmiştir. İnsanın kentsel mekân deneyiminde yönünü bulabilmesi ve zihninde oluşturduğu haritalar bütünüyle kentsel mekanların anlamlarını ve okunabilirliklerinin ortaya konulmasında önemli bir metot oluşturmaktadır. Ele alınabilecek verilerle kentsel mekân algısındaki faktörlerin sentaktik ve semantik okumaları ve yorumlamaları yapılabilmektedir. Kentsel mekanların algılanma sürecinde psikoloji alanının alt çalışma başlıkları her zaman var olmuştur ve var olmaya devam etmektedir. Toplum psikolojisi, insan psikolojisi, kent psikolojisi, çevresel psikoloji... vb. alt psikoloji başlıklarının hepsi bir şekilde kentsel tasarım ve mimari konularında kendini var etmektedir. Tüm bu kavramlar eşliğinde, kentsel mekanların bir parçası olan muralların (duvar resimleri) kentin okunabilirliği ve insan algısındaki konumu oldukça etkili olmaktadır. Murallar yapıların cephelerinde, büyük ölçekte yapılan insan algısında oldukça vurgulayıcı ve bulunduğu kentsel mekânı daha tanımlı hale getiren kentsel göstergeler olarak tanımlanabilmektedir. İnsanın kentsel mekân deneyiminde bulunan murallar, çevreyi daha iyi algılamada yardımcı bir kaynak olarak görülebilmektedir.

Tez çalışmasına başlamadan önce ve sonrasında, disiplinler arası geniş bir literatür taraması yapılmıştır. Çevresel psikoloji, yer ve mekân, yön bulma, çevresel algı, çevresel biliş... vb. birbirini besleyen bütün kavramların literatürdeki gelişimi günümüzde de devam etmektedir. Literatürdeki geçmiş araştırmalar ve çalışmalar eşliğinde başlangıç olarak teorik çerçeveyi kuvvetli tutmak adına çeşitli kavram tanımlamaları ve bu kavramların gelişim süreçlerinin anlamlandırılmasıyla çalışmaya adım atılmıştır. Çevresel biliş, algı, yön bulma, mekânsal dizim üzerine geçmişten bugüne yapılan çalışmalar bu çalışmanın temelini de oluşturmuştur. Bu adımlardan sonra, bu teorik çerçeveyi kuvvetlendirmek adına seçilen örneklem alan olan İstanbul Kadıköy Yeldeğirmeni mahallesi üzerinde fotoğraflama ile mural analizlemeleri yapılmıştır. Bununla birlikte kentsel mekânın okunabilirliğini sentaktik değerler ile ele almak adına mekânsal dizim programı ile entegrasyon, aksiyal haritalandırma ve görünübilirlik analizleri yapılmıştır. Son aşamada ise ana metodolojik uygulama olarak seçilen bilişsel haritalama çalışması, örneklem alanda gönüllü katılımcılar ile yapılmıştır.

Son aşama olarak uygulanan bilişsel haritalama çalışması aynı kriter ve profiller üzerinden katılım sağlanarak yapılmıştır. Çalışmanın amacını tam anlamıyla yerine getirmesi adına alanı önceden çok az deneyimlemiş ve hiç deneyimlememiş gönüllü katılımcılar ile yapılmıştır. Deneyimi hiç olmayan ya da önceden çok az deneyimlemiş katılımcılar olmasının sebebi; ilk kez deneyimlenen bir kentsel mekânda insan algısında fiziksel ve doğal çevre olarak en çok hangi temsillerin olduğu çalışmayı daha kuvvetli hale getireceği düşünülmektedir. Tüm bu çalışma sonucunda gelecekte yapılacak olan, kentsel mekânın tanımlanabilirliğinde insan algısında etkili olan faktörler ve kentsel göstergeler olan muralların da farklı potansiyelleri var edeceği ve muralların kentsel mekanların anlamları için daha fazla etkiye sahip olabileceği düşünülmektedir.

Çalışma alanı olarak; muralların homojen olmasa da bir ara kentsel ölçek büyüklüğünde oldukça fazla sayıda yer İstanbul kentinin Kadıköy ilçesinde bulunan Kadıköy Yeldeğirmeni mahallesi seçilmiştir. Örneklem alan, kentin oldukça yoğun sirkülasyona sahip bölgeleri arasında kalmış bir bölgedir. Ayrılıkçeşmesi Marmaray istasyonu, Kadıköy Altıyol otobüs durağı, Kadıköy sahil otobüs peronları ve Kadıköy metrosu, vapur iskelesi... vb. gibi ulaşım noktalarına yürüme mesafesinde konumlanmaktadır. Genel olarak bakıldığında; Halitağa caddesi ve Bahariye caddesi eksenlerinden mahalleye sirkülasyon yoğun şekilde gerçekleşmektedir. Bölgenin

topografik durumuna bakıldığında, kentin kıyı bölgesinden yaya erişilebilirliği mevcut olmasına rağmen eğimden kaynaklı çok tercih edilmemektedir. Bir diğer yoğun erişimin bulunduğu nokta Ayrılıkçeşmesi Marmaray istasyonundan gözlemlenmiştir. Özetle alana doğu aksından batı aksına ve güney aksından kuzey aksına doğru erişilebilirlikleri tercih edilmektedir. Tipomorfolojik olarak bakıldığında, yapıların çoğu tarihi ve koruma altında bulunan ahşap ve taş malzeme yapım sistemi ve avlulu sistem ile kurulmuş yapılanmalar olduğu gözlemlenmektedir. Mahallenin kendine özgü kültürü geçmişten bu yana korunarak günümüze ulaşmaktadır. Günümüz koşulları ve sosyo-kültürel profillere bakıldığında ise; Kadıköy'ün merkezi sayılabilecek olan Moda ve Caferağa gibi bölgelere istinaden daha kült bir oluşumla kentteki kimliğini oluşturmaktadır. Cephelerin doğal ve yapıli çevre arasında kendini var etmesine ek olarak bulundurduğu murallar ile oldukça zengin bir kentsel kimlik ve deneyim alanı sunmaktadır.

Çalışmaya katkı sağlayan katılımcılara hiçbir şekilde başlangıç ve bitiş noktası komutu verilmemiştir. Mahalle sınırları genel olarak tasvir edilerek, istedikleri noktadan başlayarak istedikleri konumda bitirmeleri istenmiştir. Çalışmaya 20 katılımcı katkı sunmuştur. Alanın katılımcılar tarafından 30 dakika boyunca komut verilmeden gezinmesinin ardından; iki aşamalı bilişsel haritalama çalışması yapılmıştır. İki aşamalı bu haritalama çalışmasında her aşama 5 dakika olmak üzere 10 dakikada tamamlanmıştır. İlk aşamada; beyaz bir A4 kağıdına siyah kalemle çizim yapması istenmiştir. İkinci aşamada ise kırmızı kaleme geçmesi istenmiştir. Bu iki aşamanın yapılmasının sebebi; insan zihninde deneyimlediği kentsel mekânı temsil ederken baskınlık sıralamasının frekans değerlerini daha iyi saptamak adına uygulanmıştır.

Elde edilen bütün temsil ürünlerinin kategorileştirilerek daha net bir saptama yapılacağı düşünülmüştür. Saptanan net sokak, ticari yapı, okul, park, mural tasvirlerine bakarak hangi sokakların insan zihninde daha tanımlı olduğu ve bu sokak eksenlerinde mural mevcut mu sorusu ile çalışmanın ana amacı ortaya çıkarılmıştır. Genel olarak elde edilen ürünlere bakıldığında; doğal ve yapıli çevrenin bir yapı cephesi üzerinde oluşturduğu algı, bazı ticari yapıların cepheleri, muralların ve ahşap konutların insan algısında yoğun yer edindiği yorumu ortaya çıkarılmıştır. Çalışmanın diğer bir aşamasında mekansal dizim (space syntax) için örneklem alanın elde edilen verilerini sayısal bir sonuç olarak elde etmek amacıyla kullanılmıştır. Muralların konumları ve okunabilirliği (intelligibility) arasındaki bağlamı vurgulamak çalışma için önem taşımaktadır. Okunabilirlik değerlerinin tam anlamıyla veriyi karşılaması için entegrasyon (integration) ve VGA (visual graph analysis) ve aksiyal harita (axial map) analizleri yapılmıştır. Bu mekânsal dizim analizleri için Alasdair Turner tarafından geliştirilen DepthmapX bilgisayar programıyla yapılmıştır.

Çalışmanın son aşamasında; bu kavramların ve verilerin sonuçlarını SPSS ile regresyon analizi ile sentezleme çalışması yapılmıştır. Oluşturulan eşik ve frekans değerlerinin bilgileri ışığında kentsel mekânda bulunan muralların kentsel mekânın görünübilirlik değerlerinden öte kendi içerisinde bulunduğu konumun görünübilirlik değerlerinde değişimler yarattığı düşünülmektedir.

Çalışmanın sonucu olarak, bir kentsel mekânın insan zihninde tanımlı olmasında fiziksel çevrenin önemi büyüktür. Bu kentsel göstergeler olan muralların bulunduğu çevreyi daha tanımlı duruma getirdiği yorumu yapılabilmektedir. Kısaca bu çalışma sonucunda kentsel mekânda büyük ölçekli olan muralların yalnızca kentsel estetik bağlamının yanında kentsel bellek ve yön bulma, çevresel hareket kavramları konularında etkileri oldukça büyüktür.



1. INTRODUCTION

While experiencing an urban space, perception and cognition play a significant role within the individual's experiential filter. In other words, as individuals engage with urban environments, they reveal various cognitive factors present in their minds. The dominance and degree of these factors vary from person to person. Since their existence, humans have been shaped by their surrounding social environment and accumulated experiences. Social, cultural, and economic conditions, as well as educational backgrounds, constitute the primary subcomponents of these cognitive factors. More specifically, variables such as age and profession also have a considerable impact. Through the influence of these elements, individuals establish their place within society and continue their lives. The synthesis of one's lived experiences and cognitive perception forms the foundation of human existence. At the core of all acquired experiences lies the uniqueness of the individual. For instance, while some people perceive life in a more theoretical and structured manner, others develop a spontaneous perspective grounded in lived experiences. Even the most structured theoretical frameworks are ultimately based on personal experiences and internal discoveries. Through all these dimensions, individuals perceive their surroundings and orient themselves within it. However, at a certain point, these individual outcomes also require classification under common denominators. In this sense, individual uniqueness must also align with shared categories, allowing for collective analysis.

When experiencing an urban space, perception and cognition play a significant role in the individual's filter of experience. In other words, while experiencing urban space, individuals reveal various cognitive factors present in their minds. The dominance and degree of these factors vary from person to person. Since their existence, people have constructed and sustained themselves through the social environments they inhabit and the experiences they acquire. Factors such as social, cultural, and economic status, as well as educational background, constitute the main subcomponents of these influences. More specifically, variables such as age and profession also play a role.

Through all these influences, the individual establishes their place in society and continues their life. The synthesis of one's lived experiences and cognitive perception forms the foundation of their existence. At the core of all acquired experiences lies the uniqueness of the individual. For instance, some individuals perceive life in a more theoretical and structured way, while others develop a spontaneous perspective based on personal experiences. Even the most structured theoretical frameworks are ultimately grounded in personal experiences and internal discoveries. The individual perceives and navigates their environment through all these dimensions. However, at some point, these individual results also require classification within a shared framework. In other words, individual uniqueness, at a certain point, leads to the emergence of collective assessments through shared commonalities.

While urban spaces shape individuals' social roles and perceptions, individuals likewise influence the urban spaces they inhabit. Human needs and desires play a significant role in the perception of urban space. Urban space becomes tangible through experience. Similarly, individuals assert their presence within the urban space through their own experiences. When experiencing an urban environment, individuals typically move with the aim of reaching a particular destination. As these objectives change, so too does their perception of space. During this process, individuals also attempt to orient themselves within the city. Although contemporary technologies and mobile applications assist in wayfinding, individuals simultaneously begin to interpret and locate themselves within the urban environment through their own perception. These interpretations may vary among individuals. For instance, elements such as a social space, a building façade, the texture of a street, or a crowded versus quiet area can trigger perceptual awareness and contribute to the mental reading of the urban environment. As individuals repeatedly experience a space, these interpretations become internalized as cognitive acquisitions. With the emergence of such cognitive and perceptual processes, human behavior contributes to the formation of identity within urban space. At the same time, the identity of the city itself begins to take shape.

Along with all these, various urban elements have historically been put forward in the formation of urban identities and have become fixed concepts over time. However, in addition to the fixed classifications of urban elements today, permeable urban indicators have also begun to emerge. Among these urban indicators, murals which are considered as such play significant roles in human perception and wayfinding within

urban spaces that are accessible to all. Murals play an important role in improving contemporary cities, establishing urban memory, and assisting in orientation. They possess the potential to alter the visibility values of a given urban space. In the context of examining this idea within a specific urban setting, the interaction with murals in the Yeldeğirmeni neighborhood of Kadıköy, Istanbul where murals have been densely present since 2012, albeit not in a homogeneous distribution has been regarded as significant. In this context, Yeldeğirmeni provides an appropriate research framework to explore the position and importance of murals in human perception, their role in wayfinding, and the contribution of murals, as urban indicators, to the legibility of urban space.

1.1 Purpose of Thesis

The aim of this thesis is to demonstrate that murals, as urban indicators representing the synthesis of urban symbols that contribute to the formation of urban memory and urban identity, play a significant role in wayfinding processes within urban spaces. In this study, it is assumed that murals contribute to urban spatial experience and have a strong influence on environmental perception. In other words, even if the street on which a mural is located has low visibility and depth values, it is assumed that murals have the potential to distort these values and render even the most passive streets within the urban fabric more visible.

Within this context, the Yeldeğirmeni neighborhood of Kadıköy an area that contains a high concentration of murals and thus offers a rich empirical data set was selected as the case study area. Through syntactic analyses conducted in this area, the role of murals in enhancing the legibility of urban space has been revealed.

Based on this approach, it is argued that more legible cities can be created in the design and improvement of present and future urban spaces without relegating the concepts of urban memory and identity to the background. Drawing on Skaburskis' (1974) notion that the social environment and the built environment are interrelated, murals are considered to possess the potential to assume significant roles within contemporary urban dynamics. Within the scope of this research, it is suggested that environmental perception may generate different outcomes through the integrated interaction of both tangible and intangible factors.

Beyond the fundamental urban elements that have been traditionally emphasized from past to present, this study also aims to create a critical discussion regarding the idea that such basic elements alone may no longer be sufficient for defining cities today, and that murals integrated synthetic urban products extend beyond conventional classifications of urban elements.

In line with the research objective, a set of guiding questions was formulated at the beginning of the study. The primary research questions shaping the direction of the research are as follows:

- Are the fundamental urban elements that have been inherited from the past sufficient for defining cities today?
- Aside from fundamental urban elements, what other factors can contribute to the legibility of urban spaces?
- Is there a relationship between the legibility of urban spaces and the concept of wayfinding?
- Do murals (wall paintings) influence the visibility and legibility values of the urban spaces in which they are located?
- Are the locations of murals within urban spaces random, or are they situated in areas with high visibility values?
- Do murals gain cognitive dominance in the minds of individuals who experience an urban space for the first time?
- What kind of impact do murals have on wayfinding behavior?
- What fundamental components are present in the route representations formed in the human mind?
- When urban spaces are analyzed through space syntax methods, are there urban indicators that distort purely quantitative data?

1.2 Scope of Thesis

This thesis consists of six chapters. In the first chapter, the subject and objectives of the study, the research questions that form the basis of the thesis, the scope of the research, and the methodologies employed are explained.

The second chapter addresses the key concepts that are significant within the scope of the research and contribute to the construction of the theoretical framework, along with the theories related to these guiding concepts. The main concepts of the study perception, cognition, wayfinding, and cognitive mapping are examined from a broad perspective in order to analyze the underlying processes.

The third chapter of the study addresses the processes of murals, which are the main subject of the research, within the context of urban space, building upon the established theoretical framework. This chapter examines the similarities and differences between graffiti and murals, their historical development, and the roles murals play in urban environments. In the final part of the chapter, the development of various examples from different parts of the world and their impact on urban spaces are discussed.

The fourth chapter focuses on the Yeldeğirmeni neighborhood of Kadıköy, which has been selected as the case study area. The historical development of the neighborhood, its transportation integrations, and its location within the city are examined. In the following sections, the conducted cognitive mapping study is described, followed by a spatial syntax analysis.

In the fifth chapter, the role and impact of the findings obtained from the analyses on wayfinding within the urban space are discussed. The cognitive mapping outputs and the results of the spatial syntax analyses are synthesized, and the case study area is evaluated in depth.

The final chapter presents the conclusions reached in light of the findings discussed throughout the study. The findings obtained from the research are summarized, and recommendations are offered.

1.3 Methods of Thesis

As the methodological approach of the study, an extensive literature review of concepts related to the topic was conducted in the initial stage. The methodological framework of the research is illustrated in a flowchart in Figure 1.1. In this context, due to its focus on the factors of human perception and cognition related to wayfinding in urban spaces, the study is evaluated within the scope of "environmental behavior" theories. While addressing the topics of perception and cognition, behavioral factors and physical environmental elements have been

interpreted both abstractly and concretely based on the environmental behavior theories of theorists such as Gibson, Rapoport, Stea, and Kaplan.

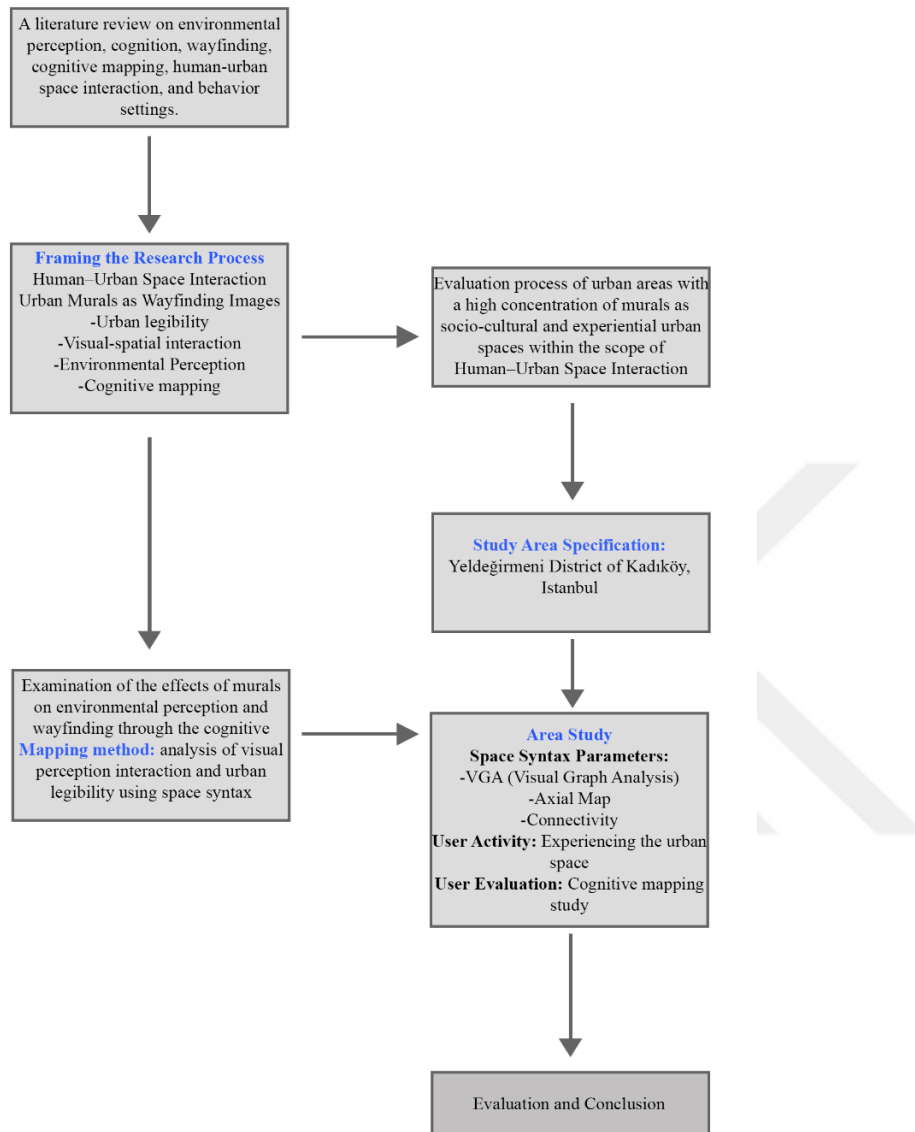


Figure 1.1 : Research flowchart.

In order to evaluate murals, which possess the distinct characteristics of these theories, within a specific context, the Yeldeğirmeni neighborhood in Kadıköy was selected as the case study area. In the first stage, various urban analyses were conducted on the area. Through photographic documentation and mapping methods, the locations of the murals within the sample area were identified and represented as point data on a map.

In the second phase of the study, a cognitive mapping study originating from Edward Tolman's psychological experiment in 1948 and today used in the field of wayfinding

in architecture and urban design was conducted in the field with a selected group of participants. The maps created by individuals who experienced the space were analyzed by determining the frequency of recurring concepts, transforming the data into syntactic information.

In addition, to examine the spatial hierarchy of the murals within the sample area, spatial configuration analyses were conducted using a previously prepared .dxf drawing. At this point, the DepthmapX program was used, and analyses such as visual graph, axial map, and integration were carried out.

As a result of this study, the spatial distribution of murals within the urban context of the sample area was examined, and a correlation was established to determine whether their locations are related to visibility values or whether these points act as urban indicators that influence visibility values.

1.4 Significance and Contributions of Thesis

This study emphasizes that the conventional fundamental elements of urban space, which have become institutionalized in urban design, are not sufficient concepts, and that there are alternative potential urban indicators. It aims to suggest that syntactic and semantic data used in wayfinding within an urban space can vary, and that each urban space may harbor its own unique potentials. In this regard, a mixed research method is developed through conducting observations, generating cognitive maps of users, and applying spatial syntax analyses, which are then implemented within a case study. With all these evaluations, the study presents a framework that can challenge and expand the established and limited definitions in the literature. It is considered that murals, rather than being classified under a specific category of urban elements, are a comprehensive synthesis concept and a permeable notion. Due to the absence of a clearly defined area of study for murals in the current literature, the study is expected to make a contribution to the field.

Within the scope of the selected concepts and approaches, the study offers a research framework that encompasses disciplines such as architecture, urban design, sociology, and psychology.



2. DEFINITIONS FOR THEORETICAL FRAMEWORK

This section of the study discusses the theoretical framework from which the research draws. In the first phase, the concepts of perception, the definition of perception, its theoretical processes, and environmental perception are addressed. The second phase focuses on cognition, including the definition of cognition and its theoretical process. Perception and cognition are often conceptually confused; therefore, this section also aims to clarify the distinctions between these two concepts to ensure a clear understanding. The third phase explores the concepts of cognitive mapping and wayfinding, which constitute the core methodology of the study and represent a synthesis of perception and cognition. This part examines the definition of cognitive mapping, its interdisciplinary interactions, and its theoretical and historical development. Subsequently, the concept and theory of wayfinding are discussed. Finally, the interaction and relationship between cognitive mapping and wayfinding are analyzed.

2.1 Perception

2.1.1 Definitions of perception

The concept of perception has been defined in various ways throughout history. According to the American Psychological Association (APA), perception is defined as "The process by which organisms interpret and organize sensation to produce a meaningful experience of the world." Another source, the Oxford English Dictionary (OED), defines perception as "The ability to see, hear, or become aware of something through the senses."

However, fundamentally, these definitions are insufficient to fully explain the concept of perception in the context of urban design and architecture. Perception consists of a highly complex system. Defining it merely as an interpretative process or a systematic organization of sensory data oversimplifies the matter significantly. In this context, perception is not solely a structure made up of the input and output of sensory stimuli; it also encompasses a cognitive process that integrates environmental context, socio-

cultural background, and past experiences. Therefore, perception is considered to be a much more complex and multidimensional concept than it is generally assumed or defined to be.

In the fields of architecture and urban design, perception is interpreted not merely as a sensory or interpretive mechanism, but as a systematic environmental construct that emerges through experiential interaction with urban space. In these disciplines, perception is a layered concept that arises from the synthesis of multisensory, emotional, and cognitive interactions between the human body and mind and the physical environment. Perception can be defined not as a passive act solely based on sensory mechanisms such as seeing or hearing, but as an active cognitive process of experiencing and engaging with urban space.

The perception of an urban space is shaped by various factors. Primarily, the personal characteristics of the individual experiencing the space such as age, profession, and socio-cultural background are the main elements affecting individual perceptual experience. At the same time, the urban space itself contains numerous variables that influence perception. The location of the space within the city, its density, morphological characteristics, weather conditions, lighting, sound, and circulation patterns all contribute to how the space is perceived. In this sense, as illustrated in Figure 2.1, perception emerges as a result of a dynamic and multi-layered interaction between the perceiving individual and the perceived environment.

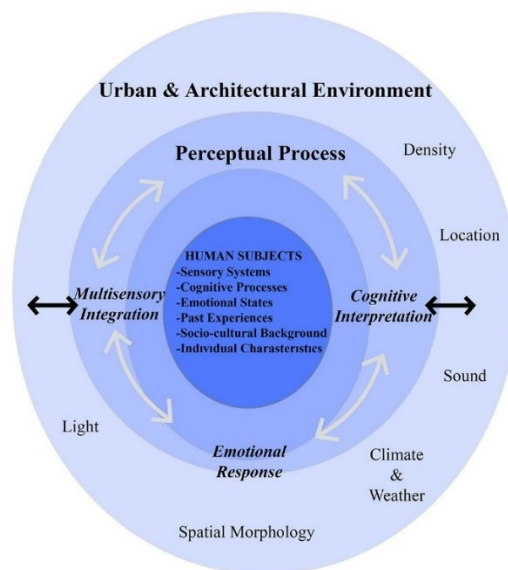


Figure 2.1 : Perceptual process.

2.1.2 Perception theories

As previously stated, perception is not a concept shaped solely by the tangible data provided by the physical environment. On the contrary, perception is a multidimensional phenomenon arising from the interaction between both concrete and abstract elements. It can be considered a dynamic system of meaning-making formed in the human mind through the integration of sensory stimuli, cognitive processes, spatial experiences, and cultural-symbolic references. In this context, perception is not only influenced by environmental physical factors but also shaped by an individual's mental, emotional, and social background.

Throughout history, the concept of perception has been addressed from various perspectives by cognitive theorists. The factors that influence perception have evolved through different phenomena. Table 2.1 presents definitions proposed by various cognitive theorists who have fundamentally shaped the theoretical framework of perception.

Table 2.1 : Theoretical framework of perception.

Theorist	Definitions of Perception	Keywords
Kevin Lynch (1960)	Perception of the city through mental images	Legibility, urban elements
Edward T. Hall (1966)	Perception of space through social distances	Proxemics, behavioral territories
David Stea (1970-1980)	Perception as cognitive processing of spatial information and formation of mental representations	Environmental cognition, cognitive maps, spatial knowledge
Amos Rapoport (1977)	Cultural and individual processes of meaning-making	Symbolism, culture
James J. Gibson (1979)	Perception through direct environmental information	Affordance, interaction

Table 2.1 (continued): Theoretical framework of perception.

Theorist	Definitions of Perception	Keywords
Christian Norberg Schulz (1980)	Phenomenological perception of the “spirit of place”	Atmosphere, experience
Rachel Kaplan & Stephen Kaplan (1989)	Perception as an active process of acquiring and organizing environmental information	Information, cognition, legibility, coherence, mystery

Kevin Lynch (1960), in his seminal work *The Image of the City*, grounded the multilayered structure of the city on a specific conceptual basis. Lynch examined the effects of perception on urban space and the city through the notion of urban images. When discussing perception and cities, the fundamental question he posed was: "How do people perceive the city?" (Lynch, 1960). This question served as a starting point for exploring the dynamics between the concepts of the city and perception.

According to Lynch, individuals use a variety of mental filters while perceiving the city, and the experienced urban environment is represented through specific mental images. He categorized urban symbols into five main conceptual elements and analyzed urban components accordingly. His research aimed to synthesize these urban elements and emphasized that the formation of their mental representations emerges through the personal experience of urban space. Consequently, how these elements are represented in human perception is entirely subjective. Moving away from rigid theoretical structures, Lynch argued that the city is perceived directly through the individual, and that urban elements can be represented without predefined constraints.

Although Lynch allowed for flexible interpretations of the representations of the city formed through perception, he also employed certain conceptual tools such as maps and diagrams to establish a theoretical foundation. Instead of traditional fixed-scale maps, he developed more flexible and scale-free representational maps. This approach stems directly from the nature of perception. Rather than relying on precise numerical measurements, Lynch emphasized a scale based on experiential and perceptual understanding within the human mind. While the concept of scale is undoubtedly important in architecture and urban design, perceptual scale often proves to be more

significant. Lynch effectively conveys this concept of scale-free scaling in his cognitive mapping methods.

Lynch classified urban elements under five key categories, which are defined as follows (Figure 2.2):

Paths: Networks such as streets, walkways, avenues, etc., followed by people, facilitating movement and connections within the city.

Nodes: Points where people gather or disperse, acting as meeting spots or transfer hubs (e.g., a bus stop or a building entrance).

Districts: Areas of the city defined by physical and social characteristics that distinguish them through cohesion or contrast.

Edges: Elements forming boundaries between districts or along paths. These may be tangible such as natural features, structures, or urban furniture or intangible, such as psychological boundaries perceived by individuals (e.g., a street perceived as unsafe).

Landmarks: Unique physical or natural structures that play an important role in the city's memory and identity, such as bridges, towers, historic buildings, or striking green spaces.

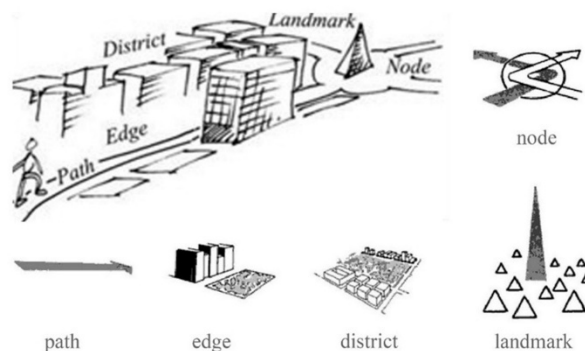


Figure 2.2 : Urban elements (Lynch,1960).

The elements defined and represented by Lynch are considered fluid and interchangeable. That is, the categories of these urban elements can shift or overlap depending on individual perception. This is because people represent and interpret the urban space they experience through their own mental frameworks. For example, a location that serves as a node for one person may be perceived as a landmark by another. Similarly, a path may be interpreted as a node depending on context. A train station may function as a path for someone traveling inside the train but may serve as

a node for another person using it as a meeting or waiting point. Likewise, a structure that helps an experienced user orient themselves within the city may be considered a landmark, whereas the same structure might be unfamiliar or meaningless to someone else. Lynch embraces this flexibility, allowing the categorization of urban elements to be entirely subject to individual interpretation. Additionally, by adopting a scaleless and flexible approach, he enables each individual to construct their own perception and interpretation of the urban environment.

Kevin Lynch made substantial contributions to the theoretical understanding of how individuals mentally represent and interpret the urban environment by employing the concepts of urban legibility and urban elements. By breaking the city down into elements such as paths, edges, districts, nodes, and landmarks, he established a foundational framework based on cognitive processes rooted in personal experience and spatial behavior. His approach highlights the subjective and dynamic nature of urban perception and emphasizes the critical role of personal experience and spatial cognition in the formation of mental images of the city.

Edward T. Hall (1966) approached the perception of urban spaces by integrating syntactic and semantic methodologies. In his seminal work, "The Hidden Dimension", Hall elaborated on his theoretical perspectives regarding perception. Central to his contribution is the concept of proxemics, through which he established an important theoretical framework addressing the relationship between perception and physical distance.

