

ISTANBUL TECHNICAL UNIVERSITY ★ GRADUATE SCHOOL

**EFFECTS OF HUMAN SCALE ON WAYFINDING
IN COMMERCIAL AREAS: CASE OF EMINONU-MASLAK
CENTRAL BUSINESS DISTRICT HUBS**



M.Sc. THESIS

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Department of Urban Design

Urban Design Programme

JUNE 2024

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İSTANBUL TEKNİK ÜNİVERSİTESİ ★ LİSANSÜSTÜ EĞİTİM ENSTİTÜSÜ

**TİCARİ ALANLARDA İNSAN ÖLÇEĞİNİN YÖN BULMAYA ETKİLERİ:
EMİNÖNÜ-MASLAK MERKEZ İŞ ALANI MERKEZLERİ ÖRNEĞİ**

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Dedicated to my dear grandmother Sabiha Yılmaz,



FOREWORD

Throughout my academic journey, special thanks to my thesis advisor Assoc. Prof. Dr. Eren KÜRKÇÜOĞLU for guiding me with his vast knowledge and providing comfort during this process. It has been a great pleasure working with him through this thesis journey and I'm so thankful for his patience, contributions, and guidance.

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May 2024

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ABBREVIATIONS

CBD	: Central Bussiness District
ITU	: Istanbul Technical University
m	: Meter
min	: Minute
MIT	: Milli İstihbarat Teşkilatı (National Intelligence Organization)
PTT	: Posta ve Telgraf Teşkilatı (Post and Telegraph Corporation)
TSK	: Türk Silahlı Kuvvetleri (Turkish Armed Forces)
MTA	: Metropolitan Transportation Authority



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EFFECTS OF HUMAN SCALE ON WAYFINDING IN COMMERCIAL AREAS: CASE OF EMINÖNÜ-MASLAK CENTRAL BUSINESS DISTRICT HUBS

SUMMARY

The design of urban areas is a crucial factor that determines human behavior and experience. Particularly in recent years, there has been an increase in efforts to reshape cities with a focus on human-oriented principles. The concept of human scale is one of the fundamental principles of modern urban design, shaping how people perceive the physical environments, move within them, and interact with them. Human-oriented design aims to ensure that the built environment is compatible with human needs and experiences. In this context, the concept of "wayfinding" emerges