Hall posits that perception is inherently linked to the spatial distances people maintain in social interactions, which are influenced by cultural, environmental, and social contexts. This idea highlights how physical space is not merely a neutral backdrop but an active component in shaping human experience and interaction within urban environments. According to the American Psychological Association (APA), proxemics is defined as: "The study of how people use space in interpersonal interactions and how variations in that use are influenced by culture, environment, and social setting." Similarly, Merriam-Webster Dictionary defines proxemics as: "The study of the nature, degree, and effect of the spatial separation individuals naturally maintain (as in various social and interpersonal situations) and how this separation varies across cultures." Hall's concept of proxemics provides an important framework for understanding the reciprocal interaction between spatial organization and human

perception, behavior, and social communication within the disciplines of urban design and architecture.

Hall categorized the space individuals use during interpersonal interactions into four main zones (Figure 2.3):

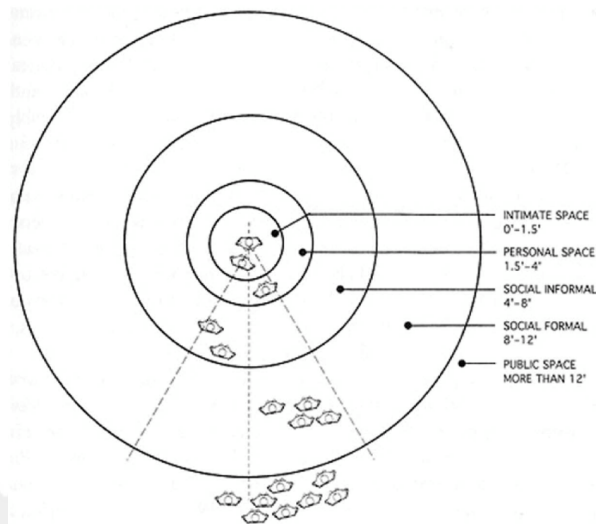


Figure 2.3 : Halls' zones for perception.

Intimate Distance: This zone covers a range from 0 to 46 cm. It involves interactions between individuals who share close personal relationships, such as family members, close friends, or romantic partners. Behaviorally, it includes actions that require close physical contact.

Personal Distance: This zone ranges from 46 cm to 1.2 meters. It is used in interactions with family members, friends, and acquaintances within a familiar circle. In terms of human behavior, Hall defined this zone as suitable for casual conversations and everyday interactions.

Social Distance: Spanning from 1.2 meters to 3.7 meters, this zone includes interactions with co-workers, classmates, or individuals within less intimate social environments. Behaviorally, it encompasses more formal interactions where communication may occur out of necessity and includes limited conversation.

Public Distance: This zone includes distances of 3.7 meters and beyond. It pertains to interactions with larger groups or the general public. Situations such as meetings, conferences, theatrical performances, and public gatherings fall into this category.

In short, Hall argued that different spatial zones in human interaction with the environment facilitate different types of social interaction. He developed this

interaction and line of thought through the concepts of proxemics and behavioral territories.

According to David Stea, the concept of perception is defined as an active cognitive process that guides individuals' spatial behaviors by transforming information acquired from the environment into mental representations. In this sense, perception is considered a fundamental component of the cognitive relationship established between the individual and the environment. Stea argues that perception is not merely the passive recording of environmental stimuli; rather, it involves the active processing and structuring of spatial information (Stea, 1973; Stea & Downs, 1977).

According to David Stea, the concept of perception cannot be treated as an isolated phenomenon; rather, it constitutes a component of the broader notion of environmental cognition. Perception represents the initial stage in the process by which sensory inputs acquired through experience are processed in the mind and transformed into information. Stea emphasizes that perception is not simply about seeing, but rather about seeing in order to understand. It plays a crucial role in the formation of mental representations. Within the perception process, the individual perceives environmental cues and converts them into mental representations, thereby designing the decision-making mechanism for their environmental behaviors. The transformation of these mental representations into concrete phenomena gives rise to various forms of application, such as cognitive maps, schemas, and spatial images. These are all representational outputs of mental processing. Stea's definition of perception can be seen as a more developed and realistic approach compared to earlier theorists such as Kevin Lynch and Edward T. Hall. While Lynch focuses more on visual aesthetics and concrete visual data, Stea emphasizes the importance of spatial knowledge, addressing every dimension of the urban space. For Stea, spatial knowledge is a key concept. By spatial knowledge, he refers to an active experiential process that includes wayfinding, decision-making, and movement mechanisms. Stea explains the mental representations that emerge as a result of the perception process through the concept of "cognitive maps." These maps are internal models created by individuals about objects in the environment, spatial relationships, and orientation. They directly influence an individual's ability to navigate, move, and make decisions in space (Downs & Stea, 1973).

David Stea examines perception under three main categories based on stages of spatial learning (Figure 2.4):

Initial Perception (First Perception): This stage refers to the limited and superficial spatial knowledge acquired during the first encounter with a space. It describes the individual's immediate perceptual and behavioral responses when experiencing an unfamiliar environment for the first time. At this stage, the information obtained is often fragmentary, temporary, and lacks depth due to the novelty of the environment.

Repeated Experience: When an individual encounters the same environment at different intervals, past experiences begin to influence perception and behavior. The spatial knowledge acquired from previous encounters is recalled and integrated with new experiences, enriching the overall perceptual process. Even if the person does not feel fully connected or attached to the environment, the stored information enables the construction of new mental representations, contributing to a more structured perceptual experience.

Long-Term Use: This category represents the most advanced level of spatial learning, which emerges through frequent exposure to and engagement with the environment. It applies to individuals who live, work, or study in the space and interact with it regularly. In this stage, the perceived environment becomes internalized, allowing for confident navigation and decision-making. The individual develops a clear and detailed mental plan of the space, indicating the presence of a well-formed cognitive map or spatial schema. The person effectively encodes the urban environment in their mind, demonstrating a stable and functional spatial understanding.

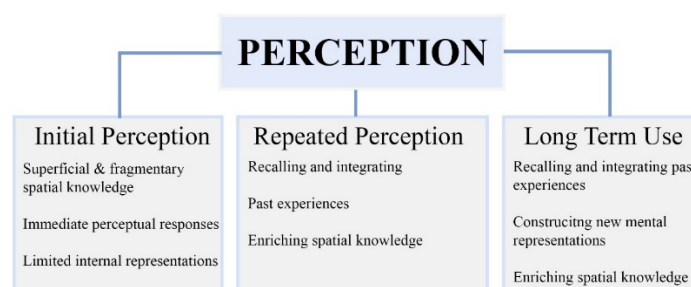


Figure 2.4 : Steas' perception categories.

In summary, Stea's understanding of perception in the context of the urban environment is closely related to the legibility of space and its capacity for generating knowledge. Urban settings that are perceptually clear, contain strong reference points, and exhibit well-defined spatial relationships enable individuals to develop more

coherent cognitive maps. This, in turn, positively influences environmental behavior (Downs & Stea, 1977). Therefore, Stea's work is positioned among approaches that consider perception not as an aesthetic evaluation, but as a cognitive process that facilitates effective interaction within the environment.

Amos Rapoport (1977), conducted extensive studies on environmental behavior, environmental perception, and environmental psychology. He emphasized the idea that cultural and individual differences play a significant role in the perception process. Rapoport argued that perception should be understood as the interpretation and meaning-making of the physical environment through experience. He proposed that perception is essentially a process of making sense of the environment.

Rapoport (1977), argued that perception is not merely the result of sensory inputs, but is shaped through individuals' experiences and their interpretations of the environment. He emphasized the relational influence of one's personal background, values, cultural norms, and social systems in the process of perception. In other words, he asserted that even the smallest living organism the human being does not perceive the environment, particularly urban space, in the same way as others. In this context, Rapoport's approach emphasizes that sensory and physical environments alone are not sufficient in the process of environmental perception.

The idea that Individuals develop mental models of their environment, which are influenced by sensory stimuli filtered through personal experiences and cultural contexts plays a significant role in shaping his theoretical perspective (Knowles & Wareing, 1981).

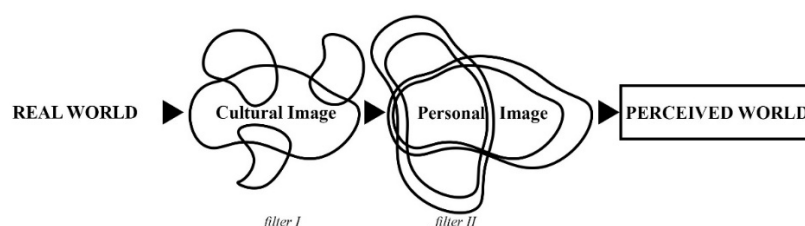


Figure 2.5 : Perceptual process by Rapoport.

According to Rapoport, the perception of the environment, specifically urban space, is a multi-stage process filtered through various layers. The perceived world is shaped and refined by numerous factors. Initially, individuals experience the real world and their surroundings directly through an unfiltered sensory system. In this process, the

first filter is cultural context; the perceiver interprets the environment based on their own cultural norms. Subsequently, the second filter individual imagination comes into play. Although individuals share common cultural norms, each person is unique, and this individuality plays a significant role in the perception process. As a result, the perceived real world, environment, and urban space pass through this individual imaginative filter, leading to different experiences and representations for each person. In summary, through the perception of reality, every individual uniquely represents and depicts the world, environment, and urban space in their own mind (Figure 2.5).

In summary, Rapoport (1977) approaches perception from a broader perspective, developing a theoretical framework emphasizing the role of cultural and individual norms in the legibility and meaning-making of urban space. For Rapoport, symbolism and culture are key factors in understanding perception.

James J. Gibson (1979) is another theorist who offers a distinct theoretical perspective on perception. He posits that perception is acquired through environmental information. For Gibson, perception is an active and dynamic process. He argues that perception is not a passive process involving complex brain information processing; rather, it is an active and dynamic process based on data received directly from the environment. Gibson emphasizes two key concepts in this regard, which form the foundation of his influential ideas and assumptions about perception: direct perception and affordance.

Direct Perception: For Gibson, perception occurs through the direct reception of information from the experienced urban space and environment. He argues that people perceive the environment and urban space based on their physical characteristics without needing pre-learned or acquired cognitive processes. This perspective suggests that sensory stimuli play a primary role in perception (Figure 2.6).



Figure 2.6 : Optical flow as represented by Gibson (1947).

Affordance: Gibson emphasizes the concept of affordances, which refers to the opportunities for action that the environment offers to the perceiving individual. In an urban space, an object can provide different possibilities for interaction to the person experiencing it. These possibilities and opportunities form the building blocks of perception. For example, a bench in an urban environment affords the possibility to sit. Similarly, the perception of urban space involves a wide variety of potential actions, enabling different environmental behaviors. This approach highlights how urban perception is closely linked to the potential behaviors that the environment supports (Figure 2.7).

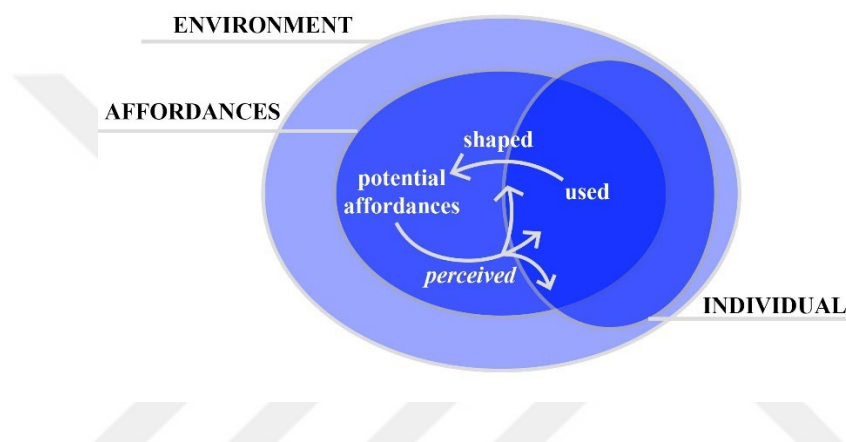


Figure 2.7 : Environment and perceived world.

Christian Norberg Schulz (1980), presents a phenomenological approach to perception. In his work "Genius Loci: Toward a Phenomenology of Architecture", he emphasizes the relationality between perception and space. He particularly highlights Heidegger's triad of space-human-being. Schulz asserts that space has a "spirit" (genius loci), and this spirit is shaped by the person experiencing it. He bases his philosophy on the idea that humans perceive space, and through their perceptions, they nourish it and discover their own meaning within it (Figure 2.8).

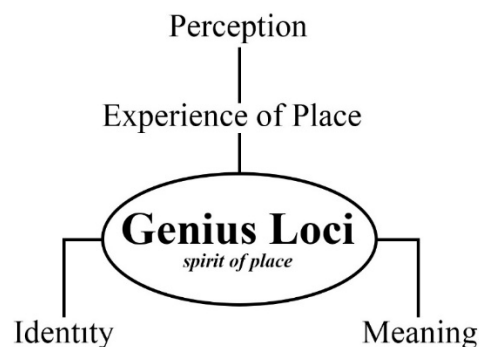


Figure 2.8 : Diagram of genius loci.

Perception is the starting point of the process of "dwelling" or "finding one's place." Urban space gains meaning through perception. Urban spaces serve as repositories of cultural memory. Therefore, as a person perceives urban space, they also reveal this urban memory and embed their own cultural norms, thus giving meaning to the urban environment. Schulz does not regard the perception of space as merely a sensory process. In other words, people do not experience urban space solely through sight or sound; they perceive it by feeling, recalling, and attributing meaning. The entire perceptual process is dynamically activated. Schulz defends the idea that urban spaces are not merely objective and passive organisms, but instead dynamic and ever-changing entities, experienced subjectively by individuals through cultural and emotional connections.

Rachel Kaplan and Stephen Kaplan conceptualize perception as an active, cognitive, and goal-oriented process through which individuals make sense of their environment, rather than as a passive reception of sensory stimuli. From the perspective of environmental psychology, perception involves the continuous organization and interpretation of environmental information in ways that support understanding, orientation, and effective action (Kaplan & Kaplan, 1989). In this sense, perception is inseparable from cognition, as it enables individuals to comprehend spatial structure, anticipate environmental conditions, and navigate within complex settings. Similar to Stea's conceptualization of perception, individuals do not merely see space; they actively organize, classify, interpret, and mentally structure it. Perception thus functions as a mechanism for gathering information from the environment, understanding spatial order, and guiding behavior, allowing unfamiliar spaces to gradually become cognitively structured and intelligible.

Kaplan and Kaplan emphasize that perceptual understanding develops progressively over time through repeated exposure and experience. Initial encounters with an environment tend to produce fragmented and superficial spatial knowledge; however, as individuals revisit and interact with the same setting, previously acquired information is recalled, evaluated, and integrated with new perceptual inputs (Kaplan & Kaplan, 1989). This cumulative process supports the formation of cognitive maps, which are internal representations of spatial relationships that enable confident movement, decision-making, and a sense of familiarity. According to Kaplan and Kaplan, individuals approach environments with three primary perceptual

motivations: meaningfulness, legibility, and orientation. Consequently, urban environments that are perceived as more understandable, readable, and coherent while still allowing opportunities for exploration are more likely to be positively experienced and preferred. From the perspective of architecture and urban design, this framework highlights the importance of designing spaces that support perceptual clarity, spatial learning, and meaningful human–environment interaction, reinforcing the role of perception as a central component of urban experience.

2.1.3 Physical environment and perception

The concepts of physical environment and environmental perception are phenomena that constantly nourish each other. The relationship between these two elements is always active and dynamic. The physical environment plays an influential role in how an urban space is perceived. With the configuration of the physical environment and environmental perception, specific factor-based categories emerge. The main factors of environmental perception can be classified as: built environment, natural environment, people and activities, weather and shadows, and finally, auditory and stimuli.

Built Environment: The characteristics of the built environment play a crucial role in shaping how individuals perceive and interact with urban spaces. The physical attributes of the urban setting particularly those defined by the constructed environment enable people to interpret, navigate, and make sense of their surroundings. This interpretation directly informs environmental behavior and shapes the lived experience of the city. A well-designed and coherent built environment enhances urban dwellers' capacity to perceive and engage with the city effectively. The healthier, more organized, and more human-centered the built form, the easier it becomes for individuals to inhabit and interact with urban space. In this context, the built environment functions not only as a backdrop but also as a dynamic element that actively shapes perception.

Key physical components of the built environment that influence environmental perception include:

- **Street Types:** Quiet residential streets, busy commercial roads, and highways all evoke distinct perceptual responses.

- **Parking Areas and Carports:** These spaces contribute to the visual rhythm and functionality of neighborhoods.
- **Sidewalks and Pedestrian Paths:** Crucial for walkability and human-scale urban interaction.
- **Vacant Lots:** Often interpreted as voids in the urban fabric, impacting the sense of place and continuity.
- **Residential and Non-Residential Buildings:** Their presence, density, and distribution affect the overall legibility of the environment.
- **Fences and Walls:** Elements that can define boundaries, shape spatial relationships, and influence perceived safety and privacy.
- **People in Motion:** The movement of pedestrians and vehicles contributes to the dynamism and legibility of urban spaces.
- **Visual Repetition and Similarity:** Homogeneity in car types or architectural styles can either create coherence or monotony in perception.

Beyond these tangible components, several formal design elements also significantly affect perception:

- **Building Heights**
- **Façade Designs**
- **Architectural Forms and Massing**
- **Interaction Between Built Structures and Human Activities**
- **Variation in Urban Imagery and Its Influence on Cognitive Mapping**

It is essential to emphasize that the built environment does not function in isolation. Its impact on environmental perception is continuously shaped by interactions with natural features, social activities, cultural meanings, and sensory stimuli. Therefore, examining the built environment as a singular, static factor may lead to incomplete interpretations. Rather, it should be analyzed as part of an integrated, dynamic system where spatial form and human perception are in constant dialogue.

Natural Environment: The natural environment constitutes another essential component in shaping environmental perception. It encompasses the spontaneous and

designed natural elements embedded within urban contexts, such as trees, water bodies, parks, and wildlife. Although often discussed as a distinct category, the natural environment cannot be meaningfully separated from the built environment; rather, the two interact continuously to influence human perception and experience.

The natural environment can be classified under several observable sub-elements, including:

- Landscaped areas and gardens (including flowers and ornamental plants)
- Trees and wooded zones
- Urban parks and green spaces
- Open mowed areas
- Agricultural fields and farmlands
- Natural water elements (streams, rivers, ponds)
- Presence of wildlife (e.g., squirrels, birds, other small animals)
- Visual or spatial repetition of natural features (e.g., recurring tree lines, grass patches)

These elements contribute to the sensory and emotional experience of urban spaces. However, the natural environment should not be seen as a static or isolated factor; its perceptual impact emerges through the active engagement of individuals with their surroundings. The presence of nature becomes meaningful only when it is experienced, interpreted, and emotionally processed by the perceiver.



Figure 2.9 : The nature of the view from home: psychological benefits, (Kaplan,2001).



Figure 2.10 : The nature of the view from home: psychological benefits, different perspective (Kaplan,2001).

This notion is illustrated through visual samples from a residential area (as seen in Figure 2.9 and Figure 2.10). Despite both images being taken from different points within the same neighborhood, notable differences in perceptual experience emerge. In each case, distinct environmental elements become prominent some dominated by vegetation and greenery, others by spatial openness or built-nature contrast leading to varied emotional responses among the observers. These variations emphasize that environmental perception is a dynamic, context-sensitive process. The natural environment does not convey meaning solely through its existence but rather through its relational presence within a spatial and social context.

People and Activities: In addition to the physical (built) and natural components of the urban environment, people and their activities constitute a critical dimension of environmental perception. The way individuals perceive and interact with urban spaces is significantly shaped by the density, diversity, and demographic characteristics of the population inhabiting those spaces. The social composition of a city encompassing cultural practices, social behaviors, and material conditions directly influences how environments are experienced, understood, and navigated. Environmental perception, therefore, is not formed solely through visual or spatial stimuli, but also through social interactions and the behaviors of others within the space. Crowdedness, public events, patterns of everyday use (such as commuting, leisure, or commercial activities), and informal encounters between urban residents contribute to the formation of spatial meaning. As a result, the urban atmosphere and consequently the perception of space can vary significantly between a densely populated plaza and a quiet residential street, even if their physical characteristics are

similar. This socio-behavioral layer of environmental perception highlights the importance of understanding the city as a lived experience, where people are not merely observers of the environment, but active agents who shape and are shaped by it.

Weather and Shadows: Another significant factor influencing environmental perception and behavior is weather and geographical conditions. Numerous studies conducted over time have demonstrated that variations in weather can affect research outcomes related to environmental perception. Similarly, daily weather patterns, including sunlight and shade conditions, play a crucial role in shaping how individuals perceive their surroundings. The interplay between the built and natural environments combined with changing weather conditions creates dynamic spatial experiences. Consequently, people may perceive the same environment differently depending on factors such as sunlight intensity, shadow patterns, temperature, and precipitation. These meteorological elements contribute to the variability and richness of environmental perception.

Auditory and Stimuli: The most fundamental elements in the formation of perception within the human mind are the sensory organs. These organs are responsible for detecting various stimuli such as images, sounds, smells, and tactile sensations, all of which play a crucial role in the perception of the urban environment. Perception begins and continuously operates through the input gathered by these sensory organs, forming the basis for how individuals experience and interpret the city.

In summary, environmental perception is a multidimensional and dynamic process shaped by the interaction of physical surroundings (built and natural environments), human activities, demographic structures, weather conditions, and fundamentally, sensory organs. These factors contribute to diverse experiences and interpretations of urban spaces, resulting in a rich and layered perceptual understanding within individual and cultural contexts. Human perception of the environment is not limited to physical characteristics alone but is also shaped by social relationships, cultural norms, and emotional experiences. Therefore, understanding environmental perception is crucial for creating more human-centered and effective urban planning and design strategies.

2.2 Cognition

2.2.1 Definitions of cognition

According to the American Psychological Association (APA), the concept of cognition is defined as follows: “Cognition refers to all forms of knowing and awareness, such as perceiving, conceiving, remembering, reasoning, judging, imagining, and problem solving.”

The International Bureau of Education (IBE), on the other hand, defines it as: “Cognitive skills are core mental abilities that are necessary for the acquisition of knowledge, such as attention, perception, memory, language, and executive functions.”

Cognition is a multidimensional, active, and dynamic mental organizational process. It encompasses a wide range of behavioral functions such as thinking, learning, experiencing, and perceiving. It can be interpreted as a system of meaning-making that synthesizes sensory data with individual experiences and emotions. This system does not operate in a static manner; rather, it functions within a continuously evolving and transformative cycle.

In the context of urban space, cognition is not limited to mere sensory experience. It also includes the individual's capacity to interpret and assign meaning to the urban environment, the ability to recall it if previously encountered, to navigate effectively within it, and to establish both physical and emotional connections with the space. In this respect, cognition constitutes the foundation of how individuals relate to, remember, and internalize the urban landscape.

Like perception, cognition can also be examined under various subcategories. One of these is referred to as sociocultural cognition. This approach posits that cognition is not merely an individual process; rather, it asserts that social structures and cultural norms significantly influence its formation. For instance, how phenomena are interpreted in different societies shapes environmental behavior. A pertinent example here is the concept of privacy. The characteristics of a particular society lead to the formation of distinct norms regarding privacy, resulting in varying patterns of environmental behavior across cultures.

Another subcategory of cognition is embodied cognition. This concept argues that experience does not occur solely within the brain or mind; instead, it is formed through the interaction between the body and the environment. In other words, the body plays a significant and active role in experiencing urban space. Actions such as walking, hearing, touching, and feeling in the urban environment are cognitive experiences shaped through bodily engagement (Lakoff & Johnson, 1999). This positions the body as an active subject of experience and brings forth the concept of spatial cognition.

2.2.2 Cognition theories

Various theoretical assumptions have been made about theories of cognition throughout history (Table 2.2).

Table 2.2 : Theoretical framework of cognition.

Theorist	Definitions of Cognition	Keywords
Edward C. Tolman (1948)	Cognition as the formation of mental maps enabling spatial learning and navigation	Cognitive maps, spatial learning
Jean Piaget (1952)	Cognition as a process of mental development through interaction with the environment; knowledge is actively constructed through experience	Cognitive development, schemas, learning
Kevin Lynch (1960)	Cognition of the city through mental images formed by spatial experience	Cognitive maps, legibility, imageability
Ulric Neisser (1967)	Cognition as an active process of acquiring, organizing, and using knowledge; perception and cognition are inseparable	Cognitive processes, information processing
Herbert A. Simon (1969)	Cognition as bounded rationality; decision-making based on limited information and cognitive capacity	Decision-making, bounded rationality

Table 2.2 (continued): Theoretical framework of cognition.

Theorist	Definitions of Cognition	Keywords
David Stea (1970-1980)	Cognition as spatial information processing and formation of mental representations through experience	Environmental cognition, spatial knowledge
Amos Rapoport (1977)	Cognition shaped by cultural, social, and symbolic systems influencing environmental understanding	Cultural cognition, meaning-making
James J. Gibson (1979)	Cognition emerges through direct interaction with environmental affordances rather than internal representations	Affordance, perception–action
Christian Norberg Schulz (1980)	Cognition as experiential understanding of place and atmosphere	Phenomenology, place identity
Rachel Kaplan & Stephen Kaplan (1989)	Cognition as an active process of organizing environmental information to support understanding and orientation	Environmental cognition, coherence, legibility

According to Edward Tolman (1948), the concept of cognition is defined through a perspective that directly connects with the fields of behaviorism and psychology. In earlier periods, particularly within classical behaviorist approaches, learning behavior was studied based on stimulus-response relationships, and no attention was given to mental processes. According to theorists like Watson and Skinner, since the mind could not be directly observed, it was referred to as a “black box.” This perspective, however, proved insufficient when it came to explaining phenomena such as flexibility in cognition and behavior, adaptability, or problem-solving.

In contrast to classical behaviorism, Tolman argued that organisms do not respond to their environment in a passive and automatic manner. On the contrary, he posited that

organisms are active learning mechanisms that are goal-oriented and strive to make sense of their environment. This conceptualization is often referred to as “purposive behaviorism.” Within this framework, learning is not merely the result of habits formed through reinforcement but is also a product of cognitive representations developed about the environment (Figure 2.11) (Tolman, 1948).

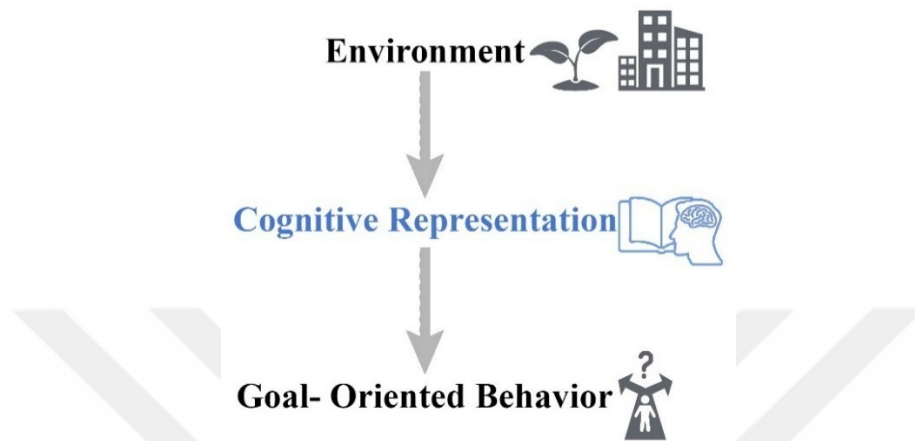


Figure 2.11 : Tolmans’ environment and cognitive representation.

According to Jean Piaget (1952), cognition can be interpreted as a system that is established through an individual’s active interaction with the environment. He argues that cognition is not innate but develops progressively over time. This view supports his role as one of the representatives of the constructivist approach in cognitive theory. In this context, cognition and cognitive development refer to the changes that occur in how individuals make sense of the world through their experiences (Piaget, 1952).

While traditional and fundamental approaches regarded cognition as a passive process in which learners and living beings were mere recipients, Piaget asserted that humans, from birth, undergo a mental process through which they actively interact with their environment in order to understand objects and events around them. With every experience, individuals continuously modify and reorganize their cognitive structures. At this point, Piaget introduces the concept of “schema.” Schemas can be defined as mental structures developed by individuals to organize and make sense of the spaces they experience. In essence, they are interpreted as representational connections.

Piaget approaches cognition and cognitive development through two sub-factors: assimilation and accommodation. Assimilation refers to the process by which individuals integrate new knowledge into their existing mental schemas essentially synthesizing the new information. Accommodation, on the other hand, is defined as

the modification of existing schemas to align with new information. These two factors function together to establish equilibrium (Figure 2.12). Equilibrium refers to the state in which an individual's cognitive system operates in harmony with the environment, and it is regarded as the driving force of cognitive development (Piaget, 1952).

Piaget classifies cognitive development into four fundamental stages: the sensorimotor stage, the preoperational stage, the concrete operational stage, and the formal operational stage. Although these stages are categorized based on age-related development, the process of development can also vary depending on the individual's interaction with the environment. For Piaget, the environment plays a significant role in cognition. However, unlike other theories, in his model, the environment is not considered a direct transmitter of information. Rather, it is seen as a phenomenon that activates and stimulates mental interaction.

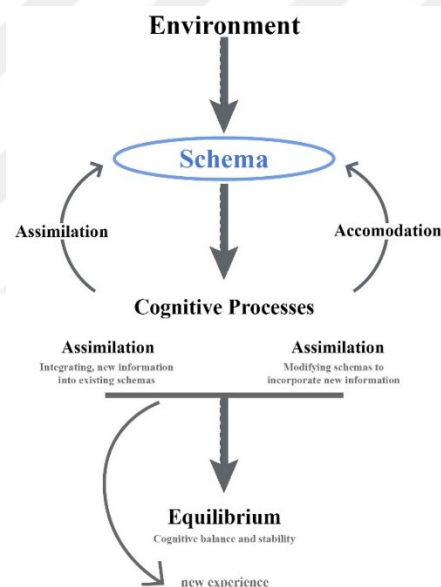


Figure 2.12 : Cognitive process and equilibrium diagram.

Piaget's theory of cognition plays a significant role in the fields of cognitive psychology, developmental psychology, and educational models. Especially, the emphasis on the construction of knowledge, the active role of the learner, and the developmental stages has become one of the foundational principles of contemporary constructivist learning approaches.

According to Kevin Lynch (1960), cognition is approached through the way individuals perceive, interpret, and mentally organize the urban environment. The city is not merely a physical space, but rather a cognitive system that individuals structure in their minds based on personal experiences of urban places. The most significant

point developed by Lynch regarding cognition is the concept of *mental images*. These images serve as key components in allowing the city to be permanently remembered within human memory through urban spatial experiences. However, when examining today's urban spatial memory, it becomes evident that the clear classification of these images has become increasingly ambiguous. The five basic components in his original framework paths, districts, nodes, landmarks, and edges can no longer be distinctly separated in practice.

Within Lynch's cognitive theory, the concept of legibility plays a crucial role. This concept refers to how easily an urban space can be read and understood by its users. Urban spaces with a high degree of legibility allow individuals to comprehend and navigate the city more effortlessly and flexibly. Another key element in the discussion of cognition is the capacity for imageability. Imageability refers to the ability of an urban environment to evoke strong, clear, and lasting images in the minds of its users.

According to Ulric Neisser (1967), cognition is defined as the process through which an individual actively acquires, organizes, and utilizes information obtained from the environment. Neisser views cognition not as a passive mechanism of perception, but rather as a dynamic and goal-oriented mental activity in which the individual is continuously engaged with their surroundings. This perspective formed the theoretical foundation of modern cognitive psychology, which places mental processes at its core (Neisser, 1967).

What distinguishes Neisser most significantly from other theorists is his assertion that there is no sharp distinction between the concepts of perception and cognition. He proposes that perception and cognition are inseparable phenomena and that mental schemas, expectations, and experiences holistically influence the perceptual process (Figure 2.13). Contrary to general theories that suggest cognition follows perception, Neisser argues that perception itself constitutes a cognitive acquisition.

Neisser also emphasizes that cognitive psychology should not be confined to artificial tasks measured in laboratory settings. In his view, real cognitive processes emerge in the complex and natural contexts that individuals encounter in their everyday lives. Therefore, the role of context and experience should not be overlooked when investigating cognitive processes such as attention, memory, and perception. This approach also laid the theoretical groundwork for later studies in ecological cognition

and environmental perception. In this respect, it can be interpreted that Neisser references the works of Edward Tolman on cognition.

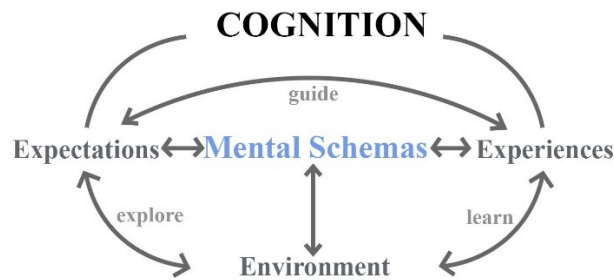


Figure 2.13 : Neissers’ cognition and mental schemas diagram.

According to Herbert A. Simon, cognition is approached as a decision-making process. Simon emphasizes that individuals do not have unlimited information during the decision-making process while experiencing the environmental space. Thus, cognition operates within the framework of the principle of bounded rationality (Simon, 1969). Behavioral decision-making in the environmental space is not merely a logical calculation process; it is a complex mental experience process formed by the synthesis of processes such as perception, attention, memory, and problem-solving. People perceive the information they experience from the urban space and simplify this information to create meaning. In this case, the decisions they make based on their experiences in the urban space cannot always be reflected in the most optimal way. Thus, cognition plays both enabling and limiting roles in the decision-making stage following urban space experiences (Figure 2.14).

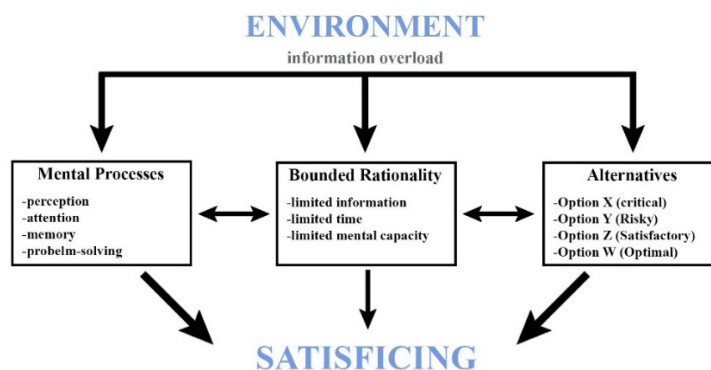


Figure 2.14 : Simons’ satisficing and cognitive mechanism process.

The most important concept Simon developed regarding the phenomenon of cognition is the concept of “satisficing.” What he actually refers to is the situation where, when deciding on their movement behaviors by experiencing urban space, people prefer

methods that are good enough rather than searching for the best method. At this point, the limited nature of mental capacities is a key aspect of Simon's understanding of cognition. The cognitive strategies involved in processing information in the human mind can lead to certain errors in decision-making regarding movement behavior. This is attributed to limitations. However, these limitations arise naturally, so it is argued that they should be considered adaptable cognitive mechanisms.

According to David Stea, cognition is defined as the process through which humans perceive their experiences in urban spaces, process that perception in their minds, and transfer it to mental representations. Stea argues that cognition, particularly in a spatial context, is an active information processing process shaped by environmental experience. In this approach, cognition is not merely a mental mechanism; it is the product of continuous interaction between the individual and the physical environment (Stea, 1974; Stea & Downs, 1977).

This cognitive process is briefly referred to as “spatial information processing.” In this process, it argues that fundamental cognitive mechanisms such as perception, attention, memory, and learning emerge through experiences of urban space. In other words, according to Stea, cognition involves an active interaction with urban space. This interaction progresses by feeding off each other.

Mental representations formed through the active process of perception and cognition with the experience of urban space are actually considered the basic outputs of environmental cognition. All of these studies play an important role in the development of the phenomenon of environmental cognition.

Environmental cognition constructs actions such as understanding, evaluating, and perceiving urban space not only through the qualities of the physical environment but also by filtering them through cultural, societal, and social experiences. Thus, it emphasizes the subjective and semantic nature of environmental cognition. Along with all this, the spatial information that emerges from experiences in urban spaces completely influences people's decisions regarding their movement behaviors (Figure 2.15). It is effective in actions such as finding one's way in an urban space, deciding which direction to go, and which areas are preferable. Thus, cognition becomes the fundamental determinant of environmental behaviors.

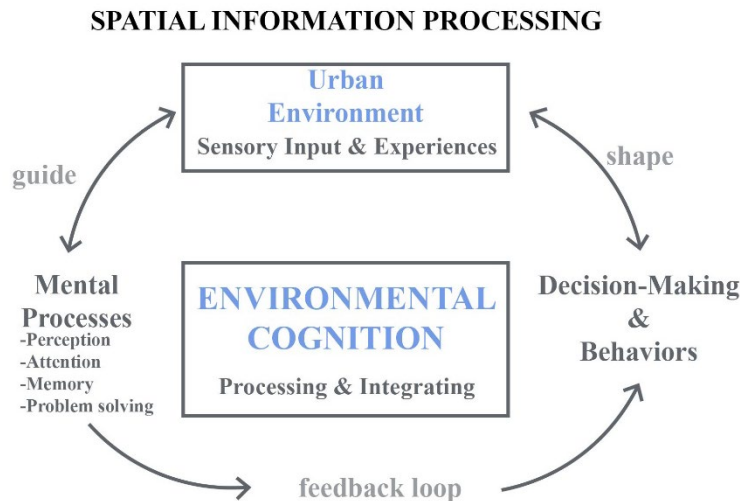


Figure 2.15 : Stea & Downs' environmental cognition.

According to Amos Rapoport, cognition is defined as symbolic systems shaped by socio-cultural, economic, social, and other factors, rather than consisting solely of individual processes. Rapoport argues that individuals' ways of perceiving and making sense of their environment are not universal and neutral; rather, they are deeply shaped by cultural values, social norms, and symbolic codes (Rapoport, 1977).

In Rapoport's cognitive approach, the environment is not merely the order of the physical environment, but also a communication mechanism that contains semantic symbols. All structural arrangements and concrete entities found in urban space are treated as symbols of abstract phenomena such as urban identity, urban belonging, and social order, etc. In other words, when a person experiences urban space, these symbols act as clues, giving meaning to the urban space. Thus, environmental cognition deals with the answers to the questions “What does it represent?” in a more complex and layered way than the answer to the question “What is where?” in an urban space. The most prominent concept in Rapoport's definitions of cognition is the concept of “meaning-making.” This concept is developed around the interpretation of urban spaces. For example, a square in an urban space carries the potential to be interpreted as a place for action, gathering, or meeting, not merely as a structural square, but because of people's interpretations of space and identity. Thus, a square acquires an identity in urban culture and is assigned the role of a cultural carrier.

Another concept to which Rapoport contributed was “cultural cognition.” The concept of cultural cognition can be defined as the formation of various cultural models in the ways people perceive and interpret urban spaces and the world. This approach

encompasses discussions about cognition being a multidimensional concept, not merely universal cognition, and that there are and can be culturally multidimensional methods of cognition (Figure 2.16). This has played an important role in questioning uniform user methods in today's architecture and urban design planning and thinking.

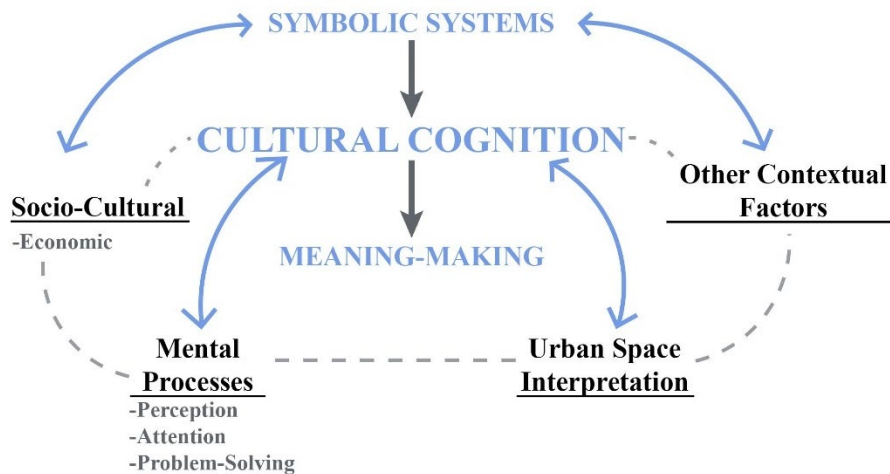


Figure 2.16 : Rapoport's cultural cognition process.

According to Christian Norberg-Schulz, cognition is not the process of perceiving or mentally representing the urban space through experience; it is defined as the totality of experiential and existential relationships established with place and space. According to Norberg-Schulz, cognition is directly linked to the process of “establishing a place” in the world and assigning meaning to that place. In this context, cognition is shaped more by the individual's experience of being-in-the-world than by the physical characteristics of the space (Norberg-Schulz, 1980).

At this point, Schulz's approach to the concept of cognition is based on the culture of phenomenology in the fields of architecture and urban design. The concept of phenomenology can be defined as a cycle of meaning-making through human interactive experiences and lives, rather than approaching the world through qualitative measurements. There is an important and active interaction between phenomenology and the concept of cognition. This is because cognition is not a situation where the mind represents the world and urban space only in abstract forms, but rather a situation of establishing a relationship with how the world and urban space can be seen and felt together with human experience. In short, cognition is discussed as a holistic experiential field where sensory perception, body, memory, and emotional states are processed together. The other two concepts that Schulz focuses on and examines in relation to cognition are place and space. The fundamental distinction

between the concepts of place and space is that space is an abstract, measurable, and geometric phenomenon, while place is defined as a phenomenon that gains meaning through human experience of spaces and supports the formation of identity and belonging. In this context, cognition emerges in the process of space becoming place. Thus, it can be considered that the concept of place identity emerges. The unique qualities of place are examined in the context of how they are perceived by the people who experience them. The fundamental components of place identity include physical environmental factors. For example, elements such as building forms, materials, scale, light, weather conditions, etc. can be considered. Taking these elements into account, a sense of belonging and meaning regarding that environment is formed along with the human experience and perception of the urban space.

The concept of “genius loci” belonging to Schulz, also mentioned in the perception section, is defined as the spirit of place. In this context, cognition refers to the intuitive interpretation, recognition, and internalization of the spirit of place in the mind. For example, by experiencing the place where they live, a person learns its order and relationality (Figure 2.17). Thus, cognition transcends abstract knowledge and becomes a dynamic and active interaction with the experienced place.

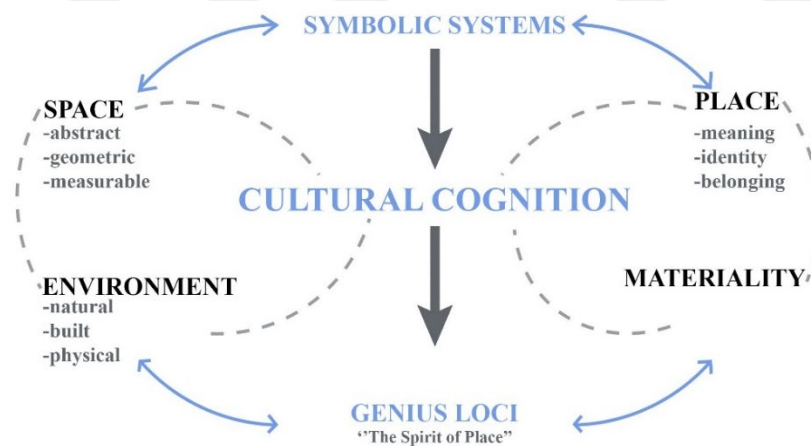


Figure 2.17 : Diagram of Schulzs’ cultural cognition and genius loci.

According to Rachel Kaplan and Stephen Kaplan, cognition plays an important role in the field of environmental psychology. Today, the concept of cognition is also important in its more detailed mastery of the field. Rachel Kaplan and Stephen Kaplan argue that cognition progresses based on the idea that it constitutes the process of actively organizing and making sense of the information humans acquire from their environment through experience, thereby guiding their behavioral movements.

According to the Kaplans, the environment continuously provides information to the individual's cognitive system, and how this information is structured determines how understandable, directive, and preferable the environment (Kaplan & Kaplan, 1989) (Figure 2.18).



Figure 2.18 : Diagram of environmental cognition by Kaplans’.

According to Rachel and Stephen Kaplan, cognition argues that perception is not a passive act and is not a purely representational process to be considered in isolation. This actually allows for a broader discussion of how today's cities are experienced and perceived. In other words, humans take in their experiences in urban spaces, select and classify this information, create harmonious patterns between them, and use these patterns to make sense of their surroundings. For this process to progress positively, individuals must feel safe, be able to find their way, and achieve cognitive harmony in their contact with their environment. In summary, according to Kaplan, environmental cognition focuses on how things are organized rather than what is seen. This allows us to talk about a multidimensional and comprehensive cognitive phenomenon in the study of today's cities, moving away from passive visibility qualities.

According to Kaplan, one of the fundamental concepts of cognition is coherence. The concept of coherence expresses the potential and actual state of the environment's order, consistency, and integrity, etc. When looking at highly comprehensible environments, interactions are observed between urban space elements and symbols. This allows humans to organize the environment mentally with less effort and retain it in their minds. The other two concepts emphasized by Kaplan are defined as legibility and orientation. The concept of legibility is defined as the ability to determine where one is while experiencing the urban space and to understand where one can go, relating the distance between two points. In summary, when viewed from the perspective of

architecture and urban design disciplines, it is argued that legible cities reduce spatial uncertainty by facilitating humans' ability to find their way. Thus, cognition takes on the role of a safe and effective means of relating to the environment.

2.2.3 Distinction between perception and cognition

Perception and cognition are often confused in terms of meaning. However, there are specific distinctions between the two concepts (Table 2.3). Cognition encompasses the concept of perception while going beyond it. It can be understood as a structured process system. In contrast, perception is more of an immediate and momentary process. Cognition involves phenomena that are more deeply rooted in the mental and interpretive layers of the mind.

Table 2.3 : Distinction between perception and cognition.

Aspects	Perception	Cognition
Definiton	The process of receiving and interpreting sensory stimuli	The mental process of understanding, analyzing, remembering and decision-making
Nature	More immediate, reactive and sensory-based	More abstract, interpretive and mentally constructed
Process Type	Initial and direct interpretation of the environment	Structured and multi-step processing of information
Focus	Sensory input (sight, sound, touch ...etc.)	Mental operations (memory, reasoning, language, imagination)
Time Scale	Momentary and short-term	Often continuous and long-term
Relation to Space	How a space is felt or sensed directly	How a space is mentally mapped, remembered and assigned meaning
Urban Design Context	Experiencing the atmosphere of a square or street	Understanding urban form, navigating and connectingwith space on a cognitive level

When examined through specific subheadings, the fundamental differences between the concepts of perception and cognition become more apparent. In terms of their origins, the process of perception begins with sensory data. In contrast, cognition starts by processing the input received from perception through mental operations. The nature of perception operates at a more basic and lower level it is a reflexive and immediate phenomenon. Cognition, however, is more complex, involving the abstraction and interpretation of concrete data. Functionally, perception allows for the recognition and awareness of urban space, while cognition takes on the task of interpreting and making sense of that space. The role of perception is to create awareness and observation, whereas cognition focuses on analysis, learning, memory formation, and decision-making. Contextually, perception involves short-term and immediate reactions, while cognition consists of continuous, experience-based processes that synthesize and transmit stored information over time.

James J. Gibson's ideas and definitions of cognition differ from traditional and conventional definitions of cognition, moving beyond the dimensions of internal mental representation and approaching the concept as one that arises from the direct interaction between humans and their environment. According to Gibson, cognition does not arise as a result of the mind representing the environment; rather, it occurs directly and unmediated through the perception of the affordances offered by the environment (Gibson, 1979).

Gibson's ecological perception theory, which he developed and presented, essentially argues that perception and cognition cannot exist independently of the environment. According to this approach, there are no sharp boundaries between the concepts of perception and cognition. Although there is no hierarchical order between these two concepts, both concepts work on the holistic functioning of the organism-environment system. When defining the concept of cognition, Gibson places the concept of “affordance” at its center. The concept of affordance defines the behavioral possibilities that objects and surfaces concretely present in the environment offer to organisms. For example, a chair can be sat on, a staircase can be climbed, etc. These can be thought of as potential interpretations of object-action relationships through visual constructs. In short, according to Gibson, cognition represents a direct understanding that focuses on what objects are used for rather than what they are.

Another context that has generated thoughts is the “perception-action unity.” In this context, perception, cognition, and action are considered in terms of their interrelationships and as a continuously active process. When experiencing urban space, humans move by perceiving. As humans move through urban space, they begin to enrich their perceptions. With this process, cognition goes beyond being merely a mental activity. It begins to become a physical and environmental systematic process. In short, according to Gibson, cognition is approached as “embodied” and “situated” processes, presenting a contemporary approach.

2.3 Cognitive Mapping and Wayfinding

2.3.1 Definition of cognitive mapping

According to the American Psychological Association (APA), cognitive mapping is defined as: “A type of mental representation which enables individuals to acquire, code, store, recall, and decode information about the relative locations and attributes of phenomena in their everyday spatial environment.” Another definition provided by Oxford University Press describes it as: “The mental process by which individuals acquire and organize knowledge of their spatial environment.” In its most simplified form, cognitive mapping can also be expressed as: “Cognitive maps refer to mental representations of maps or environments, as revealed in a variety of tasks.” (Tversky, 1992)

Cognitive maps are representations formed as a result of synthesizing the concepts of place and space that individuals develop in their minds through experiences within urban environments. In the formation of cognitive maps, the interaction between the individual and the environment plays a significant role. There exists a strong dynamic relationship between the natural and built components of the experienced urban space and the user profile engaging with it. Therefore, establishing a connection between the experienced space and the user who experiences it is crucial. The most fundamental distinction between cognitive maps and technical maps is that cognitive maps are constructed through the mental representations and experiential perceptions that individuals form of a space. In essence, cognitive maps can be considered as the synthesis of perception and cognition. For this reason, cognitive maps are more flexible and personalized in terms of readability and interpretation. In addition to being

unique to the individual, cognitive maps can also be regarded as tools through which one projects their own mental perspective. These representations evolve over time depending on the frequency of exposure to the space. For instance, the mental map created by a first-time visitor to a place will differ from that of a person who visits the same space repeatedly. Likewise, cognitive maps of users who visit a space infrequently or only once will differ from those who inhabit that space regularly or permanently.

The concept of Cognitive Mapping was first introduced by Tolman in 1948, through a psychological study (Eden, 1988). Tolman conducted this experiment using rats. In a controlled laboratory setting, various maze systems were constructed, and the observational experiment was carried out by directing the rats to find food (Figure 2.19). One of the most significant observations in this study was that the rats deviated from their previously learned behaviors in order to locate the food.

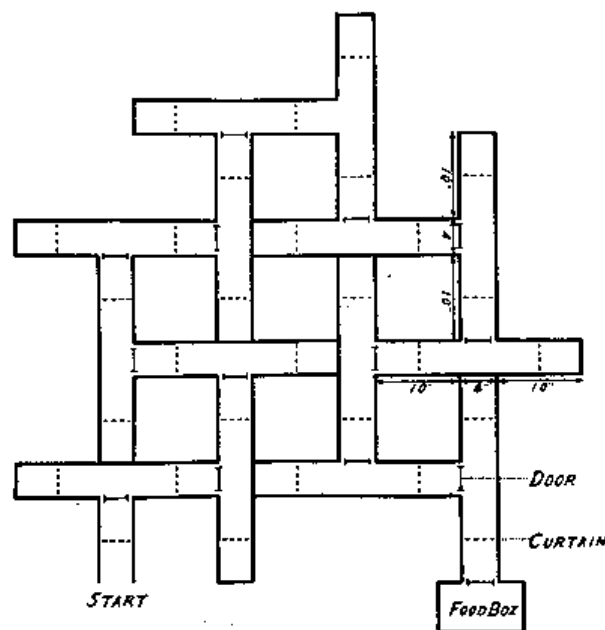


Figure 2.19 : T-alley maze (Tolman,1948).

As the maze paths were altered, the rats began to exhibit behavior that involved searching for and testing alternative routes. Initially, they relied on learned responses and perceived the maze as a spatial environment, forming a mental map of it. Later, as certain paths were blocked, they began to explore alternative routes (Figure 2.20).

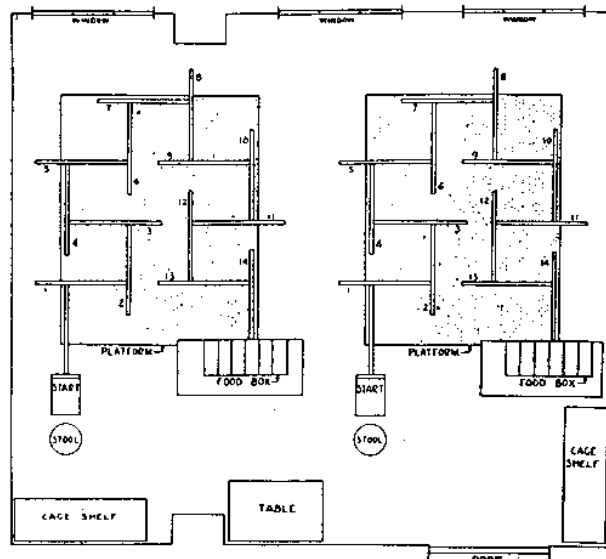


Figure 2.20 : T-elevated mazes (Tolman,1948).

Initially used as a concept within the field of psychology, it has in recent years become widely adopted in the field of architecture and urban design as well. Cognitive mapping studies hold significant importance in the fields of architecture and urban design. They serve as tools for understanding human experience within urban spaces. Cognitive maps also strengthen the relationship between environmental behavior and the body–space interaction, thereby contributing to the development of pedestrian circulation systems within the urban context. Furthermore, cognitive mapping plays a critical role in the processes of urban memory and the interpretation of the city, both of which are closely linked to the concepts of perception and cognition. The transformation of physical and social experiences of the city into mental representations is a process that is deeply supported by cognitive mapping practices.

Cognitive maps are not systematic; therefore, they are subjective products that reflect individual mental representations unique to the experiencer. Although the term “cognitive” is used conceptually, these maps can also be described as part of a perceptual process encompassed by cognition. For users of urban spaces, cognitive maps may serve as a wayfinding tool. As users mentally situate themselves within the urban environment, these maps act as internal resources to help them navigate the city more effectively. Finally, cognitive maps do not rely on a fixed metric or physical measurement system. Instead, they are shaped by the personal, experiential metrics of the individual. In this sense, they are considered mental image-based maps, rather than concrete, physical representations.

2.3.2 Definition of wayfinding

The concept of wayfinding has been defined in various ways. According to the American Psychological Association (APA), it is described as "The process by which people use spatial and environmental information to reach a destination.". Based on this definition, it can be interpreted as the set of mental traces that individuals construct while experiencing urban space by synthesizing the perceived environment with spatial information gathered from their surroundings. More precisely, "Wayfinding is the cognitive and behavioral process of orientation and navigation in space" (Arthur & Passini, 1992). Thus, wayfinding in urban space can be defined as a perceptual and behavioral process.

Arthur & Passini (1992) conceptualize the wayfinding process in three main stages: information gathering, decision making, and executing movement (Figure 2.21).



Figure 2.21 : Process of wayfinding (derived from Arthur & Passini, 1992).

In the first stage, information gathering, the user who is experiencing the urban space begins by collecting elements such as signs, symbols, and other environmental cues present in the space, as well as sensory data and physical characteristics of the built environment. In the second stage, the individual cognitively processes and interprets all perceived information in the mind to determine which direction to take. In the final stage, executing movement, the person acts upon the decisions made and begins to move accordingly. This is a dynamic and continuous process, where wayfinding occurs actively throughout the entire experience.

The concept of wayfinding is a multidimensional and complex system. This system encompasses environmental behavior sets as well as the full scope of perception and cognition. When considered as a system, wayfinding in the fields of architecture and urban design has been proposed to function through three main components (Weisman, 1982). It influences environmental behaviors with high potential for variability. Throughout this process, both the perceived urban space and the emotional states and socio-cultural structure of the perceiving individual play significant roles. These three core elements can be categorized as behavioral, design, and operational. At the beginning of the system within the behavioral component elements such as behavioral

theories, perception, and cognition combine with the physical characteristics of the experienced urban environment. These behavioral elements, shaped within the context of urban spatial perception, also establish a contextual link with the stages outlined by Arthur & Passini (1992). Within the design component, wayfinding is explored through the lens of the legibility of urban space. Circulation within an urban environment or in the interior design of an architectural space is often shaped with the support of wayfinding principles. Lastly, the operational component becomes more apparent in systematic and functionally driven spaces. For instance, wayfinding plays a critical role in the internal circulation schematics and accessibility of buildings such as hospitals, educational institutions, and airports, as well as in the transitions between public open spaces and these structures.

2.3.3 Relation between cognitive mapping and wayfinding

Cognitive mapping and wayfinding are defined as two interrelated concepts that have mutually reinforce and strengthen each other throughout history. Cognitive maps serve as mental representations of experienced urban spaces and function similarly to a personally designed sketch, plan, or map of the environment. That is, they form representations of questions such as "Where am I, what is here..." etc. Cognitive mapping refers to the process of acquiring and structuring spatial information through human experiences in urban spaces, and recalling this information when needed. The concept of wayfinding is defined as the process of transforming spatial information and representations acquired through these experiences into real and direct actions and decision-making behaviors. Therefore, the identification and use of routes, which are a fundamental component of wayfinding, cannot be separated from or evaluated independently of cognitive maps. In other words, although cognitive mapping and wayfinding are mentioned together, they are two interdependent levels with functionally different definitions.

Cognitive maps are unique mental representations created by individuals based on their personal experiences with a place. These representations help individuals describe a place to others who have not yet experienced it, creating a descriptive framework. This framework may include various types of references, such as "on the corner of the street, opposite the house with the blue shutters, next to the graffiti on the wall, on the street with lots of trees." In this context, when someone unfamiliar

with a place asks for directions, the person who has experienced that place can guide them using these personalized descriptors. In this case, it is thought that cognitive maps can actually be called a "representation" process. Waydinding, on the other hand, thinks that since the result of these representations is considered as behavioral responses, it can be called an "action" process. This shows that cognitive mapping and wayfinding work together and that cognitive maps play a supportive and complementary role in the spatial orientation and navigation process. In summary, cognitive maps can be interpreted as an intermediary concept that supports and contributes to the development of the wayfinding concept.

Cognitive maps form a mechanism that supports the concept of wayfinding. This mechanism can be examined under three main headings:

Configurational Knowledge: Cognitive mapping can also represent the interactions and positions of elements in urban space. Thus, people can create alternative routes in urban spaces, infer shortcuts, and interpret and navigate to new destinations. The configurational interactions and connections within urban space can be interpreted. Configurational knowledge is considered "survey-level knowledge" (Thorndyke & Hayes-Roth, 1982). This, in essence, feeds the concept of wayfinding by revealing probabilistic configuration equations of routes derived from cognitive maps.

Frames of Reference: Cognitive maps provide a systematic integration of egocentric references formed from person to object and allocentric references formed from object to object. The egocentric concept seeks answers to questions such as "what is in front of me/behind me, what is to my right/left," etc.; while allocentric refers to phenomena formed by feedback such as "the building is across from the park." In architecture and urban design, egocentric and allocentric concepts, when examined within the context of wayfinding and cognitive mapping, involve investigations into how an urban space or interior space is perceived, and whose reference points are used in its design and arrangement. These two concepts are not technical architectural terms, but rather methods of thinking about spatial perception and shaping. In other words, they are used to describe the mental map of an urban space. In the egocentric approach to thought, the human being is considered the central point of reference in the perception of urban space or place. The space begins to acquire meaning at the point of "I am here" when it is experienced. Subsequently, movement further strengthens this meaning. In the egocentric approach, space and body cannot be considered separately.

The perspective within the space, movements, stillness and continuity in actions, and changes in direction play significant roles in the experience. The experience of urban space or spaces is a temporal phenomenon. As movement increases in the experience of space, the meaning and knowledge of the space expand in human perception and mind. Therefore, the egocentric approach develops by arguing that architecture, independent of technical criteria and quantitative characteristics, establishes a complete interaction with the abstract, sociological, and physiological human body. The allocentric approach in architecture can be considered a more concrete and quantitative phenomenon. It focuses on seeking the overall integrity of an urban space or interior space. Instead of proceeding based on human experiences, it attempts to establish a holistic relationship based on order and organizational hierarchy. For example, in architecture and urban planning, the allocentric approach involves designing through the gradation and interconnectedness of axes, and the relationships between streets, avenues, and squares in an urban area, etc. Although egocentric and allocentric approaches are often considered separate, they are actually two concepts that reinforce each other. In fact, the allocentric approach establishes the system, while the egocentric approach develops itself by considering the system's impact on and influences on humans. In this context, both systems play an important role in cognitive mapping and wayfinding concepts. This is because humans create egocentric representations in their minds regarding how urban spaces or experiences make them feel. However, they also utilize an allocentric approach in their quantitative wayfinding, as they navigate using their own perspective and the possibilities offered by the urban space. In short, both of these reference systems play an important and active role in cognitive mapping and wayfinding concepts.

Urban Sign Integration: Cognitive maps are based on representations, highlighted urban signs, and routes. In the process of integrating these into wayfinding and cognitive mapping concepts, objects, structures, and urban and spatial cues are encoded within this network. This fundamental concept can also be defined as place-based coding. In fact, it can be said that when an urban space is experienced and perceived, the spatial signs and objects encoded in the mind during the representation and wayfinding phases are also utilized.

However, the relationship between cognitive mapping and wayfinding is never linearly proportional. In other words, a good cognitive map doesn't necessarily offer good

wayfinding potential. This can stem from the connections a person makes between their own mind and actions, or from the lack of sufficient and memorable impact of their representations on others. Due to various personal and environmental factors, cognitive mapping and wayfinding may not always yield positive results. But this doesn't mean they are completely unrelated or inadequate. In fact, it speaks more to inefficiency than inadequacy. In summary, there is a constantly evolving and dynamic relationship between cognitive mapping and wayfinding. They can never be considered separately. Cognitive maps can also be interpreted as the results of the wayfinding process.

2.4 Spatial Configuration and Its Relationship with Perceptual and Representational Layers

2.4.1 Spatial configuration as one layer of urban experience

Significant advancements have been made over time in the perception and cognitive processes associated with the experience of urban space, through various theories. These advancements have led to the emergence of the phenomenon of spatial arrangement, a computational analysis of experienced urban space, encompassing mathematical and physical aspects under various syntactic headings, going beyond mere sensory tools such as seeing or experiencing. Experienced urban space, or an interior space, becomes a subjective analysis, unique to each individual's personal experience. However, experiences are unique, and interpretations of perceived space vary from person to person. Therefore, spatial arrangement analysis demonstrates that urban spaces can be addressed not only through semantic analyses but also through syntactic analyses. In short, it is argued that a synthesis of syntactic and semantic analyses in interpretations derived from the experience of an urban space can yield stronger results and interpretations for that space. This is not always a clear positive interpretation; rather, it aims to create a discussion environment where interpretations based on personal experiences may not always coincide with rational conclusions and interpretations that offer an objective perspective.

As mentioned in the previous section, cognitive maps and the concept of wayfinding mental representations formed as a result of an individual's experience of an urban space create a spatial configuration in the individual's mind for that urban space. That is, as a result of their experiences while moving from one point to another, they

interpret how they can move in different locations and where reference connections exist, thus creating their own unique spatial configurations. A physical urban space also has a fixed configuration, morphologically, through various designs and arrangements, that is, through clear quantitative data. At this point, the linearity and deviations between the spatial configurations formed in the mind as a result of experiences within an urban space and the mathematically formulated spatial arrangement analysis create a significant potential working environment for future designs and arrangements of urban spaces.

Findings obtained from the experience of an urban space have been subjected to various classifications. From the past to the present, different concrete data have been analyzed by reducing them to various classifications within the framework of various theories. However, in today's urban context, a clear answer to the question, "What exactly are the readability, definability, and memory elements of urban space?" cannot be found. The lack of a clear answer on this issue is not a negative; on the contrary, it is an important indicator emphasizing the existence of multidimensional and multilayered systems in urban space research. As a simple example, Kevin Lynch's classification of basic urban images is no longer sufficient to define today's cities. This is because rigid and limited definitions cannot adapt to the changing urban environment. At the same time, the internalization of these fixed classifications in memorized forms can make current discussions in fields such as urban design, architecture, and urban planning negative and limitless.

A city has never been a structure that could be defined by fixed systems. Elements such as the lives it contains, the dynamism of its streets, and human behavior make it alive and dynamic. In other words, a city has no fixed mathematics or formula. Every point within the city is constantly undergoing change and transformation. Spatial arrangement analysis is argued to be an important syntactic method in urban space research, particularly in examining urban readability. However, spatial arrangement analysis alone is insufficient for defining cities, which are sociological and psychological constructs. Because when a city is systematically defined and analyzed, the value of perceptual and semantic representational dimensions is often relegated to the background.

According to Hillier and Hanson (1984), spatial configuration is considered an element that shapes behavioral patterns within urban space. That is, spatial arrangement is not

a direct determinant of human behavior, but rather a factor that constitutes part of the possibilities. Therefore, it cannot provide a clear definition for every urban space. Although spatial arrangement analysis successfully reveals measurable characteristics such as accessibility and mobility, it remains limited in terms of how users perceive, interpret, and make sense of the space. Hillier (1996) also emphasizes that spatial arrangement theory does not encompass all factors in defining urban space; spatial dimensions are only an analytical method of analysis. Consequently, when analyzing urban spatial arrangement, it is a subject that should be considered not only by examining its configurational structure but also by considering its interaction with perceptual and cultural representational layers (Figure 2.22).

When considering spatial configuration in relation to perceived space and wayfinding movement within urban spatial experiences, movement theories hold a significant position. Movement theories establish a strong relationship between the structural environmental characteristics and spatial configuration features of urban space, and the potential for movement within that urban space. Movement, configuration, and attraction are considered three main phenomena with strong relational connections.

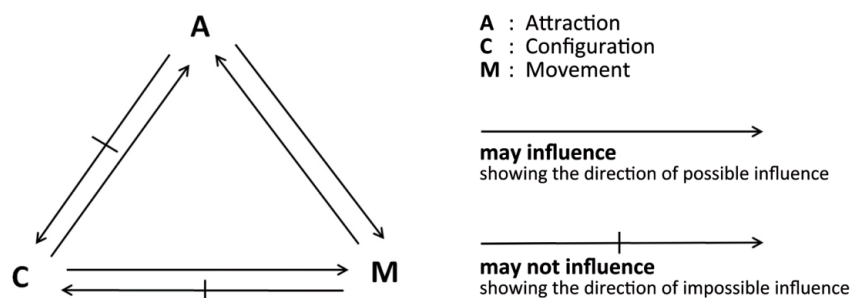


Figure 2.22 : Movement diagram (derived from Hillier,1996).

In the diagram, "A" represents attraction, "C" represents configuration, and "M" represents movement. Configurational states affect attraction, while attraction cannot affect configurational states. Configurations affect movement, while movement can affect configuration. Besides these two, there are only two concepts that mutually influence each other: movement and attraction. That is, attraction can affect movement, and movement can affect attraction. Within the system formed by these three main phenomena, it can be argued that the primary purpose for movement is derived from configuration. In short, configurational differences and changes affect movement independently of the attraction phenomenon. That is, configuration can

have an effect on movement, but it cannot always be said to be very effective. This is because there are different abstract concepts related to attraction.

Within this system, there are two different approaches to movement management: "through-movement" and "to-movement." The "through-movement" concept arises from the experience of passing through various regions while moving from one place to another. In this concept, there is no specific destination. In this experience, the movement is shaped by the urban and spatial configurations along the routes. The "to-movement" concept, on the other hand, applies to situations where a destination is defined, meaning there is a specific endpoint. In this case, the act of movement is necessarily defined by stricter boundaries within the existing spatial configuration.

When considering attraction patterns in an urban space or interior, concentrations can be observed in specific areas. For example, in a museum's exhibition area, the attraction of the centrally located exhibition area is positively high. Similarly, when viewed from an urban space perspective, a design or arrangement within a collectively considered area can increase its attraction. To support this with a syntactic conclusion, it can be said that configurational factors also play a role. In other words, the spatial configuration in these examples can be interpreted as providing movement potentials. Another possibility is that configurational effects are more pronounced when attraction patterns are more homogeneously distributed within the urban space or space under examination. A third possibility is examined through an urban space system where configuration is disregarded and attraction patterns are not homogeneously distributed. In an urban space with heterogeneous attraction patterns, the interaction between movement patterns and configuration may be weak (Hillier et al., 1993).

In summary, the key concept that should not be overlooked in urban spatial experiences and spatial configurations is the act of movement. The extent to which an urban space can allow flexibility in its movement boundaries affects the state of movement. Syntactic and technical spatial configurations also play an important role within this system. However, none of them can be considered separately in contemporary studies. This is because neither the physical nor the social conditions of urban spaces are homogeneous. Today's urban spaces have become phenomena that are constantly changing and always open to change. In other words, in areas where the spatial configuration is quantitatively most positive, attraction may sometimes be low. At the same time, when looking at the configurational situation, it can be interpreted

that an area with lower quantitative characteristics can create formations that are more conducive to movement and provide flexible permanence in the mind through the attraction it contains.

2.4.2 Visual, sensory and representational elements beyond spatial configuration

When considering the perception and experience of urban space, as previously mentioned, it is believed that approaching these spaces from a single dimension is insufficient for understanding and appreciating them. This is because urban spaces are neither purely technically designed nor purely sociologically developed phenomena. Urban spaces are dynamic phenomena that change as a synthesis of all these aspects. Similarly, the spatial configuration of a city is not merely a numerical or verbal phenomenon. In other words, urban spaces are considered to be not merely linear and metrical voids, but rather perceived phenomena with representations. In short, looking at urban spaces from only one dimension is insufficient in today's discussion environment. At the same time, in ongoing studies on spatial configuration, attention must be paid to perceptual collisions where the numerical aspect may deviate. In this context, technical aspects such as the geometric and mathematical cross-section of spatial configuration, plans, etc., alone are insufficient for explaining spatial configurations in the context of architecture and urban design discussions.

In this context, one of the main topics of discussion in this study is to examine the shortcomings and complementary aspects of spatial configuration and mental representations. It is important to move beyond the fundamental assumption that a space can only be measured in the metric system. Because distance units systematically presented solely through numbers can never constitute sufficient elements in the context of architecture and urban design. The spatial situations in the interactions created in the mind through the experience of space can change. For example, if two different situations are examined, a sample equation can be established by assuming that the distances between the two points are different. The elements observed during the experiences of these two different spatial distances may have the opposite effect on human perception due to different environmental factors. For example, when experiencing a long-distance space, the different building facades, street formations, morphological structures, and visual elements encountered along that route can create a significant shift and deviation in the perception of distance when

experiencing a shorter-distance space with no visual interaction, ordinary street connections, and flat structures. At the same time, an urban space is not merely a static phenomenon perceived visually as a result of human experiences. Each person possesses unique characteristics in urban spaces, influenced by their environmental behaviors. In other words, when a person experiences an urban space, they act according to what is more dominant in their own visual and mental perception. In this context, not every visually impactful image necessarily has to be perceptually dominant for everyone. Another point to consider is that, in areas where visual perception is strong relative to the numerical size of the space, it is sometimes argued that visual perception dominance cannot be achieved. This can distort the spatial configurational states of the city. The configurational states and perceptual dimensions of urban spaces are never fixed and objective formations. This is because the city is a dynamic and constantly changing phenomenon. The physical and built environmental elements of the city constantly interact with different changing conditions such as daily weather conditions, lighting, high population density, etc. At the same time, various structural environmental elements, however fixed they may be, create a dynamic phenomenon through their experience. For example, even when multiple people experience the same urban space, it is revealed that they create situations that can be differentiated by their interpretations of the city. Even the mental representations of the space perceived by two different people experiencing the same urban space at the same time differ. Studies from the past to the present show that, in addition to different rotation preferences, the perceived urban space and its connections and interpretations, even within the same rotation, differ through cognitive maps.

In the experience and perception of an urban space, various visual elements play a dominant role in mental representations. This is thought to be effective in transcending the theoretical structural state of spatial configurations. That is, when experiencing the configurational state of an urban space, the behavioral movements of individuals can change in relation to the visually interacting elements. Thus, rather than disregarding visual phenomena, the aim is to create perceptual dominance by examining the meaning of what is seen. Thanks to this dominance, different configurational potentials of the space are formed. In other words, visual elements can be interpreted not merely as aesthetic or formal phenomena to be considered in isolation, but as formations that strengthen urban memory, contribute to urban recollection, and support different

readings of urban spaces (Figure 2.23). Because visual elements ensure that the urban space is remembered and takes root in the mind during the experience of that space. It is thought that they create a connection with space and a sense of belonging, going beyond the one-dimensional act of seeing. In short, urban spaces can be considered as multi-sensory formations. That is, space is on the verge of becoming a state that leaves a mental and perceptual mark on the body, moving beyond the one-dimensional act of seeing. At the same time, spaces are a system mechanism to produce meaning. Thus, space gains meaning and behavioral movement through the elements, materials, and arrangements it contains. At this point, Henri Lefebvre (1974) addresses space through a triad. These are classified as perceived, perceived, and lived spaces. “The triad allows for both the understanding of the production of space and the examination of the experience of space in every mode of production and society, as well as the examination of the reciprocal relationships, oppositions, and arrangements of mental, social, and physical spaces” (Ghulyan, 2017).

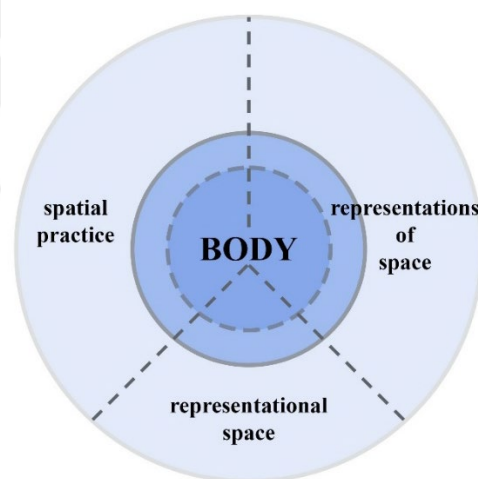


Figure 2.23 : Lefebvre’s spatial trilogy.

The first element of Lefebvre's spatial trilogy is considered to be perceived space. Perceived space can be defined as the space of daily life. That is, these are spaces where people spend time in their daily lives, use them actively, and gain meaning through practical routines. Life in these spaces progresses through movement. They are also informational spaces acquired through habits. Examples include streets, avenues, school-home routes, etc., which contain dynamic yet stable relationships between the body and space. Perceived space eventually becomes lived without being noticed, because these spaces arise not from people's diverse experiences, but from their needs. In short, perceived space can be considered as routine, continuous daily

formations within the city. The concept of intuited space, on the other hand, can be considered as belonging to a specific group. It is a phenomenon produced for people who conduct academic and professional studies on spaces and play an influential role in their improvement, modification, and design. For example, it includes fields such as architects, urban planners, cartographers, etc. The concept of space encompasses not only psychological and sociological experiences but also theoretically based concepts such as plans, sections, and diagrams. Lefebvre's concept of space is the dominant type of space seen in modern society. However, the most important criticism is that the concrete lines and mathematical practices of space completely detract from its semantic meaning. Because space forms a living organism with humans. Spaces are first conceived mentally, and then physically implemented. If this process is not considered, spaces begin to fail to correspond to experiences. In other words, no matter how well a space is planned, it can remain foreign to the human body experiencing it. The final concept of the spatial triad is lived space. Lived space is considered a more abstract phenomenon. However, for today's urban spaces, it can be considered to fall into this category for accurate and clear definition. In lived space, the sense of belonging and emotions are dominant. It contains mental images for every person experiencing it. The idea that space gains meaning through experience and the feelings it evokes is valid for the concept of lived space. These spaces cannot be defined by clear boundaries, and each individual experiencing them is unique. Every experience can create a boundary and a plan. As a result of experiences, people reinterpret and recreate spaces by assigning meaning to them through the relationship they establish with them. In short, the phenomenological meaning-making process that each person engages with in lived spaces can vary.

In summary, visual and sensory interactions established with space can reveal the various potentials of spatial configuration. Furthermore, it is necessary to address the various factors influencing the formation of spatial configurations, beyond single, concrete quantitative data, in contemporary architectural and urban design research. Because, just as architecture and urban design are not one-dimensional spaces, considering these concepts from a single dimension is insufficient for solving current problems. It is considered important to remember that there are multi-layered factors affecting the configurational states of space; visual, perceptual, physical, etc.

2.4.3 Murals as an in-between phenomenon

Throughout history, urban open spaces have contained various elements that influence visual perception. These are elements of different sizes and that interact sensorially. Murals, which are the main focus of this study, are also considered as elements that enhance visual interaction in contemporary urban spaces.

Murals are generally defined as large-scale paintings on the walls of a building facade. However, this definition is semantically insufficient for murals. Their functions are not solely aesthetic or aimed at improving urban spaces; they are formations that strengthen urban memory in the human experience of urban space, aid in navigation, and give urban identity and belonging to the area where they are located. Although murals are applied in a single dimension, they contain multi-dimensional functions in human perception. They are seen as creating not only a visual element but also a spatial interface in the urban space where they are located. In this case, murals are considered to have the competence to change the configuration potentials and possibilities of urban space. In other words, murals are neither solely architecture nor solely an independent art element. The importance of murals, which can change the focus of urban space, expand and alter its meanings, and transform the experience, represents a significant area of study in today's cities. Murals do not always have to be located at the focal points of the city. On the contrary, some murals can be found in forgotten and difficult-to-understand places in the city. This also means that spatial configuration cannot be viewed in a single dimension. Because spatial configurations possess more stable presences that are numerically represented. However, the addition of murals alongside these works can distort the readability of urban spaces. Or, while a plain building facade in an urban space may have little or no spatial value, building facades with murals enable the urban space to become an active conveyor of meaning. In short, it transforms the wall, a passive part of the spatial configuration, into an active, experimental surface function through the interaction of the people experiencing it.

In this context, murals are able to reconstruct the existing fundamental urban readability perspective by distorting it. They disrupt the existing and static scales of urban space and distort the depths of urban space through experiences. Thanks to murals, space, perceived through experience, changes and transforms.

Murals serve a wide variety of functions. They are increasingly evident in every experience within an urban context today. One of these is their role in route planning. In modern route and navigation technologies, murals are incorporated into maps, creating urban memory routes for those experiencing urban spaces for the first time. From this perspective, they can be considered as phenomena that can be subsequently integrated into spatial configurations and reveal their configuration potentials.

Looking at the source of the first example, we see a work that transforms a map into a mural map (Figure 2.24). At its core, the creator presents regionally diverse murals in the cities they visited, interactively as a route. Through the included access, users can also find images and addresses of the murals at each location. Looking at the map used as a base map, it's noticeable that murals were already incorporated into the regular map. In this context, it is considered that the interaction between murals and spatial configuration, which can attract attention in human perception within an urban space experience, is of considerable importance.



Figure 2.24 : Example of murals map (Url-1).

The second example, a mural map, is seen as an organized bike tour in Austin, Texas, created by a volunteer organization to promote the city's culture (Figure 2.25). Participation in these bike tours created a route along the murals. This event, which also served to showcase various murals in a particular area of the city, allowed participants to experience these routes not only by walking through different streets but also through various experiential activities. Examining the map reveals that while some mural points are continuous along certain streets, others are scattered, potentially

disrupting the route. The idea is that the murals make previously unseen streets visible. In this context, considering the interaction with spatial configuration, it can be argued that the locations of the murals can cause the configuration to deviate and be reinterpreted through different experiences.



Figure 2.25 : Examples murals map with bike tour (Url-2).

In this context, it is argued that murals can be a kind of urban indicator influencing spatial configurations. Looking at various studies in the literature on spatial configuration, it is seen that configuration has factors consisting of various stages. In this context, the stages of a study were examined (Figure 2.26).

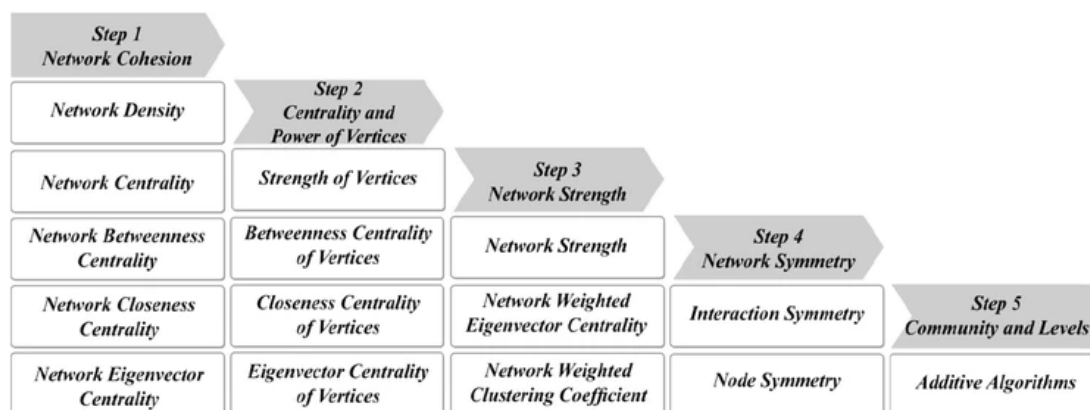


Figure 2.26 : A methodology to assess the spatial configuration of urban systems in Iran from an interaction perspective processing(2015).

In the first stage, factors formed from general structural and physical conditions are considered. The spatial configuration situations, starting with various basic physical conditions such as centrality, distance, street and road connections, etc., are continued

by narrowing down to more specific aspects. In the second stage, the strengths of the space are considered. For example, squares, city centers, proximity to the city center, main streets, etc., the known physical conditions of that city are filtered. In the third stage, the strengths of the city are considered entirely. Elements such as connections established with city centers are considered. In the fourth stage, the possibilities in the city's connections are considered. All of these considerations are transformed into a spatial organization scheme with the most intensive and frequently preferred uses. The addition of connections with nodal points and points open to interaction or with high interaction potential is considered. At this stage, the city is considered in terms of its physical and psychological aspects, taking experiences into account. In the final stage, the interaction that the individual has with the city comes into play. In fact, the factors at this stage consider all the elements that an individual can add to the spatial configuration. This carries all the physical, structural, and cultural codes of the city. At this point, the factors of spatial configurations show diversity and difference. That is, variations can be observed in an urban spatial configuration. This diversity contains different connections and interactions. In this context, it can be argued that the stages of spatial configuration, reduced from general to specific, are in a five-stage process, and the category containing murals can be considered in the final stage (Figure 2.27).

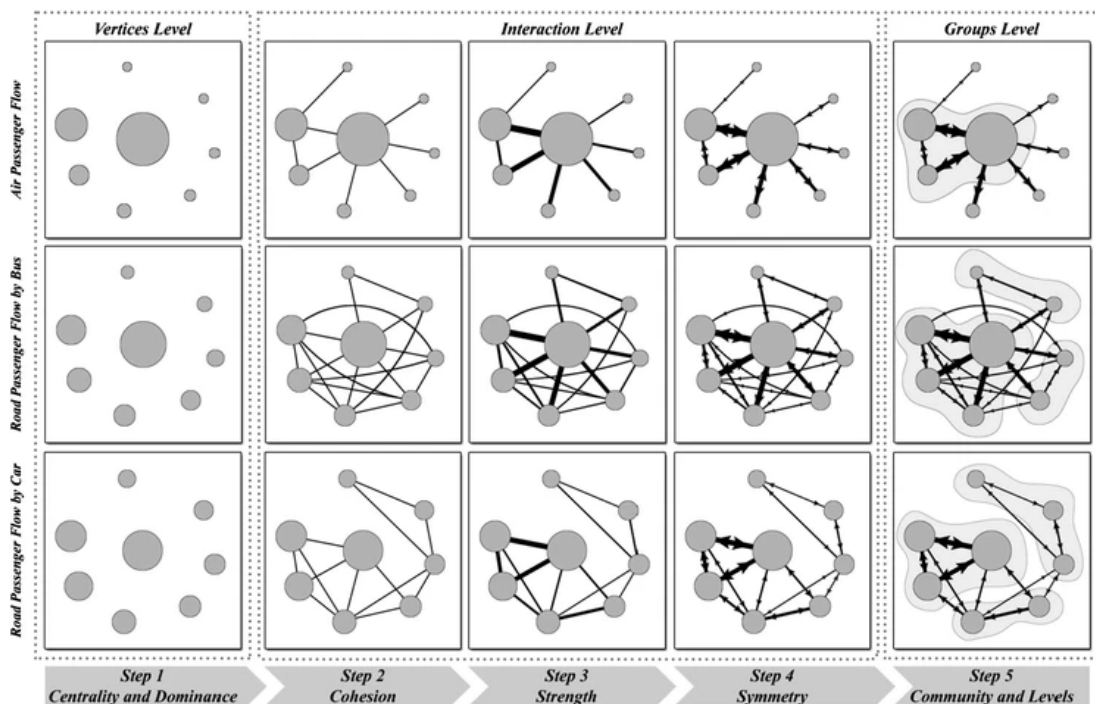


Figure 2.27 : A methodology to assess the spatial configuration of urban systems in Iran from an interaction perspective(2015).



3. URBAN SPACE AND MURALS

In the third chapter of this study, the concepts of place-space and murals are examined. The section begins with a general discussion of graffiti and murals as forms of street art, focusing on their development and significance. Following this, the roles of graffiti and murals within the urban fabric are explored, particularly their interactions with architectural and urban perspectives, as well as their contextual relevance. The differences between graffiti and murals are then analyzed through both physical and social dimensions. In the second subsection, various examples of murals from around the world are presented and interpreted. This part of the study primarily discusses the spatial positioning of murals in the urban environment and the relational dynamics they establish with their surrounding urban context. Four case studies have been examined in this section. These are located in Prague, Berlin, Porto, and Rio de Janeiro, and have been selected due to their international recognition and significant impact in the field of urban art.

3.1 Graffiti and Murals

3.1.1 Evolution of graffiti and murals

Street arts are a dynamic phenomenon that has existed and will continue to exist in urban space from past to present. In general definitions, according to the Oxford English Dictionary (OED), graffiti is defined as: “Graffiti is writing or drawing scribbled, scratched, or sprayed illicitly on a wall or other surface in a public place.” According to the American Psychological Association (APA), it is defined as: “Graffiti is often seen as a form of non-verbal communication and identity assertion in urban youth culture.”

According to the Getty Art & Architecture Thesaurus (AAT), the concept of mural is defined as: “Murals are broadly defined as any artwork applied directly to a wall or ceiling surface, including frescoes and mosaic decorations.” In her 2022 study on murals, Maevskaya states: “A mural is a large-scale painting or artwork applied directly to a wall or ceiling, serving as a form of monumental art that enhances the

appearance of buildings and contributes to urban development and local identity in modern cities.”

Based on the definitions, graffiti and murals can be considered forms of street art typically created with spray paint and located in various parts of urban open spaces. Sometimes, they are acts carried out solely for the sake of creation by the artist; other times, they are produced as reflections of current social events. They are influenced by different norms such as social, societal, political, and ethnic factors. It is considered a symbolic act and set of movements that claim the streets and cities as belonging to the people themselves.

When examining its historical background and development, graffiti preceded murals. Graffiti began to be practiced by the public in the second half of the 20th century in the United States as a reaction to social events. It started to appear on the walls in different central areas of cities as a form of resistant response and action. In the urban context of the 20th century, it was generally a period when various urban planning ideas emerged and emotionless cities began to be produced cities designed with limited and rigid planning, detached from daily social and cultural life routines. In fact, this period marks the time when neoliberal thinking started to gain significant political influence over cities. Under this mindset, cities were approached purely through the lens of positivist sciences, disregarding the importance of spirit and emotions. If examples are to be given from architectural and urban fields, this was exactly the period when Jane Jacobs also emerged with her oppositional stance, advocating that the individuals who should have the most say in urban planning decisions are the residents of those cities.

It is not entirely accurate or comprehensive to consider graffiti and murals solely as elements on urban walls. In fact, when we look at their origins, during the first half of the 20th century, they were also applied by young communities in suburban areas, their surroundings, and on trains. Rather than being reactive or topical expressions, these were produced as a way of life, particularly in the ghetto areas of cities. Therefore, in some societies, these practices have been labeled as acts of vandalism. The individuals producing them have also been subjected to various negative characterizations. However, when examining historical patterns, it is thought that cities, too, have a need for such forms of expression. In this context, the diagram created by Daniel Feral in

2012 provides a highly illustrative account of the historical processes between street art graffiti and street art (Figure 3.1).

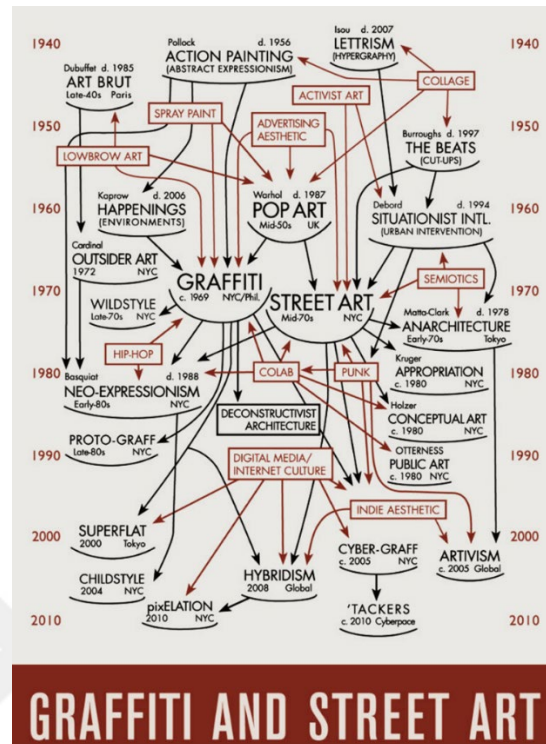


Figure 3.1 : Daniel Feral's diagram of graffiti and street art (Url-3).

In the early 1940s, street art and graffiti were just beginning to emerge. Considered the starting point for art moving to the streets, these years saw the beginning of the idea that art could exist outside of formal, non-artistic training (Figure 3.2). Essentially, it was believed that street art could influence standardized art and that this shouldn't be seen as vandalism.



Figure 3.2 : Different types of graffiti (Erkan, 2025).

With the use of spray paint, various expressions could be quickly applied to any wall. Initially, hypergraphs, which seemed complex, were conceived as a kind of signature, a way for an individual to express their presence in that street and city. Later, more visual and abstract expressionism emerged, creating more aesthetically pleasing but still signature-like works of art (Figure 3.3).



Figure 3.3 : Examples of art brut (Url-4).

In the 1950s and 1960s, art truly began to exist in the streets. The city continued to be viewed and processed as a stage. Artistic productions such as logos, icons, and signs emerged. The meaning of the city was also produced, and art became an integral part of the city through creations that added memory and remembrance to it. This type of art no longer needed an enclosed space for exhibition; it made the experience accessible to everyone within the city. In short, this period saw interventions in the physical and built environment of the city. Cities were also approached in a reactive manner to various planning approaches in urban development and production. It is considered a period that sheds light on and reinforces Guy Debord's urban interventions from a different perspective.

In the late 1960s and early 1970s, graffiti truly began to exist in the city. Shaped by the needs of the time, this phenomenon became more political and identity-driven. Their locations within urban spaces were not entirely random; they were produced in visible locations. In this context, they were most prevalent in transportation networks and train stations, which were key areas of the era (Figure 3.4). The burgeoning hip-hop music culture of the time also significantly and powerfully fueled graffiti and

street art. The use of both as a method of rebellion and expression of opinion, depending on the period, significantly linked these two phenomena.



Figure 3.4 : Tracy 168 wildstyle, 1958 (Url-5).

The 1970s and 1980s marked a period when the idea that graffiti and street art were part of the public sphere began to be accepted by society. Initially considered vandalism and illegal, these works began to be viewed by society as a means of expressing ideas, marking a time when street art and graffiti were viewed within a more semi-legal framework. Looking at the works from this period, particularly in America, the importance of the idea itself becomes more apparent. Hip-hop culture began to emerge more strongly during this time. The core idea of this culture is considered to be the street and the life of the people (Figure 3.5). That is, people are a part of their city, neighborhood, and street.



Figure 3.5 : Art vs transit, 1977-1987 (Url-6).

The city develops and changes with its people. In this context, critical interventions and different planning in cities were met with negativity by the people. Because the regulations and plans implemented had effects that diminished neighborhood culture and dulled the memory of cities. Art, at this point, became a tool for action. It was considered a source through which ideas could be conveyed and the importance of culture could be demonstrated. The graffiti and street art that emerged began to change at this point.

With the 1990s and 2000s, street art and graffiti also took a step towards digitalization. A work created in one part of the world can reach another through digitalization (Figure 3.6). In other words, a graffiti or street art piece can transcend its local context and reach a global audience. As part of a hybrid system, these works have begun to manifest themselves in different ways in every city around the world for the communities they affect. This has resulted in the creation of works in different contexts for each city.



Figure 3.6 : Exhibition of loading: street art in digital age (Url-7).

Today, graffiti continues to be produced in various parts of the city. At the same time, it has evolved into an art form that is documented and expressed digitally. As technology advances, both the methods of application and the societal and urban impacts of these productions have become more prominent. Furthermore, graffiti is no longer limited to works created with paint or markers; it now includes three-dimensional examples. Through the use of diverse materials, it has transformed into a

multidimensional phenomenon and a form of performative art. Viewed in this context, graffiti has become a phenomenon with much broader interactions than simply being spray-painted on a wall. In contemporary urban design and architecture, street art is considered to encompass aspects that should no longer be viewed solely from a single dimension. This is because these works can also be considered as a layer of imagery, guidance, and a map within today's cities.

In summary, from past to present, graffiti and murals have constituted a collection of expressive images that assert themselves in cities and public spaces across different countries and their respective urban contexts. In this regard, murals tend to be more prominent. This is due to their typically larger physical scale, which allows them to have a greater presence in the urban environment, as well as their stronger impact on spatial perception within the city.

3.1.2 Significance of graffiti and murals

Murals and graffiti, which fall under the category of street art, are considered interactive phenomena that exert their influence in various fields. The importance of murals and graffiti extends to a wide range of areas. They possess the potential to be incorporated into contemporary works in numerous fields, including urban, social, cultural, and sociological. They can be considered elements encompassing multi-dimensional perspectives, sometimes serving aesthetic purposes, sometimes urban improvement, sometimes the transmission of ideas, and sometimes an imagery. Generally speaking, murals and graffiti also have relational connections with specific phenomena.

Reactivity: Today, cities and societies around the world exist within the framework of various positive and negative events and phenomena. In response to these events and phenomena, people, as living beings of the world, are able to produce reactions. In this context, reactivity emerges as an important concept. Through such actions, individuals can express their feelings and thoughts in concrete forms. This supports the idea that graffiti and murals can be considered reactive products. At this point, it is actually possible to consider murals and graffiti as a form of expression. For example, for a particular social event or a significant turning point of that period, they can be used to ensure they are not forgotten, and to allow people to experience and interact with their visual memory within the city. Events can be positive or negative. The important point

is that they aim to trigger the active remembrance of the events that occurred. For example, one might consider a city where educational opportunities are limited. While there is an educational building in that area, the decision to demolish it can lead the community to express their reactions through the creation of a mural or graffiti. There are examples of this around the world. The aim is to depict this negative situation and portray its potential consequences in different ways. A similar situation can be considered from the opposite perspective. For example, in an urban area with a high concentration of educational buildings, a mural can depict a person from society who has become a symbol and holds diverse views on the importance of education (Figure 3.7). Such an example already exists. In this case, the focus is not on whether events and phenomena are positive or negative, but rather on how they can be addressed (Figure 3.8). In other words, murals don't only create a function of reactivity for negative situations; they can also be placed in urban spaces that have strong aspects in this regard.



Figure 3.7 : Examples of mural by Jorge Rodriguez,2015 (Url-8).



Figure 3.8 : Malala Yousafzai mural,2016 (Url-9).

Consciousness Formation: Social events play a significant role in the production of murals and graffiti. Sometimes, murals are considered to have an impact on conveying situations stemming from a specific event or public figure to a wider audience. In today's cities, individuals and societies often feel responsible and obligated to raise awareness, whether in response to positive or negative developments. Examining examples reveals that the concept of raising awareness within a specific context or series of events holds a significant place (Figure 3.9). In this context, it is seen that, in addition to the reactivity factors of events, they are also created in more negative situations. Productions are often made through symbolic events and individuals. Throughout history, cities and societies have had individuals symbolized in negative events shaped by sociological and cultural ideologies (Figure 3.10). This suggests that they produce murals to raise awareness on these negative issues.



Figure 3.9 : George Floyd mural, 2020 (Url-10).



Figure 3.10 : Greta Thunberg mural, 2019 (Url-11)..

Dynamism: Art, in all its forms, is known to be a dynamic, active, and multi-dimensional discipline. In this context, murals and graffiti are considered inherently dynamic and possess the capacity to constantly reassert their existence. As a performance-based art form, they offer a sustainable framework compatible with contemporary contexts and changing urban realities. This is because murals establish a visual interaction with the city and its people from the moment their creation begins. They are not a production that is replaced later. In terms of scale and size, they affect the area and street where they are located from the very beginning of their production. It is also thought that what attracts people's attention is not only their visual appeal but also their size and scale. Along with the morphological arrangement of the structural and physical environment, murals can sometimes be visible even from a distance. This adds dynamism to the constantly moving city. In other words, they are considered an element that actively creates interaction between people and the city, replacing ordinary urban spaces. By simply existing in the urban space, they initiate urban interventions. These urban interventions are thought to be created through abstract and concrete situations. By making the open and dysfunctional facade of the building aesthetically pleasing through visual contribution, they can contribute to creating a new focal area of the city. Or, through its interaction with the building and street it is located on, it attracts people's attention when it exists on a street with low readability

and limited connectivity, thus securing its place in the urban memory. In this way, it can provide diversity in the spatial depth of the city.

Expressiveness and Symbolism: Due to their production methods and nature, graffiti and murals are inherently highly expressive and symbolic forms. They generally carry a specific meaning and often function as representations of emotions and thoughts. These productions contain diverse forms of expression and imagery. Because different concrete objects or situations are conveyed as art forms, they can be interpreted and represented through various modes of expression. This demonstrates and validates the power of art as a communicative and symbolic tool. These productions can sometimes directly convey the desired situation and thought, and sometimes indirectly. At this point, different production styles and the ability to deform emerge. Producing the thought or phenomenon by further deforming or abstracting it is one of the elements that constitute the unique nature of graffiti and murals. A produced graffiti or mural can become a symbolic representation of that urban space or the thought it conveys. Thus, the symbolic representations initiated in the urban space where it is located take root in the urban memory. Each graffiti and mural is unique. It is not mass-produced or ordinary. Therefore, it is quite normal for it to carry symbolic importance. Viewed in this context, products that are subjective creations in the transmission of an idea can achieve objectivity in terms of the idea they convey and the phenomenon they symbolize.

Graffiti and murals play significant roles in both architectural and urban contexts. By being situated in various parts of the city, they contribute to the formation of urban identity. These forms of expression help establish the uniqueness of urban spaces and give character to the built environment. Murals, whether reflecting current social issues or engaging with their specific locations, assert a strong presence within the cityscape. By reinforcing the spirit of the spaces they occupy, they illuminate aspects of urban memory and heritage for future generations. Even when created purely for aesthetic purposes, murals still serve to strengthen the sense of place and belonging within the urban fabric.

When examined in more detail in terms of aesthetics, murals in Turkey are often found on empty and functionless wall surfaces of buildings that surround parking lots located in vacant parcels within residential neighborhoods. The integration of these blank and

non-functional facades into the city through art plays a significant role in enhancing urban aesthetics.

3.1.3 Distinction between graffiti and mural

Graffiti and murals can be considered two distinct phenomena belonging to the public sphere. Although they may appear similar in terms of their connection to the visual mechanisms of urban space, their purposes, forms, relationships with public space, and legal status create differences. These differences can be compared by examining them under specific headings.

Table 3.1 : Distinction between graffiti and mural.

Criteria	Graffiti	Mural
Definition	Visual productions, usually in the form of writing, created without permission on public or semi-public surfaces	Typically large-scale, permitted public art productions featuring figurative or narrative art on a building facade
Permission and Legitimacy	It is mostly illegal; legitimacy is established through subcultural norms and written tradition	They are mostly permitted, planned, or supported by institutions/local governments
Primary Purpose	Signature (tag), visibility, territorial claim, and subcultural status production	Public message transmission, aesthetic contribution, spatial identity creation
Target Audience	First of all, other graffiti artists and subculture members	Broad public audiences, neighborhood residents, urban users
Formal Language	Focused on text (tags, throw-ups, pieces), typography, and style	Figurative, narrative-based, thematic, and site-specific compositions
Scale	It varies in size from small to large; mostly surface-limited and fragmented	Typically large-scale, holistic studies covering the entire facade

Table 3.1 (continued): Distinction between graffiti and mural.

Criteria	Graffiti	Mural
Temporality	Temporary; susceptible to erasure, repainting, and re-creation cycles.	Relatively permanent; the goal is to protect and maintain it.
Production Process	Fast, individual or small team production; mostly night shifts	It requires planning, long-term effort, and coordination among artists, institutions, and venue owners
Identity and Anonymity	Anonymity or the use of pseudonyms is common	The artist's identity is usually clear and presented visibly
Relationship with Public Space	Public space is seen as a space for intervention and ownership	Public space is treated as a shared and negotiated surface
Relation to Urban Policy	It is often associated with crime, vandalism, and discourses of control	Urban renewal is linked to cultural policies and tourism strategies
Position in the Literature	Subcultural practice is discussed in terms of resistance and the axis of invisibility/visibility	Public art is examined within the context of urban aesthetics and a sense of place
Boundary Cases	It is able to approach mural aesthetics through figurative and large-scale productions	Graffiti can consciously incorporate written language and style

When examined through the lens of the table, the differences in production practices and definitions between murals and graffiti are evident. Although these two forms of production can exist in the same urban space and on the same surface, they are distinct. Graffiti, by its very nature, is generally produced anonymously and without permission, involving randomness. Graffiti incorporates a subcultural language of communication, featuring diverse typologies and signatures (tags). Graffiti production can develop more quickly and spontaneously.

However, due to its often unauthorized nature and the undesirability of its location, graffiti can create a sense of undesirability, making it less likely to be permanent. Murals, on the other hand, are generally planned productions implemented in collaboration with local governments and various organizations. Their production process is more planned and takes a longer time. They can be interpreted as an open, interactive form of production in urban spaces, appealing to a wide public audience. The narrative structure of murals, along with the expressions and thoughts they convey, is more easily readable.

Another strong aspect of mural production is considered to be its positive and collective influence on urban memory, stemming from its embodiment of urban aesthetics and a sense of place. However, considering the production practices and scale of graffiti today, it cannot be ruled out that in some cases, the boundaries between graffiti and mural may be more permeable, rather than the sharp distinctions that exist between them. In graffiti, which contains a non-random narrative and reaches a scale similar to murals, the practice of unauthorized production always has the potential to create a clear distinction.

In summary, graffiti and murals are two phenomena that appear similar but have clear boundaries in their production practices. Graffiti and murals can influence each other. In particular, graffiti production can be influenced by mural production today. It can be seen that they reach common points in terms of scale, material technologies used in production, expression of thought, etc. However, when examined within the context of urban design and architecture, it can be argued that the visual and perceptual relationships and connections that murals establish with urban space are much stronger.

3.2 Cross – cultural perspectives on murals

This section of the study examines murals located in cities around the world. It analyzes their historical development as well as their interaction with urban space. Through these interpretations, the relationships between the points of production and the urban spatial configuration are investigated. Thus, it is argued that the urban spatial locations where the murals are placed are not always central and spatially legible choices.

3.2.1 Wall of John Lennon, Prague

John Lennon Wall in Prague is a phenomenon that has undergone continuous changes from the past to the present. Looking at the wall, it's not actually a mural. However, in terms of its functionality, it could also be considered a mural.

Looking at its historical process, the paintings and writings that began on the wall after John Lennon's death in the 1980s were actually commissioned by society as a symbolic wall expressing peace, freedom, and ideas against the political transformations in Czechoslovakia. Although the government of the time tried to remove the wall's construction each time, it was repeatedly updated and reproduced by society, becoming a public archive. From the perspective of urban design and architecture, it holds great importance in terms of altering the layers of meaning and patterns of behavior within a space without exceeding or changing its physical boundaries. While a wall in an urban space represents a boundary among the basic urban elements, it has now transformed into an interface phenomenon because it is a manufactured surface and, through interactions, becomes an expression of society within the urban space (Figure 3.11). In short, the wall is no longer a boundary element or a visually viewed element; it is an element where photographs are taken, where people stand, where people visit in short, an element that multiplies and intensifies behavioral movements in the urban space.



Figure 3.11 : John Lennon wall (Url-12).

The wall is located very close to the Charles Bridge-Mala Strana, one of the city's busiest tourist and historical axes. The street where the wall is situated in the urban space is physically narrow and, according to the spatial configuration, is located on a route that would be considered secondary (Figure 3.12). This street is a connecting

piece in terms of its morphological structure. It is located in a central but secluded, public yet semi-hidden position within the city. Situated on a narrower, linear, and short-lived passageway compared to other streets in its vicinity, the John Lennon wall interrupts this passageway.

Nevertheless, the presence of the John Lennon wall allows it to acquire the characteristic of a target urban space. While no specific urban spatial behavior was intended in the construction of this wall, it has become a symbol that is constantly repeated and embedded in the urban spatial memory through waiting, interaction, visiting, and collective production. If this wall had been created in a main square, it would have been framed or merely a visible element. However, in its current location, in a space that is a remnant of the urban flow, it creates an unexpectedly distorted density. From the perspective of urban theory, this aligns with Michel de Certeau's idea of "the production of space through use."

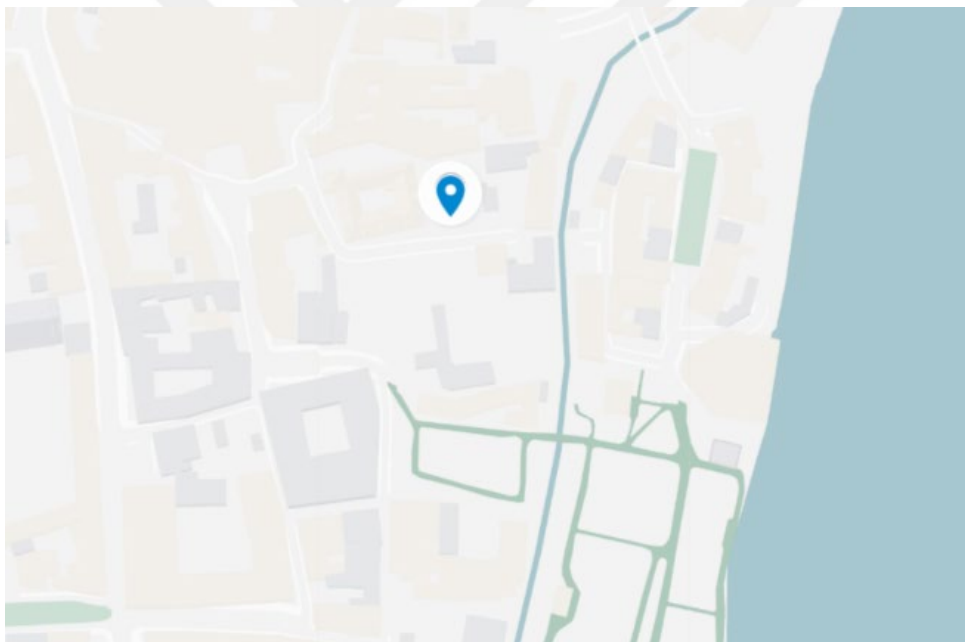


Figure 3.12 : Location of John Lennon wall.

Viewed in this context, readings from the John Lennon wall also support the idea that the effects of murals are not limited to visual interaction alone. Their placement in voids, thresholds, and secondary and tertiary areas within the urban space has significant effects. In other words, they influence the configurational states of urban space, which can transform as it is experienced, rather than being solely defined by fundamental and theoretical planning decisions. Thus, murals allow for discussions

not only about urban aesthetics but also about the spatial planning strategy of urban spaces (Figure 3.13).



Figure 3.13 : Wall is over of John Lennon wall (Url-13).

3.2.2 The Fraternal kiss, Berlin

Fraternal Kiss is a mural in Berlin that emerged from historical influences. There is a contrast between the morphological situation of this mural and the location of the John Lennon Wall in the previous example. The chosen urban space is not situated in a void, but directly on top of the historical event (Figure 3.14). The Fraternal Kiss mural is located on the East Side Gallery, the longest surviving section of the Berlin Wall. The Berlin Wall is a phenomenon that clearly delimits and separates two urban spaces. Its historical significance is also immense. In this context, this mural is not on a building facade or a street wall, but directly on a boundary element. This mural becomes an image that transforms the urban space into a source of narrative and strengthens urban memory. In other words, it creates sociological and perceptual boundaries rather than physical factors of the wall.



Figure 3.14 : Fraternal kiss (Url-14).

Considering its location within the city, it is situated at a point where tourist axes, bicycle routes, and the river promenade converge. Thus, instead of being a mural open

to discovery, it is a work that is primarily experienced daily within the urban context. From the perspective of urban design and architecture, it does not deform or alter the spatial configuration because the mural is already positioned on a promenade (Figure 3.15).

Therefore, it does not interrupt the flow of movement in the spatial configuration. It does not create a state of cessation, but rather offers an experience of slowing down. It provides a situation that guides the reinterpretation of the urban space, rather than its exploration through experience.

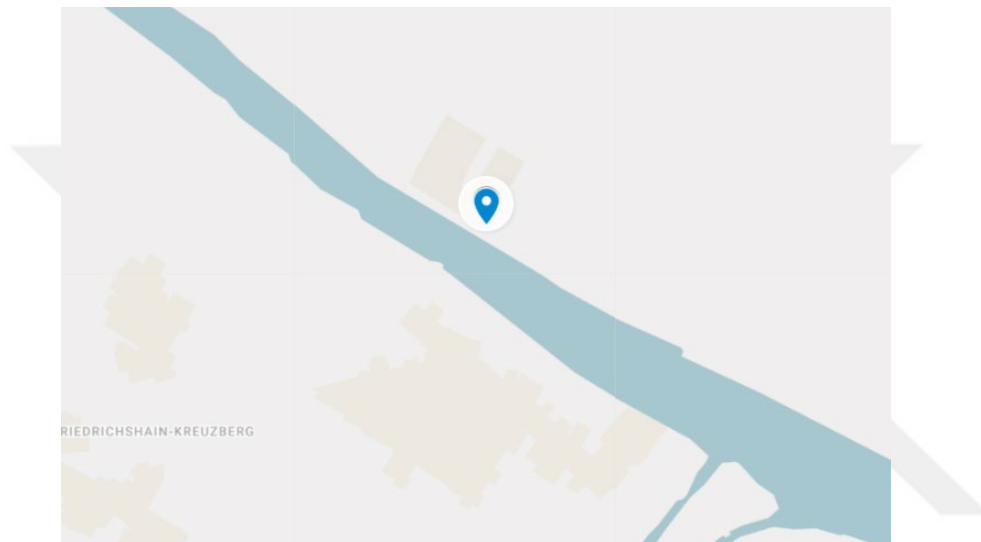


Figure 3.15 : Location of fraternal kiss.

In summary, the Fraternal Kiss mural can be interpreted as influencing the configuration of urban space not only through physical experiences but also through urban memory, ideological thought transmission, and everyday practices. Thus, it positively impacts the readability of urban space.

3.2.3 Half rabbit, Porto

The Half Rabbit mural in Porto represents a different spatial situation compared to the other two mural examples. It allows for different interpretations in terms of the relationship between the edge and center of the urban space, and the configuration of the urban space itself (Figure 3.16).

In this context, it paves the way for the creation of more productive spatial configurations.



Figure 3.16 : Half rabbit mural, (Url-15).

When considering the location of the Half Rabbit mural within the urban space, it is not in the historical center, but rather on a side street corner in Vila Nova de Gaia, across the Douro River (Figure 3.17). When examining this city, its historical narrative is situated in the Riberia district. Gaia, in turn, represents the area where the city's logistical, storage, and production structures were located in the past.

Therefore, it lies in the background of the city's visual and cultural aspects. Its location within the urban space contributes to the disruption of this background. In fact, by occupying a very different point within the culturally and visually dense urban narratives, it highlights this point. When its location is examined within the context of urban design and architecture, its existence in a not very visible spot makes it a valuable example in terms of establishing the relationship between the representative points and the less represented points of the city in terms of urban spatial configuration. In this context, it supports the idea that every mural does not necessarily have to be located in areas with high and dense visibility in the urban space.

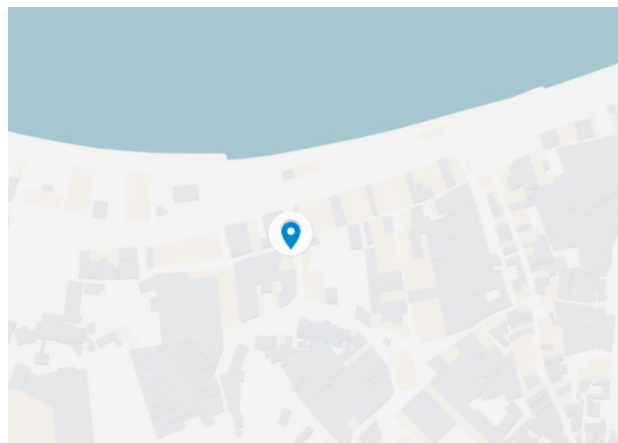


Figure 3.17 : Location of Half rabbit mural.

The experience on the John Lennon mural is established through the relationship between body and wall. The Fraternal Kiss mural, on the other hand, exhibits a linear experience. The Half Rabbit mural, however, presents a different perspective. This mural offers people a large-scale, panoramic experience. It's possible to see the mural while walking along the river promenade, looking across from the Riberia River, and crossing the bridge connecting the two banks.

Thus, experiencing the mural doesn't require going to the street; it becomes an image added to the urban landscape. In this context, murals move beyond being mere street objects and become producers of urban images. The building facade where the Half Rabbit mural is located is made of a rough material bearing the traces of the city's industrial past.

Another difference is that it's a three-dimensional mural designed from recycled materials. The most important aspect of this production is the convergence of the memory of the urban space with the language of the urban space. Rather than altering the urban space it occupies, the Half Rabbit mural establishes a relationship with it. This supports the idea that each street in the city has significant spatial configurations. The Half Rabbit mural doesn't merely produce the act of stopping as a behavioral response in people experiencing urban spaces.

People may gather in front of it, but everyday actions largely continue in the same ways. However, this mural has a different impact on environmental behavior in urban spaces, affecting the re-evaluation of gaze routes within those spaces. In this context, the phenomenon of visual orientation plays a strong role in urban spaces. In short, the Half Rabbit mural can be interpreted as a production that influences the perceptual hierarchy of spatial configuration rather than the physical use of urban space.

3.2.4 Etnias, Rio De Janerio

The Etnias mural in Rio de Janeiro is a work that has the potential to be approached from a different perspective compared to the other three murals interpreted. While Prague features the interconnectedness of backstreets, Berlin a historical boundary, and Porto a coastal-background urban spatial configuration, this mural in Rio de Janeiro consciously takes on the role of a globally visible urban showcase, placed within the context of the scene (Figure 3.18).



Figure 3.18 : Etnias mural (Url-16).

The Etnias mural was created on Boulevard Olimpica in the Porto Maravilha district, which was transformed within an urban context before the Rio Olympics. This mural production is not situated in a random urban space or on a secondary street, but is consciously framed and positioned on an axis for a universal perspective (Figure 3.19). While murals are generally created for urban spaces, in this example, the urban space has been prepared for the mural. In other words, it can be argued that the urban space, at this point, goes beyond being a passive surface and acts as a curator. Boulevard Olimpica, in terms of its physical structure its wide cross-section, pedestrian-prioritized design, and continuous movement is morphologically similar to the East Side Gallery surface examined in Berlin.

However, they differ in content. While the Fraternal Kiss mural conveys critical thought against a historical trauma, the Etnias mural undertakes the representation of culture and the transmission of ideas of social unity. The experience of this mural is created within a linear corridor, resulting in an encounter. That is, people do not simply pass in front of the mural; the mural forms the background of the public experience.

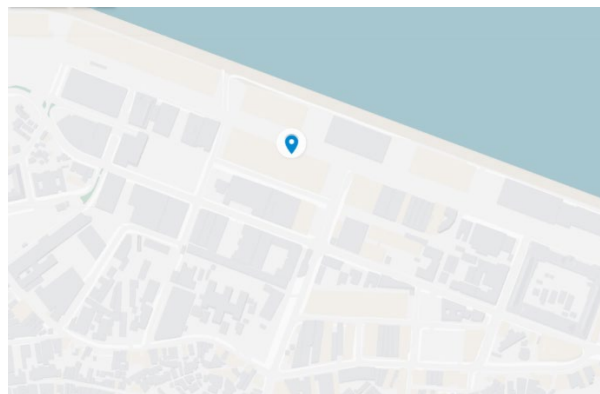


Figure 3.19 : Location of etnias mural.

Viewed within the context of urban design and architecture, the role of spatial configuration bears the imprint of contemporary digitalization. When interpreted in light of the urban improvement preparations during the Olympics of that era, this mural has become an urban imagery produced for social media and communication networks. In other words, this mural aims to reach a wide audience through imaginative networks, transcending only physical environmental experiences. In this context, it can be argued that these interactions within the urban space are produced with not only the users experiencing that space in mind, but also a universal audience.

In summary, looking at all four examples, it can be said that murals influence urban spatial configurations from different perspectives. This influence can be structured sometimes from bottom to top and sometimes from top to bottom.



4. STUDY AREA: KADIKÖY-YELDEĞİRMENİ

In this section of the thesis, the fieldwork conducted is presented. Kadıköy Yeldeğirmeni was selected as the field study area, and a general description of the site, its historical urban development, and transportation analyses were conducted. In the second subsection, the locations of murals the main focus of the thesis were identified, and a mural map was produced. Additionally, significant urban nodes within the study area were examined. In the later sections, spatial configuration analysis was carried out using the DepthmapX program. The selected factors and data sets for measuring the depth and legibility values of these nodes were defined. In this spatial analysis phase, not only the urban nodes but also the murals under investigation were included in the data analysis.

4.1 About The Study Area

4.1.1 Location and accessibility of Yeldeğirmeni

Yeldeğirmeni, also known as Rasimpaşa, is one of the 21 neighborhoods in the Kadıköy district of Istanbul, Türkiye, located on the Anatolian side. It is situated in the western part of the district (Figure 4.1).

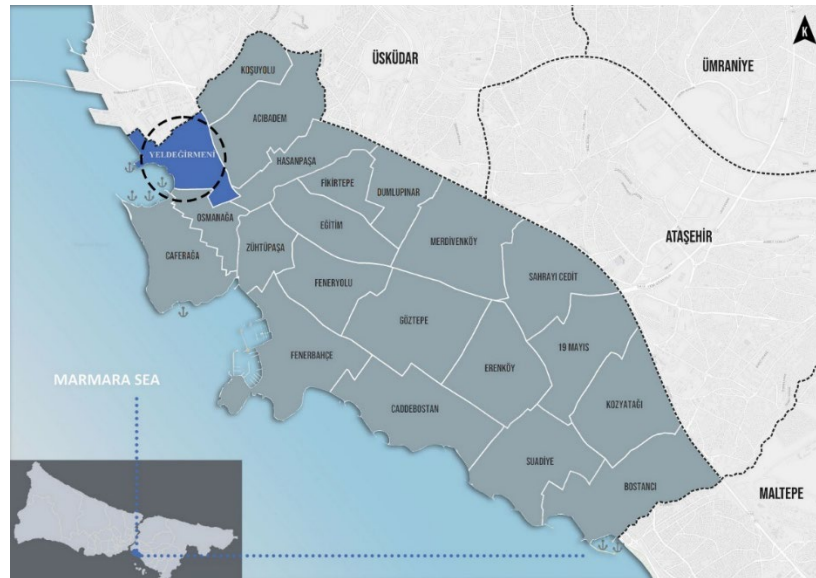


Figure 4.1 : Location of Kadıköy, Yeldeğirmeni.

The neighborhood is located north of and within the boundaries of the historic Haydarpaşa Train Station, south of the Kadıköy Bazaar (which, although not within its boundaries, exhibits intense urban mobility), and west of the Bosphorus coastline. In fact, the coastline is within its boundaries, making the neighborhood a transitional area. It is considered a potentially valuable region for urban design and architecture studies, where the station, bazaar, residences, and historical buildings work together in an integrated and collective manner. The topographical formation of the neighborhood is a sloping area descending from east to west. This slope enriches the perspectives of the streets leading to the coastline, creating strong visual interactions towards the sea and the historic Haydarpaşa Train Station (Figure 4.2).

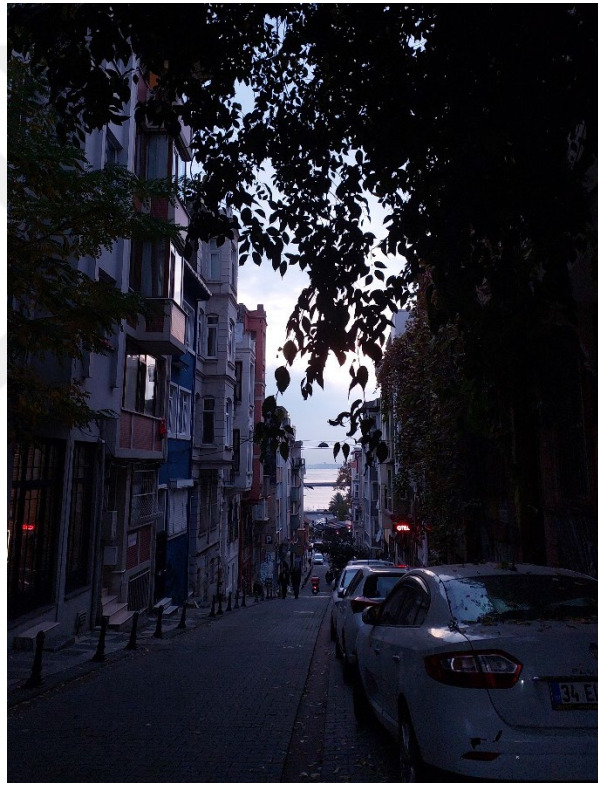


Figure 4.2 : View of street and coastline.

One of the strongest aspects of this neighborhood is its diverse transportation options. Walking is the most preferred and dominant mode of transport within the neighborhood. Kadıköy Bazaar, Moda, and the waterfront are all within walking distance. People generally access these areas on foot. Yeldeğirmeni's streets are narrow but permeable, which contributes to its potential as a "slow city." A significant advantage for access from other parts of the city is its proximity to the rail system. The Ayrılıkçeşmesi and Söğütlüçeşme stations of the Marmaray are within walking distance or a short transfer distance from Yel değirmeni (Figure 4.3). The metro line

also has a station at Ayrılıkçeşmesi. This location means that access to Yeldeğirmeni takes approximately 7-10 minutes on foot.



Figure 4.3 : Marmaray station and Yeldeğirmeni.

Another transportation option is sea transport. Kadıköy Pier is located on the coastline. These piers are important elements that shape the neighborhood's urban identity. Thanks to its proximity, it is directly accessible from other parts of the city such as the Islands, Eminönü, Karaköy, and Beşiktaş via ferry and sea motor lines. The last transportation route used is road transport, namely minibuses and buses. This transportation route passes through Halitağa Street, which is included in the neighborhood's boundaries at a certain point (Figure 4.4). Another stop is the minibus stop located on the west side of the neighborhood, opposite the coastline (Figure 4.5).



Figure 4.4 : Halitağa and Altıyol street.

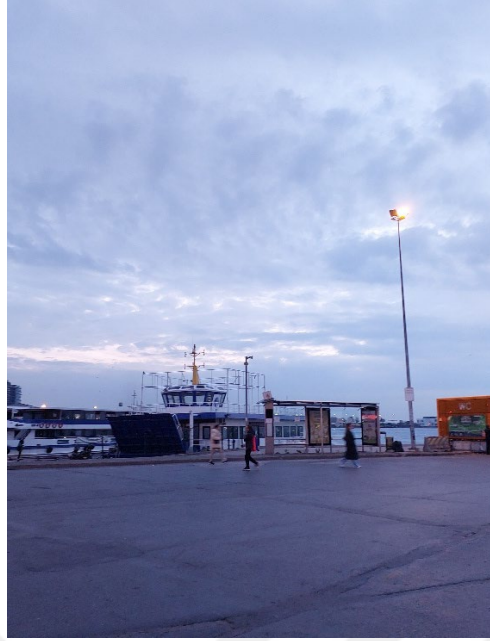


Figure 4.5 : Bus station in coastline.

In summary, Yeldeğirmeni Neighborhood is located in a strategically important area within the city, offering strong connectivity in terms of transportation. This high accessibility provides residents with a sense of control and direction, reflecting a certain environmental psychology. Therefore, Yeldeğirmeni Neighborhood is considered not merely a residential area, but rather a region where urban mobility and urban spatial experiences are concentrated.

4.1.2 Historical background, development, and contemporary significance of Yeldeğirmeni

Kadıköy district of Istanbul has historically emerged as a dynamic urban space where people come together and interact. With its diverse open, closed, and semi-open public spaces, this area attracts individuals from different age and social groups by facilitating social, commercial, and educational activities. The diversity offered by Kadıköy allows people to connect on various topics, thereby strengthening social interaction.

Kadıköy is an urban district, each neighborhood possessing its own unique spatial structure and characteristics. Areas interacting with the sea are particularly preferred due to the opportunities they offer. Welcoming visitors from all corners of Istanbul, Kadıköy boasts a rich array of structural functions that facilitate interaction between neighborhoods. Hosting educational institutions, commercial areas, social and cultural event venues, and healthcare services, it holds a significant position as an urban center

in Istanbul. Kadıköy's public spaces cater to both outdoor and indoor activities. While some neighborhoods exhibit dense residential structures, others maintain a balanced presence of housing and social spaces, enhancing the quality of life for their residents. Despite efforts to preserve its historical fabric, some areas face risks related to redevelopment processes, which could jeopardize Kadıköy's characteristic architecture and urban memory (Figure 4.6).

An examination of its morphological structure from the past to the present reveals that its plans are generally shaped by traditional approaches, often employing inward-facing, private courtyard techniques. Known for its socio-cultural richness, Kadıköy is filled with various events and social activities throughout the seasons. Especially during the summer months, coastal areas of Istanbul become bustling with people from different parts of the city, intensifying social interactions. With its historic neighborhoods and architectural fabric, Kadıköy continues to preserve its historical heritage, carrying the traces of the past into the present (Figure 4.7). In this way, Kadıköy stands out as an important center reflecting both Istanbul's historical identity and its dynamic socio-cultural life today.



Figure 4.6 : Example facade in Yeldeğirmeni.



Figure 4.7 : Sculpture of iron in Yel değirmeni.

The Yeldeğirmeni neighborhood in Kadıköy, Istanbul, is known as the area where the first apartment buildings were located. It is a historical and urban conservation area. This is due to the historic Haydarpaşa train station located on the coast. Historical records indicate that many families working at the station began living in Yeldeğirmeni after its construction. This gives the neighborhood significant historical and cultural richness. In particular, the Velpreda Apartment, also known as the Italian Apartment, is one of the oldest residential buildings in the area. Located on one of the streets leading to the sloping coastline of the neighborhood, it is situated in line with the Haydarpaşa train station (Figure 4.8). Records show that architects and engineers who came from abroad to work on the station's construction lived in this apartment and other surrounding buildings.



Figure 4.8 : Velpreda appartement.

Looking at the physical environment, the settlement is built within a courtyard system. Generally, the ground floors consist of social, cultural, and commercial buildings, while the upper floors are used as living spaces. Each street has a different building texture, facades, murals, and graffiti. In locations close to the train station, along the horizontal axes providing access to the coastline, several other building functions are also identified. For example, this neighborhood, stretching from the coast to the city, has different socio-cultural formations within itself. The Hemdat Israel Synagogue is also an iconic and well-known structure of the neighborhood. This synagogue is also historically significant as one of the oldest synagogues in Istanbul. Another example is the German Primary School, now called Osmangazi Primary School, located on the same street opposite the Italian Apartment building (Figure 4.9).

This educational building, designed by German architects and engineers who did not work at Haydarpaşa Train Station at the time, for the education of their own children, is one of the structures that has survived to this day. Considering all this, it can be seen that the rich cultural and historical structures and fabric of the neighborhood are still preserved and efforts are being made to preserve them. All of this immediately gives the neighborhood a unique urban identity, characterized by more art events, various cafes, and a quieter atmosphere compared to the Kadıköy market, fostering its own subculture.



Figure 4.9 : Osmangazi primary school.

Each street in the neighborhood boasts diverse street art productions that contribute to its distinct urban identity. Various graffiti, murals, and distinctive building facades, etc., are considered indicators of its rich and vibrant urban identity. All of these aspects

are seen as elements that contribute to the neighborhood's uniqueness. Visitors from other parts of the city also observe a greater focus on experience within this urban space. This suggests that the neighborhood can maintain its positive urban identity and memory in a new and contemporary urban environment. In fact, it can be interpreted that despite changes, the neighborhood strives to preserve its socio-cultural richness. Considering the context of contemporary cities and architecture, it can be argued that it is one of the rare urban spaces that has managed to preserve its own unique character.

In summary, there are significant differences between the environmental perception and experiences felt in this neighborhood compared to other areas of Kadıköy. The harmony between the physical and social environments is quite pronounced. This makes the neighborhood a valuable location for various research projects in the context of urban design and architecture. Like any urban space, the neighborhood is subject to urban interventions. However, these interventions are carried out in a way that minimizes or preserves the social and communal urban memory of the neighborhood, which is considered an important area.

4.2 Selection of The Study Area

The study area for this thesis was determined as the Yeldeğirmeni neighborhood in the Kadıköy district of Istanbul. The reasons for choosing this study area, expressed at a broader scale, include the fact that Kadıköy district is an important focal point on the Anatolian side of Istanbul, and the presence of murals, which are a form of urban intervention within the context of contemporary urban design and architecture (Figure 4.10).

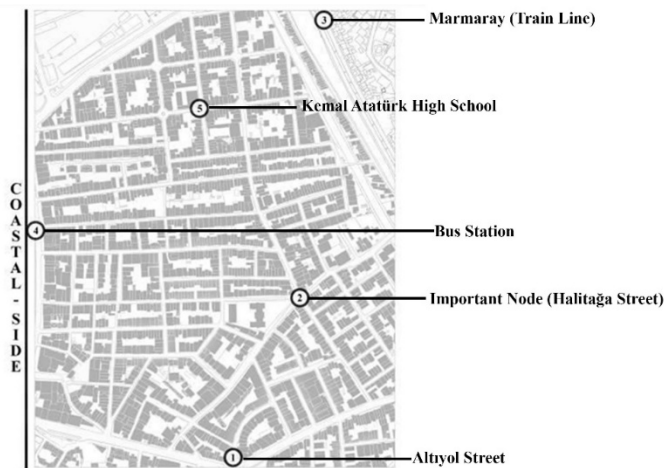


Figure 4.10 : Important point for Yeldeğirmeni.

From the late 1950s onwards, art began to move from enclosed exhibition spaces to public production. These art productions manifest themselves in public spaces, which are constantly used by society, allowing individuals to experience these urban spaces and changing their perspectives on cities in their mental perceptions. In a way, art makes the invisible visible and allows the unnoticed to be noticed.

As an example, Yves Klein's (1958) work "Blank" depicts emptiness in an enclosed exhibition space, while Arman's (1960) work "Full," also presented in an enclosed exhibition space, has a visual impact that extends to the street (Figure 4.11, Figure 4.12). In this context, enclosed exhibition spaces may no longer be sufficient. Therefore, the interpretation suggests that urban spaces are now being produced as exhibition spaces, and that the perception of the streets they inhabit can have different visual effects. These visual elements are thought to contain factors that have remained in the background of urban spaces and can influence configurations by going beyond theoretical spatial arrangements. In this context, murals produced in the urban spaces under examination can be considered.

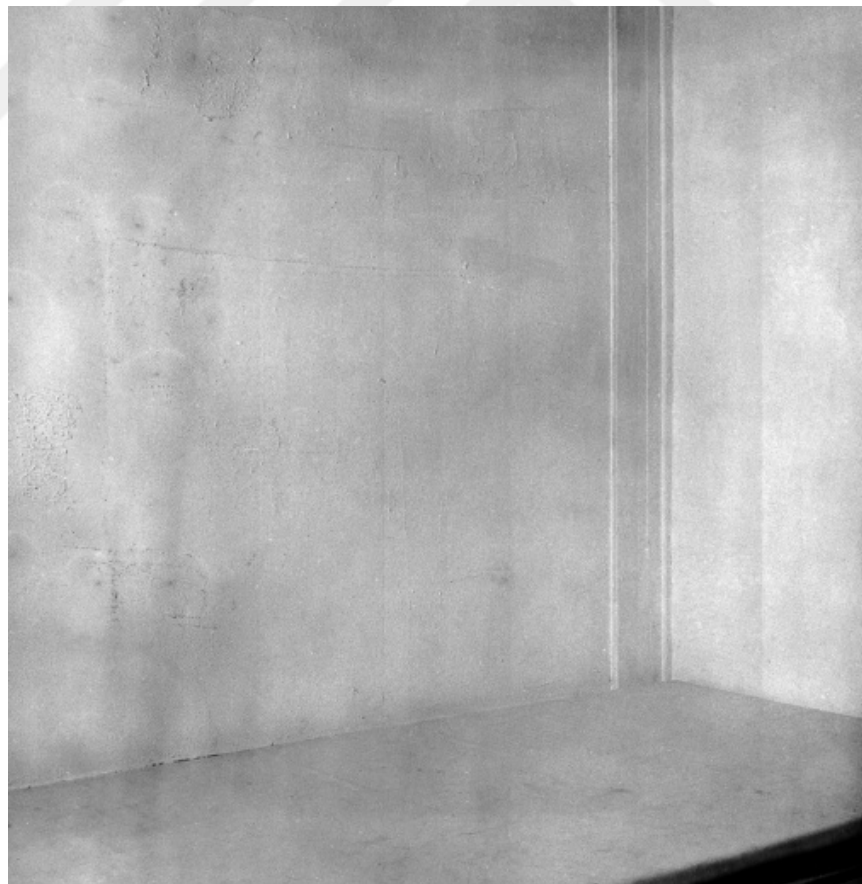


Figure 4.11 : Exhibition of blank, 1958 (Url-17).



Figure 4.12 : Exhibition of full, 1960 (Url-18).

Based on the discussions surrounding urban readability issues in relation to murals, it was considered that focusing on murals, while pursuing a quantitative and qualitative research objective, could strengthen the study of an urban space. At this point, the aim was to conduct the process using cognitive mapping methodology in the experimental process of wayfinding, perception, and cognition. Neighborhood units were examined as a study area at the intermediate scale of urban space. Due to Istanbul's heterogeneous nature, the study of a neighborhood was envisioned for this topic. The goal was to select an area as an exemplary urban space where the concepts of urban and public memory manifest themselves and undergo changes. Looking at Istanbul as a whole, the Yeldeğirmeni neighborhood stands out among the neighborhoods that have experienced various urban changes and developments. As one of the oldest settlements on the Anatolian side of Istanbul, the Yeldeğirmeni neighborhood in Kadıköy has preserved its historical fabric while also suffering damage to various structures over time. Even an urban space that has not suffered significant damage can still develop and change to adapt to its time and era. One way to both preserve the historical fabric of an urban space and open it up to development and improvement is through visual elements. This is achieved through art. In a sense, this constitutes the

visual culture of the urban space. Murals, which can be examined in the field of public art, have also found their place in various locations in Istanbul (Figure 4.13).



Figure 4.13 : Process of mural (Url-19).

Considering the uneven distribution of murals throughout the city, the Mural Istanbul Festivals, held from 2012 to 2019, took place in various locations (Figure 4.14). These productions highlighted the role of art in public spaces, within the framework of the physical and natural environment, and in the fields of urban design and architecture. The area most affected and prominently featured in these improvements to public spaces within the scope of the Mural Istanbul Festivals is identified as the Yeldeğirmeni neighborhood in Kadıköy.



Figure 4.14 : Different location for mural (Url-20)..

This study argues that murals are effective in orienting within urban and public spaces and can strengthen the spatial readability of the area; therefore, the Yeldeğirmeni neighborhood in Kadıköy is considered the most effective example. In this context, alongside the syntactic data provided by the spatial arrangement configurations of the works in the selected area, the configurations of urban spaces that have emerged

through experiences also possess various potentials. The Yeldeğirmeni neighborhood is considered one of these urban spaces (Figure 4.15).

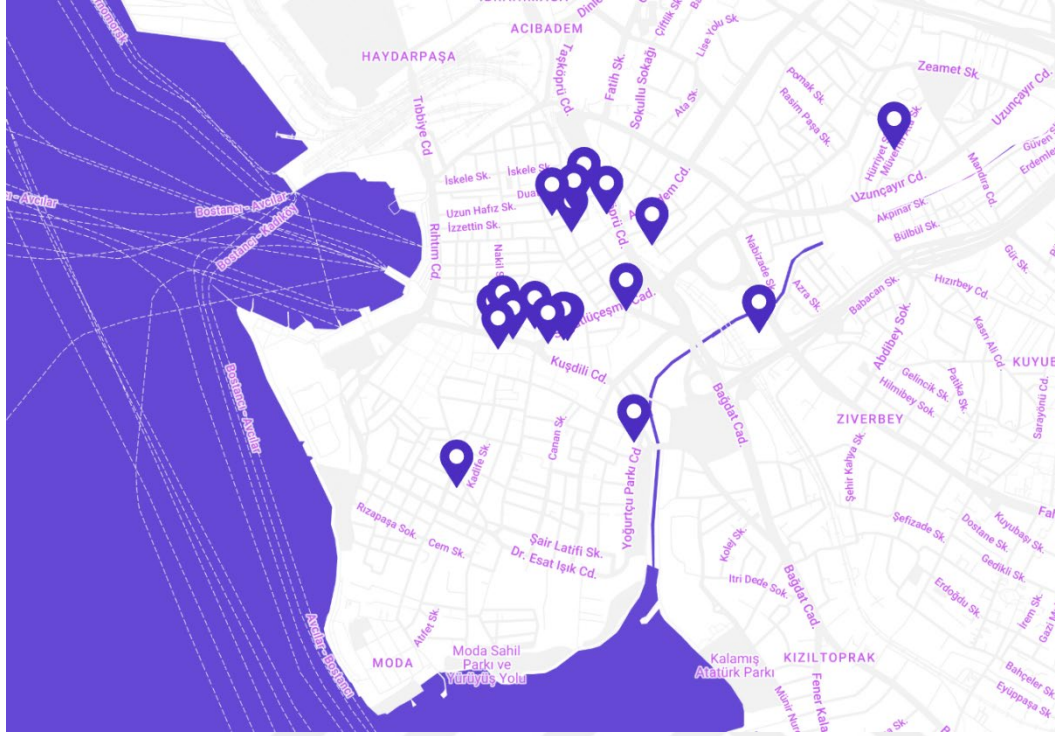


Figure 4.15 : Locations of murals (Url-21).

4.3 Methodology of The Study

When experiencing an urban space, fundamental urban elements are formed in people's perceptions and minds. However, murals are not sharply and clearly defined urban elements; rather, they are urban indicators that can distort, yet simultaneously strengthen, the visual spatial meanings and readability of urban spaces, making them more fluid. At the same time, murals are considered to be elements that add potential to spatial arrangement configurations, regardless of their location within the urban space. They make the invisible visible. From the perspective of urban design and architecture, the impact of murals is that they are productions that can be integrated into classical spatial configurations and affect the readability values of urban spaces. Within the scope of this study, various literature reviews have been conducted on the related topics of wayfinding, cognitive mapping, and spatial arrangement.

This thesis study was conducted step-by-step using three different analysis methods. The methods used for the analyses were cognitive mapping, which was developed through field experience, and spatial arrangement, which was implemented using the

DepthmapX application. Using two different datasets, the relationship between the number of repetitions of murals in the area (as extracted from cognitive mapping) and the spatial arrangement values of the streets where the murals are located was examined. Thus, whether there is a relationship between the spatial arrangement frequencies of the streets extracted from the experiences and the murals themselves was evaluated using regression analysis via the SPSS application.

In summary, the study establishes a discussion area where the semantic relationship between numerical and syntactic spatial arrangement values and human experiences plays a distorting role in urban space. In this context, the aim is to demonstrate how urban visual cultures, in the context of spatial arrangement, can make invisible streets visible in future contemporary discussions on urban design and architecture; to show that urban spaces are not merely physical environmental formations; and to reveal the potential for greater possibilities in today's cities, thus serving as a guiding study.

4.3.1 Cognitive mapping analysis method

The cognitive mapping study, the first analytical method used in this research, was conducted with individuals who had experienced the neighborhood only a few times before or for the first time. This was done to ensure a more homogeneous study and to obtain more reliable data, as the participants may not even know the streets where the murals are located or even that the murals exist. Regarding age and education level, the study focused on individuals aged 18-35 who are currently attending or have attended university. This was based on the premise that specific age ranges and education levels yield more balanced results in understanding urban spaces. Finally, to maintain a stable balance in the dataset regarding the density of the urban space, the studies were conducted only on weekends between 12:30 PM and 4:30 PM.

Before the experiment, participants were informed of the boundaries of the study area. No additional instructions were given. For approximately 30 minutes, they navigated their way through streets and avenues as they wished, without any rules. Afterwards, the meaning of cognitive mapping was explained. The forms of the depictions in the mapping exercise were left to the individual's unique style. Example drawings from studies conducted within the scope of the previously reviewed literature were shown as examples (Figure 4.16).

this data will be an important method for identifying which murals are repeated most often and for understanding their relational relationship with spatially presented data.

Subsequently, detailed examinations were conducted on these two elements obtained specifically for each map. The study initially focused on determining the starting point and whether there were any interventions in the section marked with a red pen, between the initial and final sections. In the final stage, while not entirely accurate, the corresponding murals or streets for some identified points were determined. At this stage, the possibility of discrepancies in the study arises, as a cognitive map can exhibit data inconsistencies.

4.3.3 Spatial syntax analysis method

This thesis aims to better understand the spatial configuration of the Kadıköy Yeldeğirmeni neighborhood, the selected sample area, and to syntactically address its readability using numerical data by conducting a spatial arrangement analysis. To address the area's comprehensibility with concrete and quantitative data, it was decided to utilize connectivity and integration values, drawing on existing literature as a resource. Additionally, visual graph analysis was conducted to analyze the visibility of the streets, allowing for interpretation regarding their connection to the murals. In this context, axial and other spatial arrangement analyses of the streets and avenues within the study area were performed using DepthmapX.

4.3.4 Examination of the relationship between the analyses

As previously mentioned, two categories were created from the data in the cognitive maps. Counting analyses were performed within each of these two categories. The categories considered are not fundamental urban elements. In line with the main scope of the study, streets/avenues and murals were examined. First, the murals included in the drawings were identified according to their street connections and descriptive depictions. Thus, the frequency of repetition of each mural was determined using the identification numbers assigned to the murals. The same process was carried out for the drawn streets and avenues. Subsequently, a spatial arrangement analysis of the selected study area was performed. In this context, axial map, integration, connectivity, and visual graph analyses were carried out using DepthmapX.

These two different methods were used within the main context of the study to demonstrate that urban spaces function in a synthetic manner using syntactic and semantic methods. All data obtained from the two different analyses were subjected to regression analysis using the SPSS statistical program to analyze the relationships, correlation degrees, and calculations between them.

Regression analysis performed using the SPSS program yields R and p values. The R value defines the regression value used in the analysis of data sets. The resulting regression value ranges from +1 to -1. An R value closer to +1 indicates a strong and positive relationship between the variables. However, a value closer to -1 suggests a strong but negative correlation. An R value closer to 0 indicates a weak correlation between the variables. Another indicator is the p value. A $p\text{-value} \leq 0.05$ suggests a significant correlation between the data. A $p\text{-value } 0.05 < p \leq 0.1$ indicates a low correlation, but a potential for one. Finally, a $p\text{-value} > 0.1$ suggests no statistically significant correlation between the data.

5. ANALYTICAL APPROACHES TO THE ROLE OF MURALS IN URBAN SPACE AND THEIR EVALUATION THROUGH COGNITIVE MAPPING

5.1 Introduction

This thesis study employed two main methodological approaches: semantically applied cognitive mapping analysis and syntactically applied spatial arrangement analysis. In this context, the findings and analysis results of the obtained data are presented in this section, along with detailed explanations.

5.2 Findings of The Cognitive Mappings

This thesis involved 18 participants in a cognitive mapping study conducted in the field. However, three drawings that were unclear and did not provide meaningful data were discarded. Thus, the cognitive mapping data from 15 participants was used as the basis for this study. The participants were selected from individuals aged 18-35 who were university students or former university students, and who had either visited the Yeldeğirmeni neighborhood of Kadıköy a limited number of times previously or were visiting for the first time. In the remainder of this study, those who participated in the fieldwork are referred to as "participants."

Prior to this field study, participants were given only a limited overview of the thesis work. This was done to avoid creating direct psychological pressure on their perception of the murals. Verbally explaining this would have focused the study solely on identifying these visual cultural elements, potentially compromising objectivity. All participants signed consent forms before the drawings began. Additionally, documents obtained from the Ethics Committee were provided to the participants. After 30 minutes of uninstructed exploration based on their own environmental behavior, a cognitive mapping exercise was conducted. The mapping exercise, lasting approximately 10 minutes, was carried out in two stages using black and red pens. Participants were free to choose how to describe the area, what depictions to draw, and what to write. They were only instructed to describe the areas they experienced.

In this context, when examining the cognitive maps prepared by the participants, it was determined that each map was unique and addressed different urban elements. The drawing style and presentation style of each map varied. While some participants expressed their depictions through drawings, others used explanatory descriptions in writing. When the murals and streets/avenues included in the study were analyzed, it was found that the participants most frequently depicted streets and avenues in their drawings. While some participants' maps showed a higher concentration of streets and avenues, others featured murals more prominently. In addition, some buildings and commercial areas, especially cafes, were also seen in the drawings. These depicted buildings or cafes were generally found to be Küff Yeldeğirmeni on Karakolhane Street or some buildings on side streets with different visual elements on their facades. Overall, the most frequently observed situation was the depiction of streets containing murals and the streets connecting to those streets.

Before identifying the murals in cognitive mapping, the locations of existing murals in the field were determined. An ID number was assigned to each mural (Figure 5.1). Using this method, the frequency of repetition of each mural mentioned in cognitive mapping was examined.



Figure 5.1: Murals ID in Yeldeğirmeni.

After counting the murals identified in the cognitive mapping studies, each repetition was analyzed to follow a specific frequency (Table 5.1). The results showed that the

most frequently repeated murals were those numbered M9 and M10 on Karakolhane Street. Considering its location and physical structure, Karakolhane Street serves as the main axis of the Yeldeğirmeni neighborhood, the study area. This street, which serves to extend the area along the north-south axis, has a high volume of vehicular traffic but is also considered the main circulation and connecting axis of the neighborhood. It also houses various commercial areas along its length. In this context, it was anticipated that the participants would use this street in some way. The next most frequently repeated mural was M21, with a frequency of 6. Considering its location, it is situated in a side street of the study area. Although this location, given the street structure and environmental conditions, may not be particularly productive, it remains in the participants' minds. When examining murals M3, M4, M5, M8, M16, and M20, all of which have frequency values of 1, different situations emerge. Mural M8, in particular, is one of the most well-known locations in the neighborhood, both in terms of its physical structure and as a gathering place. However, despite this, the number of times it is remembered is very low. This suggests that the data may be influenced by factors such as the physical structure and density of the streets, as well as the condition of the murals and the nature of the area itself.

Table 5.1 : Frequency of murals.

Mural ID	Frequency
M1	4
M2	4
M3	1
M4	1
M5	1
M6	3
M7	5
M8	1
M9	7
M10	7
M11	3
M12	2
M13	2
M14	3
M15	3
M16	1
M17	3
M18	5
M19	3
M20	1
M21	6

In summary, a clear correlation cannot be established between the frequency of recollection of murals and the physical condition of the streets. It can be interpreted that the effects of the murals emerge through exploration. In this context, a density map has been produced based on the frequency values of the murals on the map (Figure 5.2). It is thought that this can be incorporated as a sub-study to the interpretations that will be made in the rest of the work.

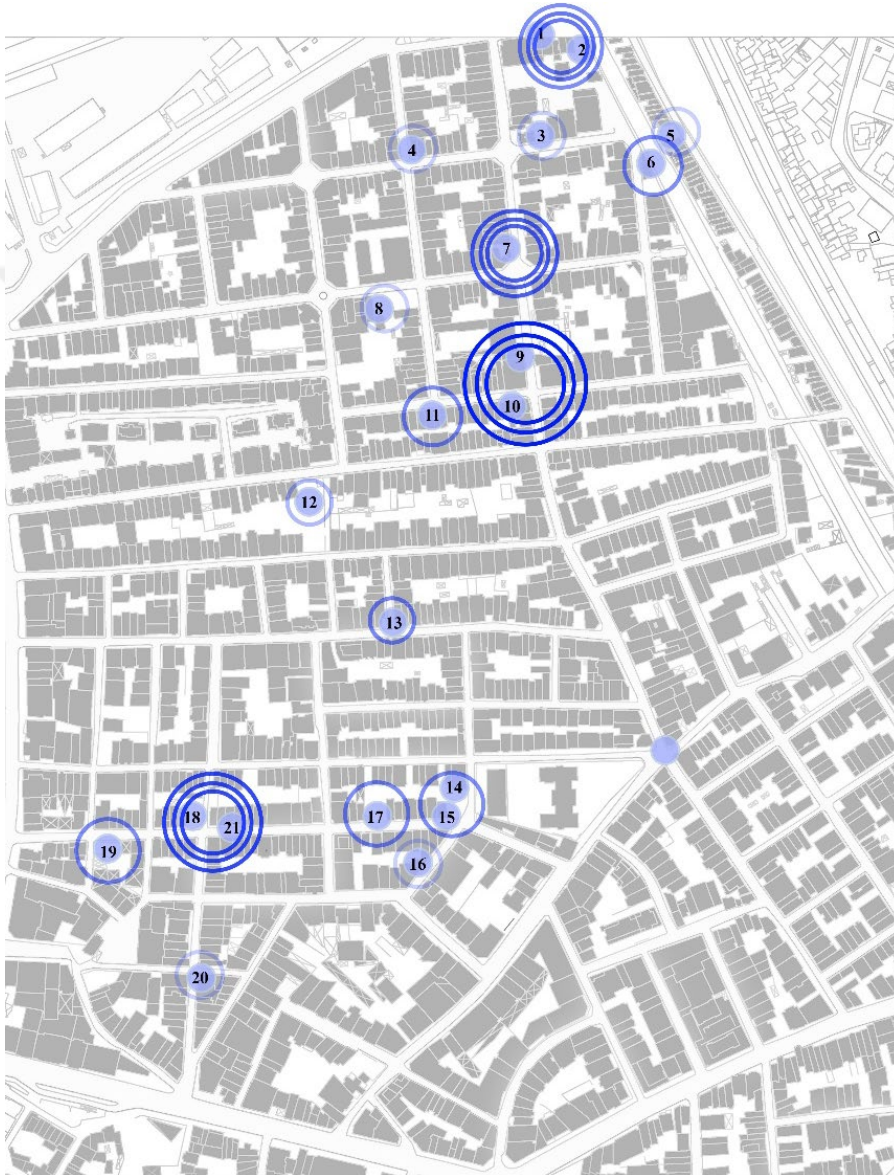


Figure 5.2: Frequency of murals map.

Another category analyzed using cognitive mapping is streets and avenues. In this context, the frequency values of the streets and avenues drawn in the cognitive maps, which emerged with the support of the participants, were determined and listed using a counting method (Table 5.2).

Table 5.2 : Frequency of streets.

Street Name	Frequency
Karakolhane Street	14
Uzun Hafız Street	12
Duatepe Street	10
Rıhtım Street	8
Ayrılıkçeşmesi Street	7
Taşköprü Street	7
İskele Street	7
İzettin Street	6
Misak-ı Milli Street	5
Halitağa Street	4
Nakil Street	3
Reşit Efendi Street	3
Recaizade Street	3
Talimhane Street	2
Yeşilay Street	1
Eşrefoğlu Street	1
Sünger Taşı Street	1
Kır Kahvesi Street	1
Macit Erbudak Street	1
Nüzhet Efendi Street	1

After counting the streets and avenues identified in cognitive mapping studies, each repetition was analyzed to follow a specific frequency. The results showed that Karakolhane Street had the most frequent occurrence with a frequency of 14. It was followed closely by Uzun Hafız Street with a frequency of 12. Looking at the morphological structure of the streets, Karakolhane Street runs along a long north-south axis of the neighborhood. Its southern endpoint connects to Halitağa Street, which leads to Kadıköy Bazaar. It is known to be a very busy axis in terms of pedestrian and vehicular traffic. Uzun Hafız Street, which also has a high frequency, bisects Karakolhane Street and runs along an east-west axis. The importance of Uzun Hafız Street lies in the fact that it forms one of the entry points into the neighborhood for pedestrians arriving via the Marmaray from the west. Another feature is that it provides access from the neighborhood to the coastline, facilitating passage from the neighborhood to other areas. In this context, its influence on cognitive mapping can be considered significant. Another street identified with a frequency value of 10 is Duatepe Street. This street, while located on the east-west axis when proceeding along Karakolhane Street, is also situated north of and parallel to Uzun Hafız Street. The street forms a blind spot a short distance after proceeding along the eastern axis. Despite this, it appears to be a dominant street that is most frequently experienced and

remembered by the participants in their studies. Streets identified with frequency values of 1 include Yeşilay Street, Eşrefoğlu Street, Sünger Taşı Street, Kır Kahvesi Street, Macit Erbudak Street, and Nüzhet Efendi Street.

The mural and street/road data obtained as a result of cognitive mapping studies have been marked on the map prepared as a base map. This makes it easier to examine the connections and locations between them.

When interpreted based on this mapping study, it can be seen that most of the murals are located on Karakolhane Street, which runs north-south through the neighborhood where the study was conducted. It is to be expected that mural production is concentrated on this avenue (Figure 5.3). This is because, looking at the results of cognitive maps of visitors to this area, it is a heavily represented and visible avenue. The presence of murals on such an axis can be effective in terms of visibility and the experience of the urban space.



Figure 5.3 : Frequency of streets map.

In contrast to this situation, another finding identified in the studies is that Reşit Efendi Street, located on the east-west axis in the southern sub-region of the study area, has a high density of murals. Looking at the relationship between the street and the murals,

the street moves along a topological slope. In terms of its morphological structure, the building functions are also located as hotels, residences, and open corner parking lots. Despite this, it is seen that murals are also quite prevalent in this area (Figure 5.4). In this context, it can be interpreted that the production of murals makes the visible streets of this urban space more interactive, while also revealing the potential of the invisible connecting roads, thereby transforming the urban space into more interactive spaces.

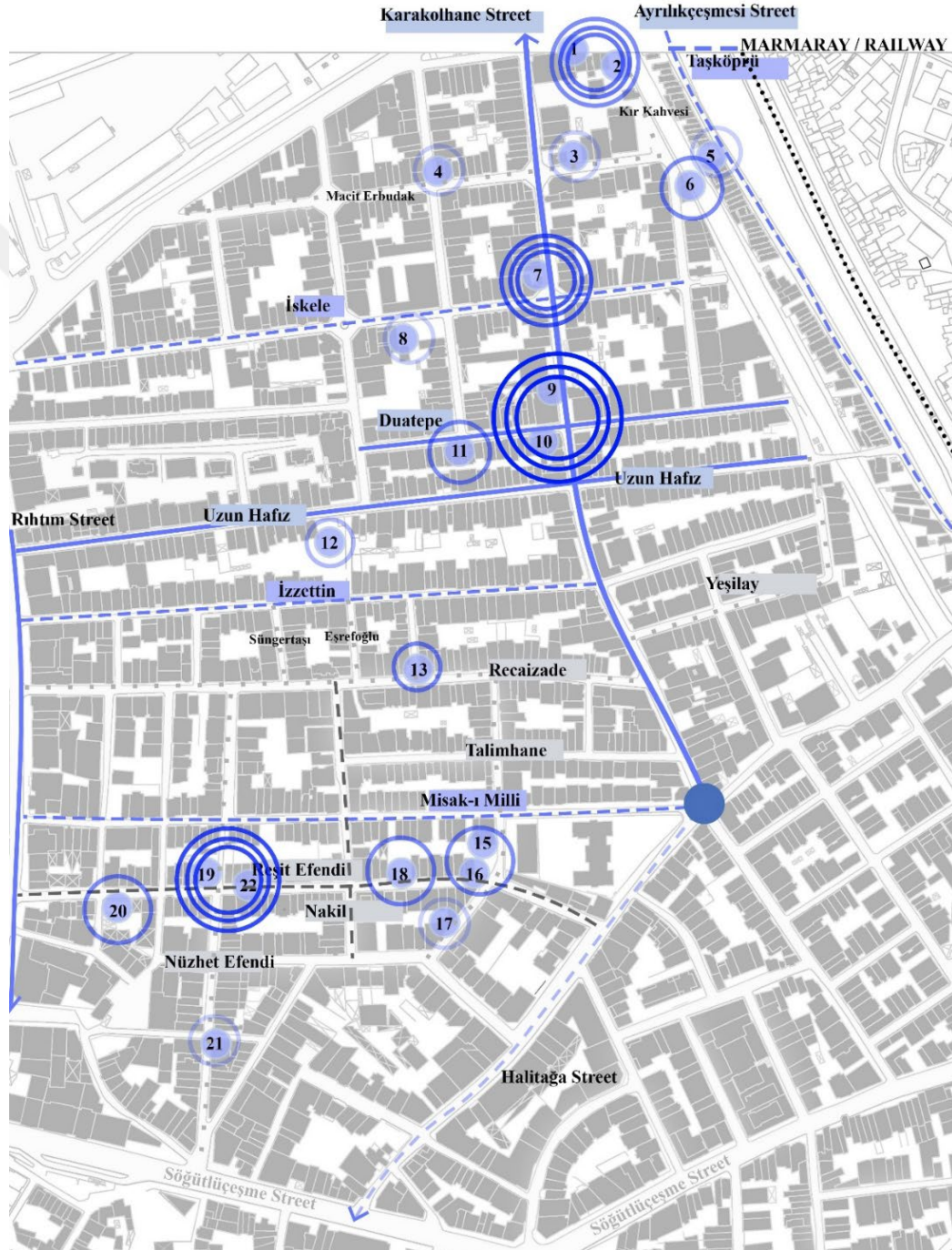


Figure 5.4 : Frequency map of murals and streets.

The frequency values created from the repetition counts of murals and streets/avenues obtained from the cognitive mapping study were produced on a base map. Looking at this map, the murals with the highest frequency values were identified as M7, M9, and M10. The street where these murals are located is Karakolhane Street, which again has the highest frequency value. However, in contrast, other murals with high frequency values, M19 and M22, were observed; the street where they are located was identified as Reşit Efendi Street. This street not only does not function as a main axis but is also located in an area with no direct connection to the main axis.

In summary, when examining cognitive mapping studies produced through the experiences of participants in the field of work, the results revealed by the data show that experiencing an urban space enables the human mind to define that space. The defined urban space is not always limited to main axes and dense areas; interactions that make the invisible visible through strong visual effects can also be found in the urban space. In this context, the presence of murals in the experienced urban space, not only on the main axes but also in the connecting streets, can make each street of the urban space more effective. This presents a new situation that can be addressed in the production and improvement of today's cities, where the memory of the urban space can be reconsidered.

5.3 Findings of The Spatial Syntax Analysis Method

Figure 5.5 shows the visual graph analysis (VGA) applied to the study area using the DepthmapX program. Together with the VGA map, the aim is to make interpretations by revealing a more systematic and numerical spatial arrangement analysis of the study. The colors indicated on the VGA map show the intensity of visibility values from blue to red. Red-colored streets and avenues indicate high visibility values, while blue and green-colored streets indicate low visibility values.

The connectivity values and visual integration values revealed through VGA analysis are emphasized. The Yeldeğirmeni neighborhood has a grid plan system in terms of its morphological structural system. In this context, when viewed in conjunction with VGA analysis, the connectivity and visual integration values of the streets in the area rarely deviate. The area where the Marmaray line is located in the northern part of the area has quite high values in terms of visibility. This can be interpreted as being due to the wider lanes in this area. At the same time, the street located in the southern part

of the area known as Altiyol Street also has high values. This is again due to the width of this street. Looking at the main center of the area, i.e., its inner boundaries, the color values are blue and green. This indicates that the visibility values within the neighborhood itself are low. In this context, Yeldeğirmeni neighborhood has narrow streets, a contiguous structural layout, and tall buildings. This affects visibility and connectivity values. In summary, when viewed with the VGA map, the Yeldeğirmeni neighborhood can be interpreted as having a structural system that preserves its physical privacy when viewed from the outside. This creates a feeling that different potentials may exist for people who experience the neighborhood from within. In summary, when viewed with the VGA map, Yeldeğirmeni neighborhood can be interpreted as having a structural system that preserves its physical privacy when viewed from the outside. This can reinforce the feeling that there may be different potentials for people who experience the neighborhood from within.



Figure 5.5 : Visual graph analysis (VGA) for Yeldeğirmeni neighborhood.

Looking at the visual integration values of the area, the average value shown in Table 5.3 is determined to be 6.19. This value actually shows that the neighborhood is a homogeneous system. The maximum value is determined to be 989.7. This value is considered quite high. However, when looking at the analysis in general terms, it can

be interpreted that this value originates from the Ayrılıkçeşmesi Marmaray area in the north, as mentioned earlier, and Altıyol Street in the south, rather than from the inner region of the neighborhood.

Table 5.3 : Connectivity and visual integration values for VGA..

Attribute	Minimum	Average	Maximum
Connectivity	1	364.676	1424
Visual Integration	1.852	6.195	989.701

Figure 5.6 shows the axial map study created using the DepthmapX program. The axial map is applied to interpret the integration values of the streets in the area. Looking at the integration values shown in Table 5.4, the average value is determined to be 0.314. This is considered a very low value for these spatial arrangement values. Generally, axial map integration values obtained from spatial arrangement analysis in an urban space are close to 1.0 or may exceed it. In this context, it can be interpreted that the Yeldeğirmeni neighborhood has a closed structural system within itself.

Looking at the maximum value, the result is 0.766. This value is also seen to be below 1.0. Looking at the integration values of the streets within the neighborhood, it can be summarized that the neighborhood is closed within itself and has homogeneous street values within itself.



Figure 5.6 : Axial map for Yeldeğirmeni neighborhood.

Table 5.4 : Integration values of axial map.

Value	Attribute
Minimum	0.042
Average	0.314
Maximum	0.766

Table 5.5 presents an analysis based on the frequency values of the murals identified through cognitive mapping, alongside VGA integration, VGA connectivity, and axial map integration values derived from the spatial arrangement analysis of the streets where the murals are located. The study includes interpretations regarding the connectivity between the syntactic and semantic analysis data obtained. The VGA Integration values of the locations of the M9 and M10 murals, which have high frequency values, are 4.21 and 3.31, respectively; it is seen that they are located on Karakolhane Street, which has a higher value compared to the locations of other murals. In contrast, the M21 mural, which has a frequency value of 3 and the lowest integration value among the streets where it is located, provides a different interpretation. This is because the analysis reveals that the M20 mural has a frequency value of 1 and an integration value of 3.82.

Table 5.5 : VGA integration, connectivity and axial integration for murals.

Murals	Frequency	VGA Integration	VGA Connectivity	Axial Integration
M1	4	3.14	125	0.087
M2	4	3.14	118	0.087
M3	1	3.32	165	0.08
M4	1	3.32	206	0.367
M5	1	3.26	223	0.122
M6	3	2.65	146	0.093
M7	5	3.11	78	0.367
M8	1	3.32	158	0.36
M9	7	4.21	407	0.354

Table 5.5 (continued): VGA integration, connectivity and axial integration for murals.

Murals	Frequency	VGA Integration	VGA Connectivity	Axial Integration
M10	7	3.31	162	0.374
M11	3	3.31	162	0.374
M12	2	4.02	354	0.255
M13	2	3.9	31	0.522
M14	3	3.51	81	0.36
M15	3	3.59	77	0.36
M16	1	3.06	64	0.203
M17	3	2.95	212	0.36
M18	5	3.22	220	0.463

In this context, it can be interpreted that while there is consistency between the frequency values of murals resulting from cognitive mapping and the visual integration values obtained through spatial arrangement analysis, some deviations may also occur. In summary, it can be interpreted that the streets where murals are produced possess effective visual elements that make invisible streets visible through human perception, rather than being a situation that can only be expressed through physical structure.

5.4 Comparative Regression Analysis of Findings

In this context, it can be interpreted that while there is consistency between the frequency values of murals resulting from cognitive mapping and the visual integration values obtained through spatial arrangement analysis, some deviations may also occur. In summary, it can be interpreted that the streets where murals. The correlation between the syntactic and semantic data of the study is examined. First, the correlation between the frequency values of the streets obtained from the cognitive mapping and the VGA values is examined. The number of valid observations evaluated in the analysis is 20. Looking at the results shown in Table 5.6, the Pearson correlation coefficient is determined to be $r = 0.436$. This result indicates that there is a positive

and moderate relationship between the variables. This result reveals that as the spatial integration or visibility values obtained within the scope of visual graphic analysis increase, street usage frequency also tends to increase. The approximate T value for the Pearson correlation was determined to be 2.053, indicating that the relationship may be statistically significant. In contrast, the Spearman correlation coefficient $\rho = 0.314$ was calculated to evaluate the relationship between the ordered data. This value indicates a positive but weaker relationship between the variables. The approximate T value for the Spearman analysis is 1.404, revealing that the relationship has lower statistical power compared to the Pearson analysis. When the findings are evaluated overall, it is understood that visual graphic analysis is related to street use intensity to a certain extent, but it is not the only factor explaining street use. Therefore, it can be interpreted that there are different factors affecting urban space use.

Table 5.6 : Regression of streets frequency and visual graph analysis.

	Value	Asymptotic Standar Error ^a	Approximate T ^b
Interval by Interval Pearson's R	0.436	0.178	2.053
Ordinal by Ordinal Spearman Correlation	0.314	0.228	1.404
N of Valid Cases	20		

Secondly, Table 5.7 presents the results of the correlation analysis conducted to reveal the relationship between street usage frequency and the connectivity variable. The number of valid observations used in the analysis is 20. The analysis resulted in a Pearson correlation coefficient of $r = 0.413$. This value indicates a positive and moderate relationship between the variables. Accordingly, as the connectivity level of streets increases, an upward trend in the frequency of use of these streets is observed. The approximate T value for the Pearson correlation was determined to be 1.925, indicating that the relationship is statistically significant. In contrast, the Spearman correlation analysis conducted to evaluate the relationship between the ordered data yielded a value of $\rho = 0.152$. This result reveals that there is a positive but very weak relationship between the variables. The approximate T value for the Spearman analysis is 0.651, indicating that the statistical strength of the relationship is low. When the findings are evaluated overall, it is seen that the level of connectivity of streets is related to the frequency of street use to a certain extent, but this relationship is not

strong. This situation indicates that urban space usage cannot be explained solely by spatial connectivity; other variables such as functional diversity, pedestrian mobility, environmental attractions, and socio-economic factors may also influence street usage intensity.

Table 5.7 : Regression of streets frequency and connectivity.

	Value	Asymptotic Standar Error ^a	Approximate T ^b
Interval by Interval Pearson's R	0.413	0.207	1.925
Ordinal by Ordinal Spearman Correlation	0.152	0.238	0.651
N of Valid Cases	20		

Table 5.8 presents the results of the correlation analysis conducted to determine the relationship between street usage frequency and the values obtained from the axial map analysis. The number of valid observations used in the analysis is 20. The Pearson correlation coefficient was calculated as $r = 0.112$. This value indicates a positive but very weak relationship between the variables. In other words, there is no clear linear relationship between the increase in spatial values obtained from the axial map analysis and street usage frequency.

The approximate T value for the Pearson correlation was determined to be 0.479, indicating that the relationship does not reach a statistically significant level. The Spearman correlation analysis conducted to evaluate the relationship between ordered data yielded a value of $\rho = 0.098$. This result also indicates that there is a very weak and negligible relationship between the variables. The approximate T value for the Spearman analysis is 0.419, indicating that the relationship does not have statistically significant power. When the findings are evaluated in general, it can be said that the spatial indicators obtained from the axial map analysis have a limited effect in explaining street usage frequency.

This situation indicates that urban space usage should be evaluated not only in terms of axial structure but also in conjunction with different spatial and socio-economic factors such as visibility, connectivity, functional diversity, and environmental attractions.

Table 5.8 : Regression of streets frequency and axial map.

	Value	Asymptotic Standar Error ^a	Approximate T ^b
Interval by Interval Pearson's R	0.112	0.171	0.479
Ordinal by Ordinal Spearman Correlation	0.098	0.225	0.419
N of Valid Cases	20		

Table 5.9 presents the findings of the correlation analysis conducted to determine the relationship between the density of murals and the results of visual graph analysis. The number of valid observations used in the analysis is 21. The Pearson correlation coefficient was calculated as $r = 0.016$. This value indicates that there is an almost negligible and insignificant relationship between the variables. In other words, there is no clear linear relationship between the increase in spatial visibility or network structure values obtained within the scope of visual graph analysis and the density of murals.

The approximate T value for the Pearson correlation is 0.069, which indicates that the relationship does not reach a statistically significant level. The Spearman correlation analysis, performed to evaluate the relationship between ordered data, yielded a value of $\rho = -0.203$. This result indicates a weak and negative relationship between the variables. Accordingly, as visual graphic analysis values increase, a slight decrease in the density of wall paintings can be observed; however, the strength of this relationship is quite low. The approximate T value for the Spearman analysis is -0.906, which also indicates that the relationship is not statistically significant. Overall, the findings reveal that the spatial distribution of wall paintings does not show a direct, strong relationship with the visual network structure.

This suggests that cultural preferences, artist interventions, social usage patterns, and local environmental factors may be more decisive in the positioning of wall paintings than spatial visibility. This also supports the interpretation that murals are an active tool that makes the invisible visible in the urban space.

Table 5.9 : Regression of murals frequency and visual graph analysis.

	Value	Asymptotic Standar Error ^a	Approximate T ^b
Interval by Interval Pearson's R	0.016	0.246	0.069
Ordinal by Ordinal Spearman Correlation	-0.203	0.228	-0.906
N of Valid Cases	21		

Table 5.10 presents the results of the correlation analysis conducted to determine the relationship between mural density and the connectivity variable. The number of valid observations used in the analysis is 21. The Pearson correlation coefficient was calculated as $r = 0.230$. This value indicates a positive but weak relationship between the variables. In other words, as the connectivity level of streets increases, a limited increase in the density of murals can be observed; however, the strength of this relationship is quite low. The approximate T value for the Pearson correlation is 1.030, indicating that the relationship does not reach a statistically significant level. The Spearman correlation analysis, performed to evaluate the relationship between the ordered data, yielded a value of $\rho = 0.067$. This result reveals a very weak positive relationship between the variables. The approximate T value for the Spearman analysis is 0.294, indicating that the relationship has a statistically very low power. Overall, the findings reveal that there is no strong relationship between the spatial distribution of wall paintings and the connectivity level of streets. This situation indicates that the location of wall paintings cannot be explained solely by spatial network characteristics; cultural preferences, artist interventions, social usage patterns, and local environmental factors may also play an important role in this distribution.

Table 5.10 : Regression of murals frequency and connectivity.

	Value	Asymptotic Standar Error ^a	Approximate T ^b
Interval by Interval Pearson's R	0.230	0.237	1.030
Ordinal by Ordinal Spearman Correlation	0.067	0.235	0.294
N of Valid Cases	21		

Table 5.11 presents the results of the correlation analysis conducted to determine the relationship between the density of wall paintings (murals) and the spatial values

obtained from the axial map analysis. The number of valid observations used in the analysis is 21. The Pearson correlation coefficient $r = 0.190$ was calculated as a result of the analysis. This value indicates a positive but weak relationship between the variables. In other words, a limited increase trend can be observed between the increase in spatial values obtained from the axial map analysis and the density of murals; however, the strength of this relationship is quite low. The approximate T value for the Pearson correlation is 0.843, indicating that the relationship does not reach a statistically significant level. The Spearman correlation analysis conducted to evaluate the relationship between the ordered data yielded a value of $\rho = 0.144$. This result reveals a weak positive relationship between the variables. The approximate T value for the Spearman analysis is 0.633, which also indicates that the relationship has low statistical power. Overall, the findings reveal that there is no strong relationship between the spatial distribution of wall paintings and the spatial indicators obtained from axial map analysis. This situation indicates that the location of wall paintings cannot be explained solely by axial spatial structure; different factors such as cultural preferences, artist interventions, social usage patterns, and local environmental factors may also play a decisive role in this distribution.

Table 5.11 : Regression of murals frequency and axial map.

	Value	Asymptotic Standar Error ^a	Approximate T ^b
Interval by Interval Pearson's R	0.190	0.156	0.843
Ordinal by Ordinal Spearman Correlation	0.144	0.210	0.633
N of Valid Cases	21		

This study examined the relationships between street usage frequency and mural density and various spatial analysis methods (Visual Graph Analysis, Connectivity, and Axial Map) through correlation analyses. When the findings are evaluated overall, it is observed that there are positive but limited relationships between street usage frequency and spatial analysis indicators. In particular, moderate positive relationships were found between visual graph analysis and connectivity values and street usage frequency, indicating that the spatial network structure has a certain effect on urban mobility. In contrast, a very weak relationship was found between the values obtained from axial map analysis and street usage frequency. When evaluated in terms of wall

painting density, the relationships with spatial analysis indicators are generally weak and statistically insignificant. This situation indicates that the spatial distribution of wall paintings cannot be explained solely by the structural characteristics of the urban space; different factors such as cultural preferences, artistic interventions, social usage patterns, and environmental attractions may also influence this distribution.

In conclusion, the research findings reveal that the spatial network structure has a certain explanatory power, particularly regarding street usage intensity, but that urban space usage and the distribution of wall paintings are shaped by multidimensional factors. This actually allows for the interpretation that an urban space can form its memory by considering two separate representations rather than solely numerical spatial analyses or solely transfers in mental representations, and that different visual potential factors within the urban space are also effective.

6. DISCUSSION & CONCLUSION

This study demonstrates that the relationship between urban space and people's experiences can be a multi-layered and dynamic structure that cannot be explained solely by the organization of the physical environment. People design, transform, and reinterpret urban spaces; at the same time, these spaces shape people's environmental behaviors, perceptions, and movement patterns. In this process of mutual interaction, the perception, legibility, and mental representations of urban space constitute an important potential area of research.

This study takes a multifaceted approach to examining the role of murals, one of the physical environmental components that influence the perception of urban space, on the legibility of urban space and human perception. It argues that murals can alter urban spatial organizations and hold various potentials.

Within the scope of this study, an interdisciplinary theoretical framework encompassing the concepts of environmental psychology, spatial perception, orientation, and cognitive mapping was first established. In line with this theoretical framework, the Yeldeğirmeni Neighborhood in the Kadıköy district of Istanbul was selected as the study area, and analyses were conducted taking into account the area's mural density, typomorphological characteristics, and urban accessibility. The methodological process of the study consisted of three main stages: mural identification and photography, spatial syntax analyses, and cognitive mapping applications. These stages allowed for the simultaneous evaluation of both the syntactic (spatial structure and relationships) and semantic (human perception and mental representations) dimensions of the urban space.

Within the scope of the cognitive mapping study, the application was carried out with volunteer participants who had no prior experience or very limited experience in the sample area. When the representations obtained as a result of the two-stage cognitive mapping studies conducted by the participants after freely wandering around the area were examined, it was determined that the elements most prominent in human perception were certain street axes, some commercial building facades, wooden

houses, and mural surfaces. This situation demonstrates that prominent visual elements and features with a strong visual character at the facade scale play an important role in the perception of urban space. In particular, it was observed that facades with murals were prominently featured in the participants' mental maps.

In another phase of the study, spatial arrangement analyses were conducted, and the integration, connectivity, axial map, and visibility (VGA) values of the study area were obtained using the DepthmapX program. Through these analyses, the spatial organization of the urban space was revealed numerically, and the spatial characteristics of the areas where the murals were located were examined. Comparing the syntactic data obtained with the cognitive mapping results can provide an important basis for evaluating the relationship between the legibility of the urban space and human perception.

In the final stage of the study, the data obtained were analyzed using the SPSS program to establish correlation relationships; the relationships between street usage frequency and spatial arrangement indicators were evaluated through correlation analyses. The analysis results revealed positive and moderate relationships between street usage frequency and visual graph analysis and connectivity values. In contrast, a very weak relationship was found between axial map values and street usage frequency. When examining the relationship between murals and spatial arrangement indicators, generally weak relationships were found. This result indicates that the locations of murals cannot be explained solely by the spatial network structure; cultural, social, and artistic interventions also influence this distribution.

However, cognitive mapping results reveal that murals can serve as powerful visual indicators in human perception. The frequent presence of murals and distinctive facade features in participants' mental representations demonstrates that these elements are important urban indicators that enhance the recognizability of urban spaces. In this context, it can be argued that murals can be considered not only as an aesthetic or artistic intervention, but also as an effective tool in urban memory, orientation, and spatial perception processes.

In this context, urban space is no longer just a space; it has become a changing, transformable open curatorial space. This is made possible thanks to murals. Murals are considered to be visually effective elements that strengthen and enhance points of

weak connection that are often overlooked in urban spaces. Murals can be produced in urban areas where visibility and connectivity are high, depending on their spatial arrangement; conversely, they can also be produced in areas with low visibility and connectivity. Therefore, spatial arrangement data, a numerical method, is currently insufficient on its own for examining urban space.

In conclusion, this study reveals that physical environmental elements, and especially powerful visual indicators such as murals, play a significant role in the perception of urban space. Murals can contribute to the readability of urban space by increasing spatial definability in their surroundings. They can also support wayfinding processes by creating distinct reference points in individuals' mental maps.

Therefore, it is important to consider murals not only as an aesthetic element in urban design and planning processes, but also as a potential design tool in terms of urban perception, wayfinding, and urban memory. It is expected that the findings of this study will contribute to future research that more comprehensively addresses the effects of murals on spatial perception and urban experience in urban design and public art applications.

This study also highlights the importance of combining syntactic analysis methods with semantic approaches based on user perception in urban space research. While spatial syntax analyses numerically reveal the movement potentials and spatial organization of urban space, cognitive mapping studies show how individuals experience these spaces and which elements stand out in their mental representations. Considering these two approaches together contributes to a more holistic understanding of both the physical and perceptual dimensions of urban space. In this context, public art productions, especially mural applications, can be considered not only as aesthetic components of urban space but also as tools that can guide urban perception and transform spatial experience.

Considering future studies, it is thought that research conducted in different urban fabrics and socio-cultural contexts could more comprehensively reveal the effects of murals on the perception of urban space. Furthermore, cognitive mapping studies conducted with larger participant groups could contribute to understanding how users' spatial experiences change according to different demographic and cultural characteristics. In addition, it is foreseen that experimental studies using virtual reality,

augmented reality, and digital mapping tools in line with developing digital technologies could offer new research opportunities for examining different dimensions of urban spatial perception. In this context, it is believed that interdisciplinary studies conducted at the intersection of public art, environmental psychology, and urban design disciplines will contribute to the transformation of cities into more legible, memorable, and experientially rich spatial organizations.



REFERENCES

- Appleyard, D.** (1973). *Environmental planning and social science: Strategies for environmental decision-making*. UC Berkeley, Institute of Urban and Regional Development.
- Arthur, P., & Passini, R.** (1992). *Wayfinding: People, signs, and architecture*. McGraw-Hill.
- Avramidis, K., & Tsilimpounidi, M.** (2017). *Graffiti and street art: Reading, writing and representing the city*. Routledge.
- Batenko, A. O.** (2020). *Mural art as a component of the cultural space of the city*. *Ukrainian Cultural Studies*, 2(7), 65–68. [https://doi.org/10.17721/ucs.2020.2\(7\).11](https://doi.org/10.17721/ucs.2020.2(7).11)
- Bechtel, R. B., & Churchman, A. (Eds.).** (2002). *Handbook of environmental psychology*. John Wiley & Sons.
- Boeing, G.** (2019, November). *Big data and urban morphology*. <https://geoffboeing.com/2019/11/big-data-urban-morphology/>
- Castells, M.** (1996). *The rise of the network society*. Blackwell Publishers.
- Churchman, A.** (2002). *Environmental psychology and urban planning*. *Handbook of environmental psychology* (pp. 191–202). Wiley.
- Cywiński, A., & Karyń, A.** (2024). *Mural as a living element of urban space*. *Arts*, 13(4), 117. <https://doi.org/10.3390/arts13040117>
- de Certeau, M.** (1984). *The practice of everyday life* (S. Rendall, Trans.). University of California Press. (Original work published 1980)
- Downs, R. M., & Stea, D.** (1973). *Image and environment: Cognitive mapping and spatial behavior*. Aldine.
- Eden, C.** (1988). *Cognitive mapping*. *European Journal of Operational Research*, 36(1), 1–13. [https://doi.org/10.1016/0377-2217\(88\)90002-1](https://doi.org/10.1016/0377-2217(88)90002-1)
- Elazzazy, N. A.** (2023). *Environmental perception of urban spaces*. *Civil Engineering and Architecture*, 11(4), 2182–2200.
- Filomena, G., Verstegen, J. A., & Manley, E.** (2019). *A computational approach to The image of the city*. *Cities*, 89, 14–25.
- Garip, E., Şalgamcıoğlu, M. E., & Koş, F. C.** (2015). *The influence of architectural configuration on the pedestrian network in Büyük Beşiktaş market*. *A|Z ITU Journal of the Faculty of Architecture*, 12(3), 105–113.
- Grant, J. R.** (2002). *Wayfinding: A broad view*. In R. B. Bechtel (Ed.), *Handbook of environmental psychology* (pp. 427–442). Wiley.
- Hanson, J., & Hillier, B.** (1984). *The social logic of space*. Cambridge University Press.
- Harvey, D.** (2012). *Rebel cities: From the right to the city to the urban revolution*. Verso.
- Hillier, B.** (1996). *Space is the machine: A configurational theory of architecture*. Cambridge University Press.
- Hillier, B.** (1999). *Centrality as a process: Accounting for attraction inequalities in deformed grids*. *Urban Design International*, 4(3–4), 107–127.

- Hillier, B., Burdett, R., Peponis, J., & Penn, A. (1986). *Creating life: Or, does architecture determine anything?* *Architecture & Behaviour*, 3(3), 233–250.
- Hillier, B., & Hanson, J. (1984). *The social logic of space*. Cambridge University Press.
- Hillier, B., & Tzortzi, K. (2006). *Space syntax: The language of museum space*. In S. Macdonald (Ed.), *A companion to museum studies* (pp. 282–301). Blackwell.
- Hillier, B., Penn, A., Hanson, J., Grajewski, T., & Xu, J. (1993). *Natural movement: Or, configuration and attraction in urban pedestrian movement*. *Environment and Planning B: Planning and Design*, 20(1), 29–66.
- Hillier, J., & Healey, P. (2008). *Foundations of the planning enterprise*. Ashgate.
- Hillier, J., & Metzger, J. (2021). *Connections: Exploring contemporary planning theory and practice with Patsy Healey*. Routledge.
- Hillier, J., & Rooksby, E. (Eds.). (2002). *Habitus: A sense of place*. Ashgate.
- Kaplan, R. (2001). *The nature of the view from home*. *Environment and Behavior*, 33(4), 507–542.
- Kim, J. (2017). *Comparing D/H ratio and perceptual qualities of squares*. *Sustainable Urban and Rural Development*.
- Lang, J. (1974). *Designing for human behavior: Architecture and the behavioral sciences*. Dowden, Hutchinson & Ross.
- Lang, J. (2006). *Urban design: A typology of procedures and products*. Architectural Press.
- Lynch, K. (1960). *The image of the city*. MIT Press.
- Maevskaya, M. V. (2022). *Murals as a key form of street art*. *Advances in Transdisciplinary Social Sciences (ICADCE 2022)*, Article 74. <https://doi.org/10.55060/s.atssh.221107.003>
- Marcus, L. (2010). *Spatial configuration and cognitive mapping*. *Journal of Space Syntax*, 1(1), 1–12.
- Miles, M. (1997). *Art, space and the city: Public art and urban futures*. Routledge.
- Norberg-Schulz, C. (1965). *Intentions in architecture*. MIT Press.
- Passini, R. (1992). *Wayfinding in architecture*. Van Nostrand Reinhold.
- Petri, J. (2018). *Touched by a mural*. *Art Inquiry*, 20, 173–184. <https://doi.org/10.26485/AI/2018/20/11>
- Plummer, H. (2009). *Architecture and light*. Thames & Hudson.
- Psarra, S. (2009). *Architecture and narrative: The formation of space and cultural meaning*. Routledge.
- Ratti, C. (2004). *Space syntax: Some inconsistencies*. *Environment and Planning B: Planning and Design*, 31(4), 487–499. <https://doi.org/10.1068/b3019>
- Rodrigue, J.-P. (2020). *Urban transportation*. In *The geography of transport systems*. Routledge.
- Schafer, R. M. (1977). *The soundscape: Our sonic environment and the tuning of the world*. Destiny Books.
- Steen, J. (2009). *Spatial and social configurations in offices*. In *Proceedings of the 7th International Space Syntax Symposium*. KTH.
- Tolman, E. C. (1948). *Cognitive maps in rats and men*. *Psychological Review*, 55(4), 189–208. <https://doi.org/10.1037/h0061626>
- Tschumi, B. (1994). *Event-cities*. MIT Press.
- Tversky, B. (1992). *Distortions in cognitive maps*. *Geoforum*, 23(2), 131–138. [https://doi.org/10.1016/0016-7185\(92\)90011-R](https://doi.org/10.1016/0016-7185(92)90011-R)

- Türkoğlu, D. H.** (2002). *Kentsel imge: İstanbul'dan bulgular*. İTÜ Dergisi Seri A: Mimarlık, Planlama, Tasarım, 1(1), 57–64.
- Venturi, R., Scott Brown, D., & Izenour, S.** (1972). *Learning from Las Vegas: The forgotten symbolism of architectural form*. MIT Press.
- Wineman, J. D., & Peponis, J.** (2010). *Constructing spatial meaning*. *Environment and Behavior*, 42(4), 479–508.
- Young, A.** (2014). *Street art, public city: Law, crime and the urban imagination*. Routledge.
- Zumthor, P.** (2006). *Atmospheres: Architectural environments, surrounding objects*. Birkhäuser
- Url-1**<<https://theholmestead.com/glasgows-street-art-2/glasgows-street-art/>>, date retrieved 05.11.2025.
- Url-2**<<https://downtownaustin.com/explore/downtown-mural-map/>>, date retrieved 05.11.2025.
- Url-3**<<https://artblot.wordpress.com/2013/09/12/the-evolution-of-graffiti-and-street-art-a-diagram/>>, date retrieved 16.03.2023.
- Url-4**<<https://blog.artsper.com/en/a-closer-look/definition-of-art-brut/>>, date retrieved 12.01.2026.
- Url-5**<<https://animalnewyork.com/2023/10/20/rip-tracy-168-wild-style-graffiti-titan/>>, date retrieved 15.01.2026.
- Url-6**<<https://www.timeout.com/madrid/art/henry-chalfant-art-is-not-a-crime-1977-1987>>, date retrieved 17.01.2026.
- Url-7**<<https://www.blocal-travel.com/exhibition/christian-omodeo-loading-street-art-paris/>>, date retrieved 16.01.2026.
- Url-8**<<https://www.streetartbcn.com/jorge-rodriguez-gerada-buenos-aires-2015/>>, date retrieved 13.04.2023.
- Url-9**<<https://lavarla.com/sehirde-aniden-karsimiza-cikanlar-murallar/>>, date retrieved 20.05.2021.
- Url-10**<<https://artdogistanbul.com/sanaticilar-george-floydu-murallar-ile-aniyor/>>, date retrieved 15.10.2025.
- Url-11**<<https://www.sprayplanet.com/blogs/news/the-artwork-of-mr-dheo-from-streets-to-collaborations>>, date retrieved 15.10.2025.
- Url-12**<<https://travelbyjaed.com/2016/05/25/prague-czech-republic/john-lennon-wall-prague-czech-republic/>>, date retrieved 13.10.2025.
- Url-13**<<https://www.smh.com.au/traveller/inspiration/pragues-john-lennon-wall-painted-white-20141119-1lpgu9.html>>, date retrieved 13.10.2025.
- Url-14**<<https://www.shutterstock.com/image-photo/berlin-germany-0430-iconic-graffiti-art-2485318065>>, date retrieved 14.10.2025.
- Url-15** <<https://streetartonlinegallery.wordpress.com/2022/10/06/the-best-street-art-in-cities-around-the-world/>>, date retrieved 14.10.2025.
- Url-16**<<https://www.livetheworld.com/post/best-street-art-spots-in-rio-de-janeiro-bw90>>, date retrieved 16.10.2025.
- Url-17**<<https://www.littleartnecdotes.com/le-vide-1958/>>, date retrieved 10.12.2025.

Url-18<<https://socks-studio.com/2019/11/23/iris-clert-yves-klein-the-void-arman-the-full-up/>>, date retrieved 10.12.2025.

Url-19<https://www.yapi.com.tr/etkinlikler/mural-istanbul-festivali-2018_166465.html>, date retrieved 10.02.2024.

Url-20<<https://www.cekulvakfi.org.tr/haber/sagir-duvarlar-sanat-eserine-donusuyor>>, date retrieved 10.02.2024.

Url-21<<https://www.mural-east.com/festival>>, date retrieved 10.02.2024.



APPENDICES

APPENDIX A: Cognitive Mappings

APPENDIX B: Cognitive Research Consent Form



APPENDIX A: Cognitive Mappings

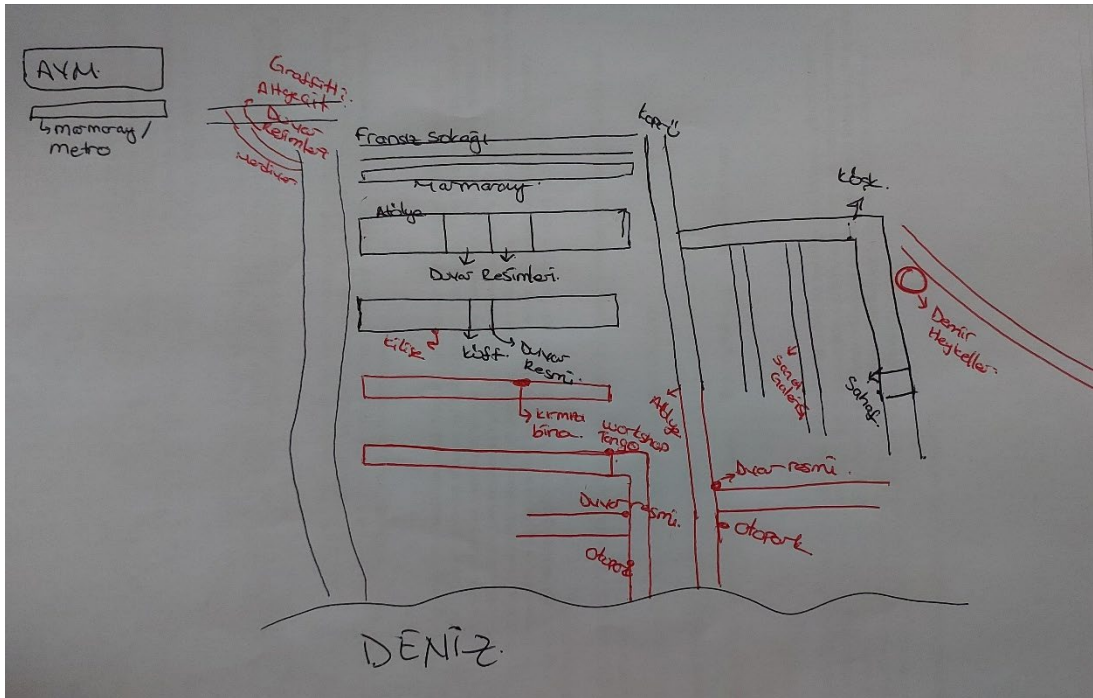


Figure A.1 : D1 cognitive mapping.

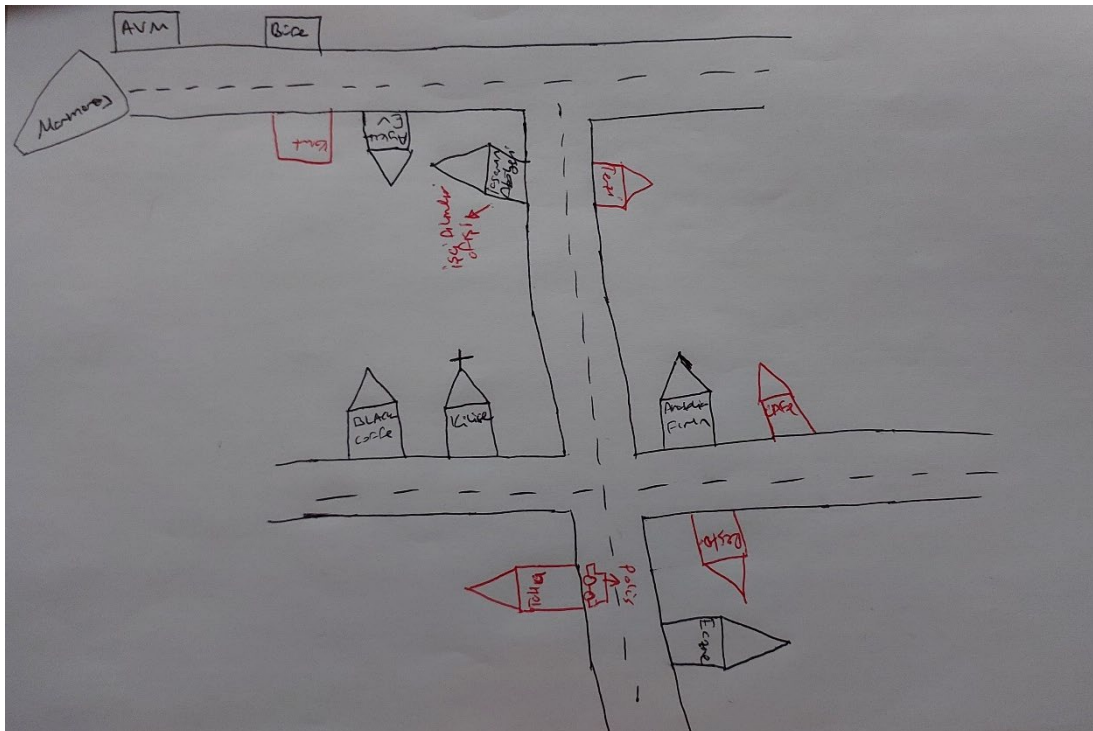


Figure A.2 : D2 cognitive mapping.

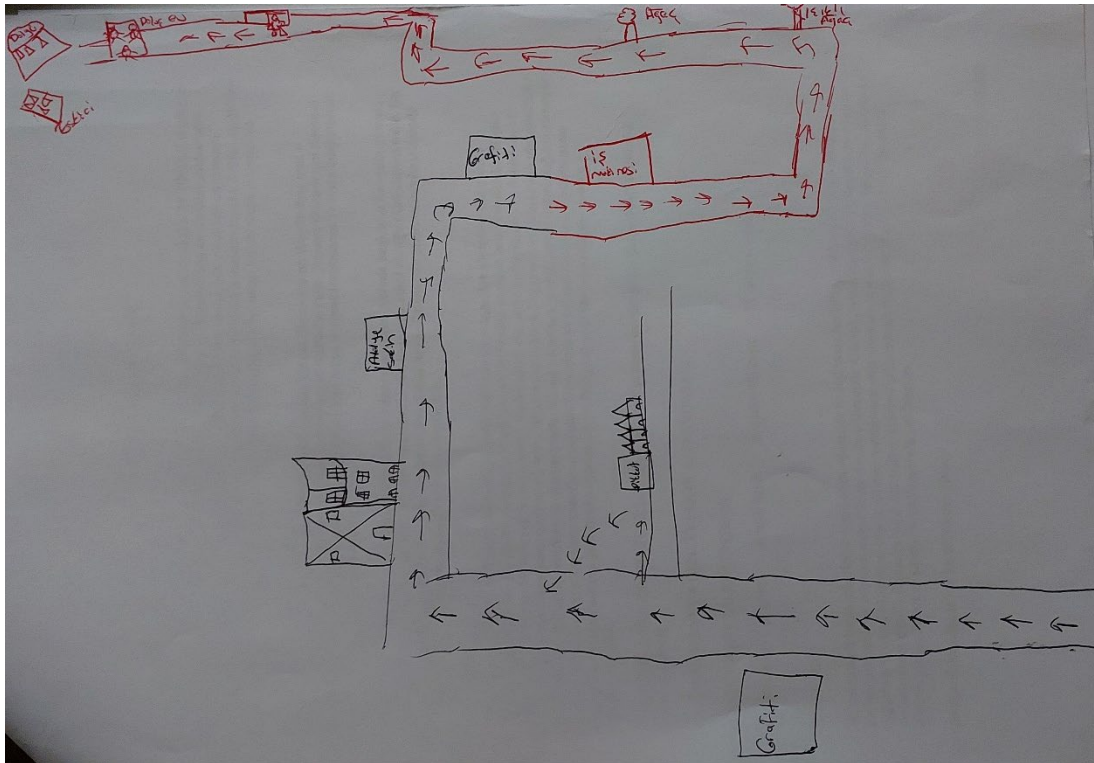


Figure A.5 : D5 cognitive mapping.

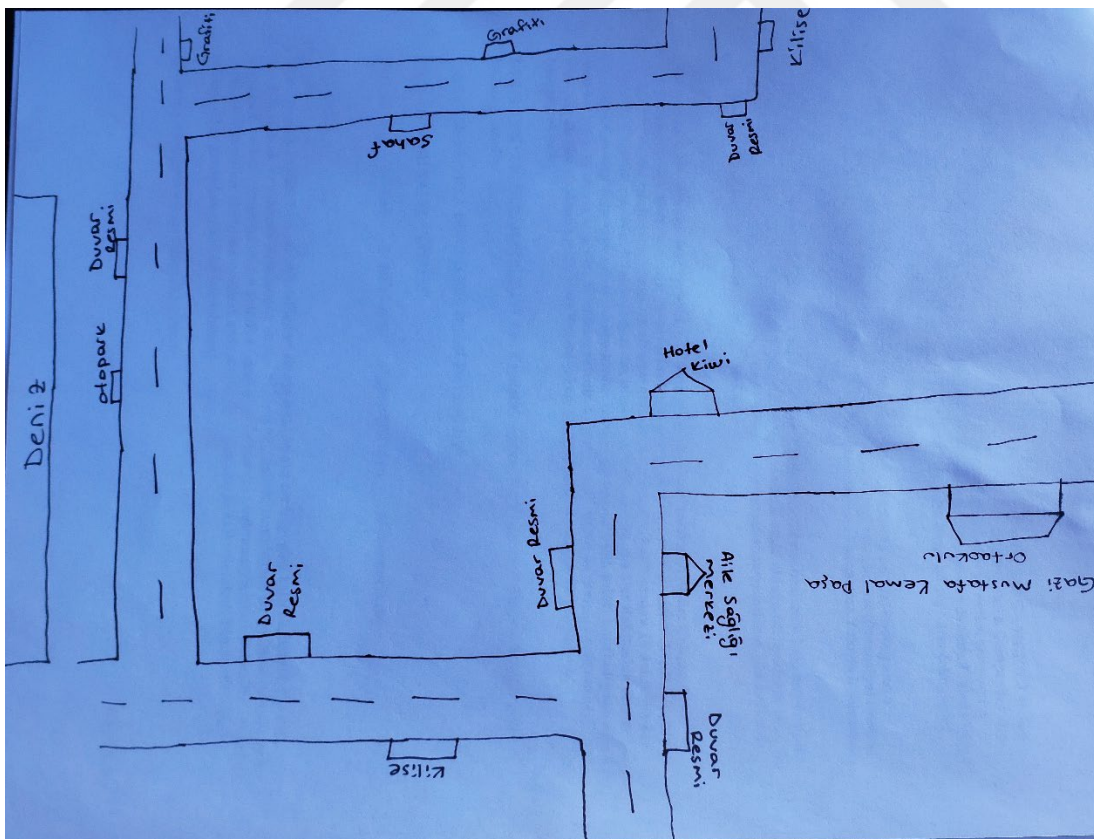


Figure A.6 : D6 cognitive mapping.

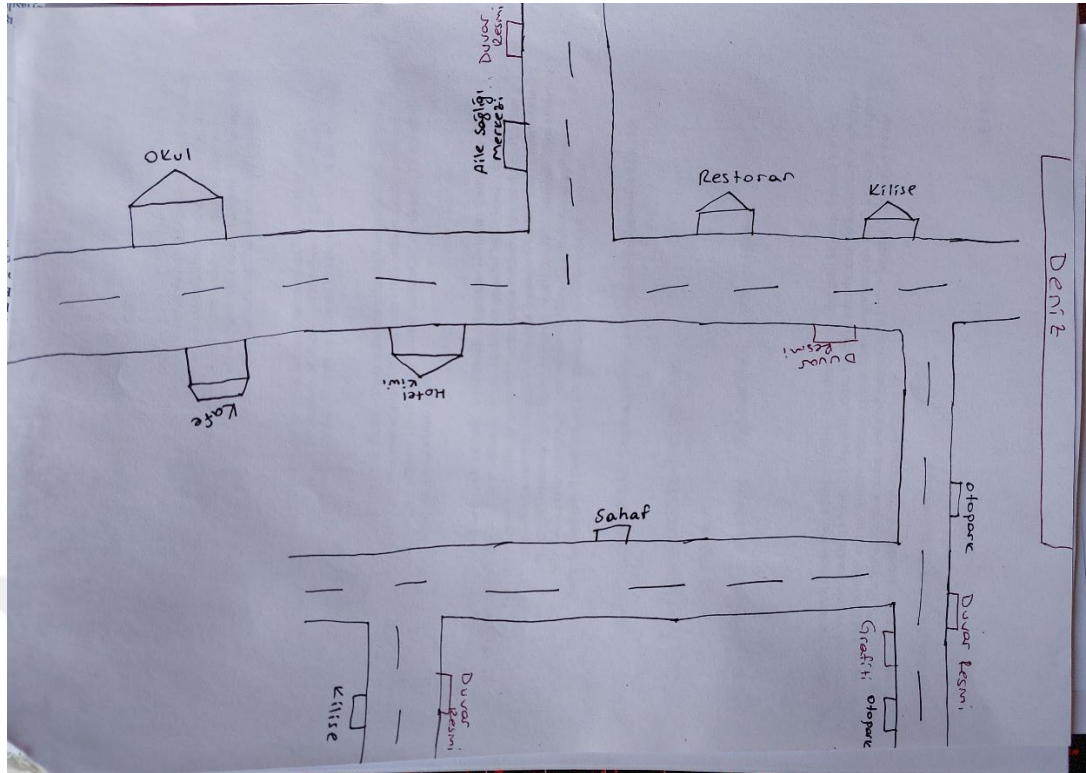


Figure A.7 : D7 cognitive mapping.

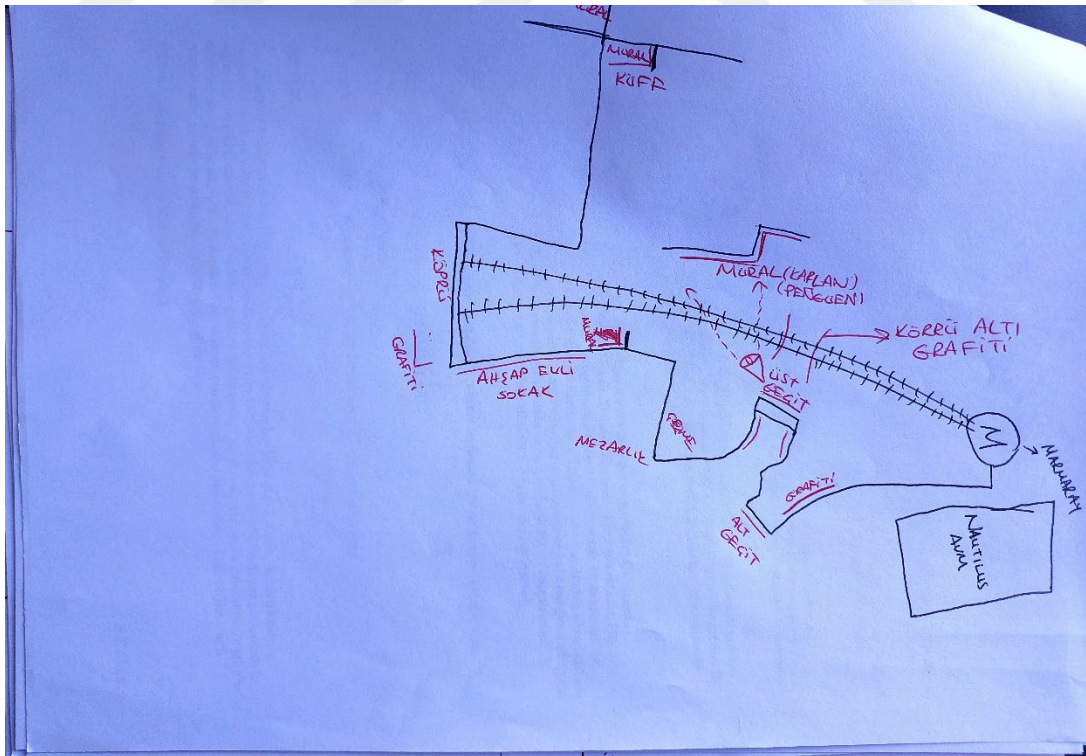


Figure A.8 : D8 cognitive mapping.

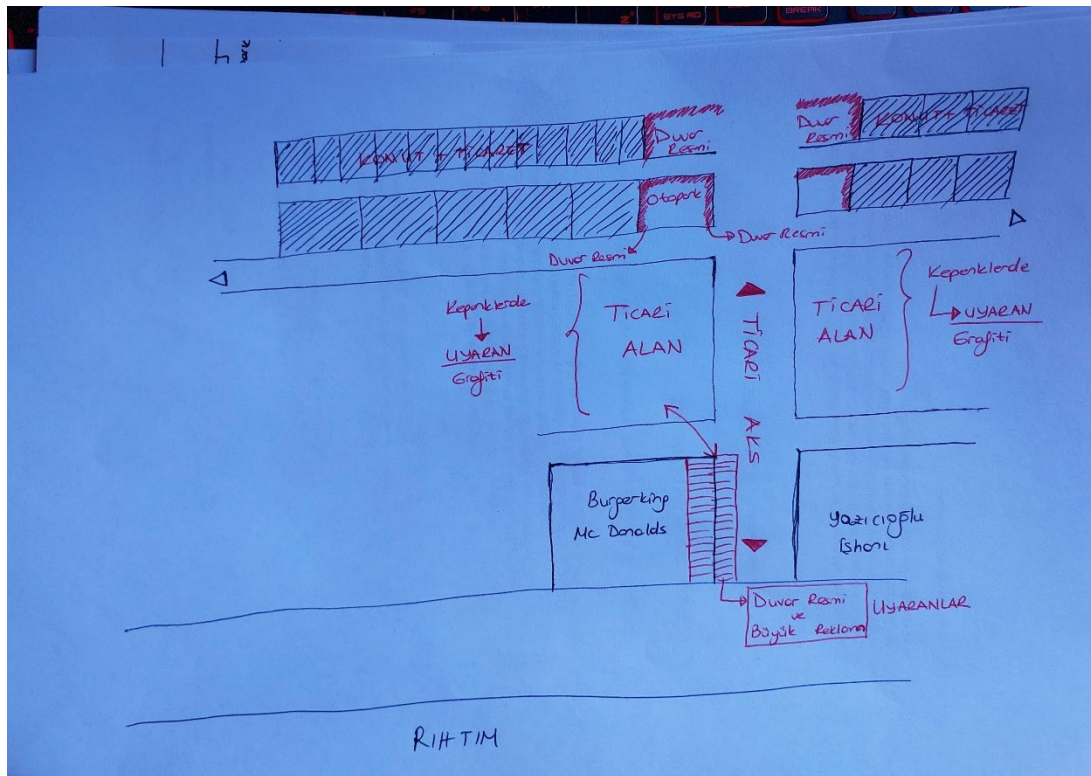


Figure A.9 : D9 cognitive mapping.

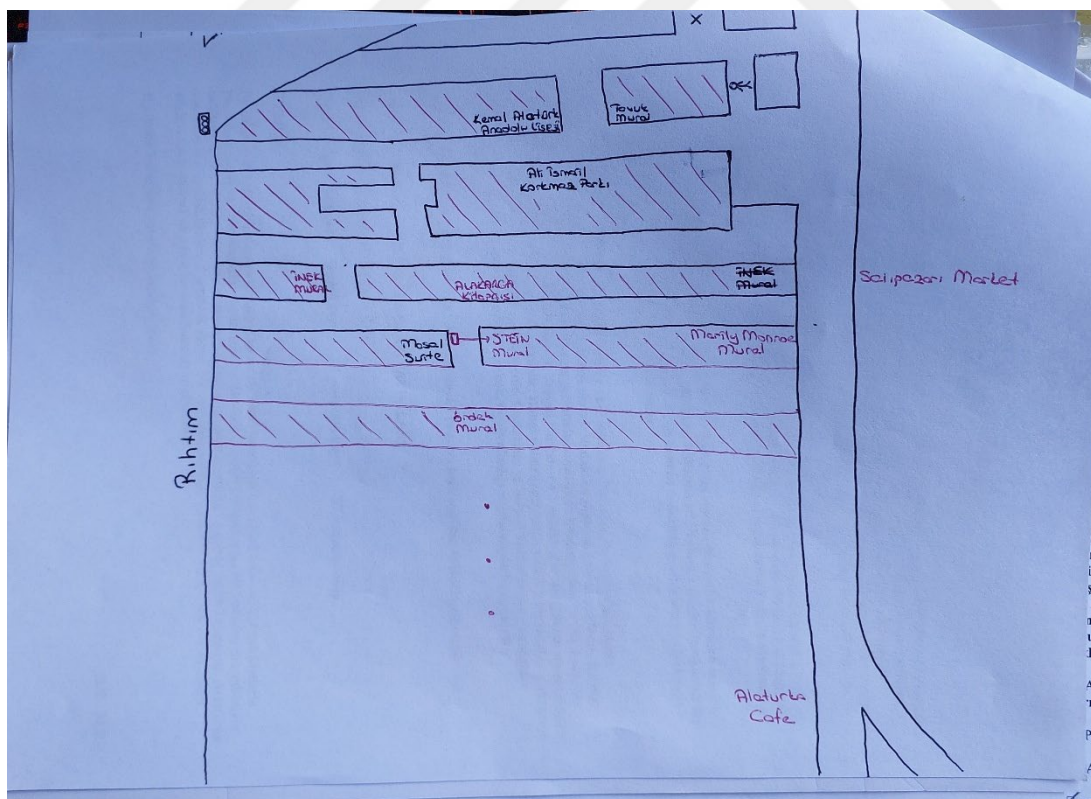


Figure A.10 : D10 cognitive mapping.



Figure A.11 : D11 cognitive mapping.



Figure A.12 : D12 cognitive mapping..

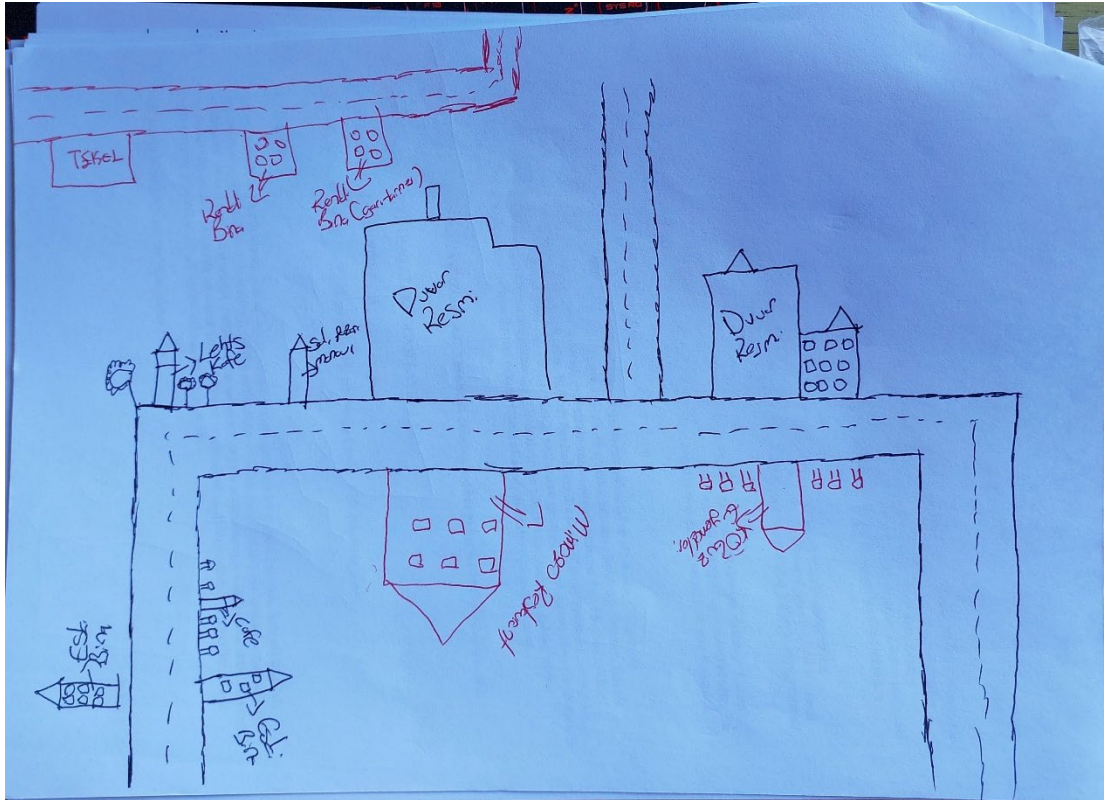


Figure A.13 : D13 cognitive mapping.

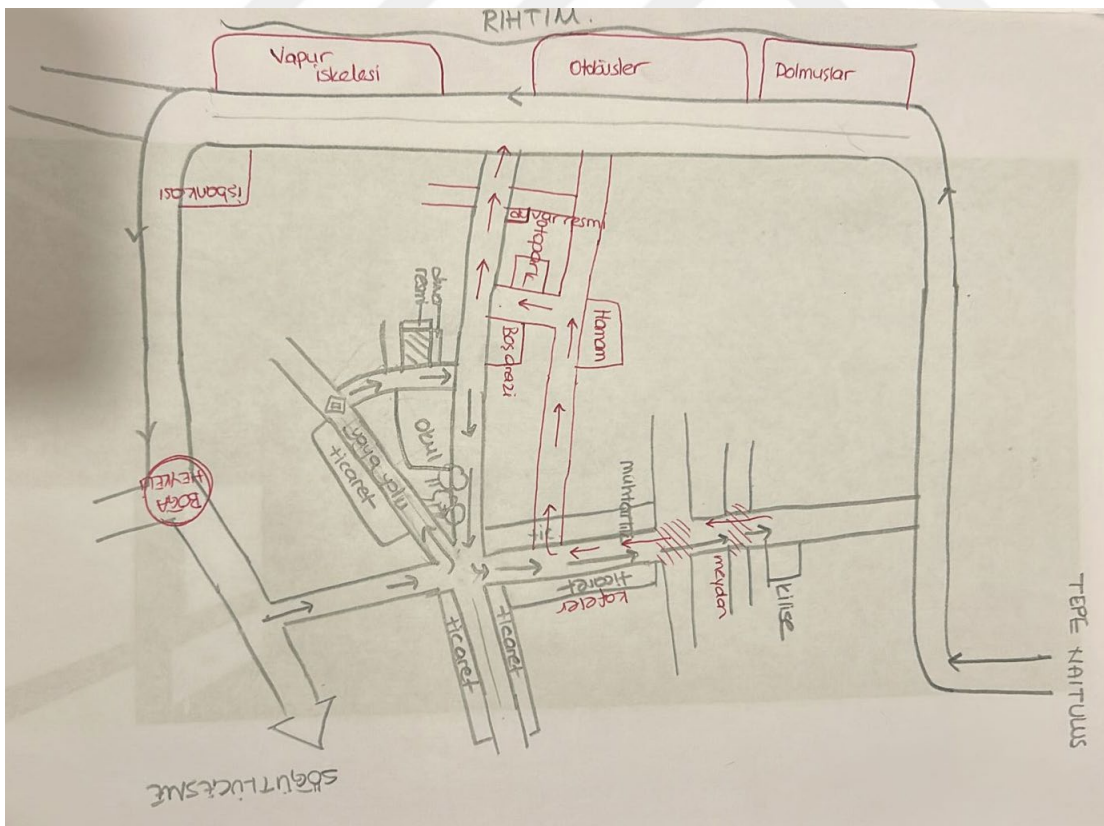


Figure A.14 : D14 cognitive mapping.

APPENDIX B: Cognitive Research Consent Form

Bilgilendirilmiş Onam Formu

İstanbul Teknik Üniversitesi Mimarlık Fakültesi öğretim üyesi **Mehmet Emin ŞALGAMCIOĞLU** tarafından yürütülen **The Effects of Murals as Potential Urban Elements on Wayfinding and a Comprehensive Cognitive Mapping Study/ Exempling of Kadıköy-Yeldeğirmeni** konusunda yürütülen araştırmaya katılımınız rica olunmaktadır. Bu çalışmada katılımınız tamamen gönüllülük esasına dayanır. Lütfen aşağıdaki bilgileri okuyunuz ve katılmaya karar vermeden önce anlamadığınız her hangi bir şey varsa çekinmeden sorunuz.

ÇALIŞMANIN ADI: The Effects of Murals as Potential Urban Elements on Wayfinding and a Comprehensive Cognitive Mapping Study/ Exempling of Kadıköy-Yeldeğirmeni (Potansiyel Kentsel Öğeler Olarak Duvar Resimlerinin Yön Bulmadaki Etkileri ve Bilişsel Haritalama Yoluyla İrdelenmesi/ Kadıköy-Yeldeğirmeni Örnekleme)

ÇALIŞMANIN AMACI: Kentsel bir mekanı ilk kez deneyimlerken zihinde baskınlık kazanan tanımlı sokakların görsel algı olarak kuvvetli olan muralların yön bulmada etkili olduğu düşünülmektedir. Bu çerçevede yapılan bilişsel haritalama çalışmasıyla birlikte kentsel mekanda gezinirken yön bulmada muralların etkili olduğunu saptamak amaçlanmaktadır.

PROSEDÜRLER:

Bu çalışmaya gönüllü katılmak istemeniz halinde yürütülecek çalışmalar şöyledir: Çalışmada katılımcıdan belirlenmiş çalışma alanını yaklaşık olarak 30 dakika gezmesi beklenmektedir. Hiçbir şekilde bir komut verilmeden yapılacak olan bu gezintinin sonucunda katılımcıdan 10 dakikalık bir bilişsel haritalama çıkartması beklenmektedir. Bilişsel haritalama 2 aşama 5'er dakikadan oluşmaktadır. Bir kağıda gezdiği alanı tariflemesi istenmektedir. Hangi yollardan geçtiği, neleri hatırladığının aktarımı olan bir çalışma ortaya koyması hedeflenmektedir. Gezintinin ve bilişsel haritalama çalışmasının sonunda ek olarak alanda gezinirken ilgisini çeken, fotoğrafladığı noktaları da paylaşması beklenmektedir.

OLASI RİSKLER VE RAHATSIZLIKLAR: Yapılacak çalışma herhangi bir fiziksel/psikolojik risk içermemektedir.

TOPLUMA VE/VEYA DENEKLERE OLASI FAYDALARI:

ONAM FORMU TALEP YÖNTEMİ:

☐ yazılı belge ☐ sözlü ☐ sesli kayıt ☐ görüntülü kayıt ☐ çevrimiçi onay

GİZLİLİK:

Bu çalışmayla bağlantılı olarak elde edilen ve sizinle özdeşleşmiş her bilgi gizli kalacak, üçüncü kişilerle paylaşılmayacak ve yalnızca sizin izniniz ile ifşa edilecektir. Gizlilik, tanımlanmış bir kodlama prosedürüyle sağlanacak ve kod çözümüne erişim yalnızca çalışmanın sorumlusu araştırmacıyla sınırlı kalacaktır. Araştırma sonuçları tüm gizlilik ilkelerine uyularak sadece bilimsel çalışmalarda kullanılacaktır. Tüm veriler sınırlı erişime sahip güvenli ve şifreli bir veritabanında tutulacaktır.

(Ekleme istediğiniz var ise lütfen ekleyiniz.)

B.E / M.E.Ş.

Figure B.1 : Cognitive research consent form 1.

KATILIM VE AYRILMA:

Bu çalışmanın içinde olmak isteyip istemediğinize tamamen bağımsız ve etki altında kalmadan karar veriniz. Bu çalışmaya gönüllü olarak katılmaya karar vermeniz halinde dahi, sahip olduğunuz herhangi bir hakkı kaybetmeden veya herhangi bir cezaya maruz kalmadan istediğiniz zaman çekilebilirsiniz.

(Eklemek istediğiniz var ise lütfen ekleyiniz.)

ARAŞTIRMACILARIN KİMLİĞİ:

Bu araştırma ile ilgili herhangi bir sorunuz veya endişeniz varsa, lütfen iletişime geçiniz:

Buse ERKAN
İstanbul Teknik Üniversitesi
Kentsel Tasarım Yüksek Lisans Öğrencisi

Yukarıda açıklanan prosedürleri anladım. Sorularım tatmin olacağım şekilde yanıtlandı ve dilediğim zaman ayrılma hakkım saklı kalmak koşulu ile bu çalışmaya katılmayı onaylıyorum. Bu formun bir kopyası tarafıma verildi.

Tarih:

Katılımcının Adı,Soyadı:

İmzası:

İletişim Bilgileri:

e-posta:

Telefon:

İletişim bilgilerimin diğer araştırmacıların benimle iletişime geçebilmesi için “ortak araştırma havuzuna” aktarılmasını

☐ kabul ediyorum ☐ kabul etmiyorum (lütfen uygun seçeneği işaretleyiniz)

Sorumlu Araştırmacı-Öğretim Üyesi
Lisansüstü Tez Danışmanı : Mehmet Emin ŞALGAMCIOĞLU

İmza

Yardımcı Araştırmacı
Lisansüstü Tez Yürüten Öğrenci: Buse ERKAN

İmza

B.E / M.E.Ş.

Figure B.2 : Cognitive research consent form 2.

CURRICULUM VITAE

Name Surname : Buse ERKAN

EDUCATION :

- **B.Sc.** : 2022, Gebze Technical University, Faculty of Architecture, Department of Architecture

PROFESSIONAL EXPERIENCE AND REWARDS:

- 2024 3DUniversum, Architect

PUBLICATIONS, PRESENTATIONS AND PATENTS ON THE THESIS:

- **Erkan, B., Şalgamcıoğlu, M. E.** 2024: Kentsel Mekanda Algı ve Yön Bulmanın Murallar Üzerinden İncelenmesi. Maltepe University Graduate Research Symposium, May 9-10, 2024 İstanbul, Turkey.
- **Erkan, B., Şalgamcıoğlu, M. E.** 2024. The Effect of Potential Urban Elements on Finding Direction in Urban Space Examplng of Kadıköy- Yeldeğirmeni, İstanbul, Turkey, *Proceedings of the 7th International Symposium on Formal Methods in Architecture*, 179-223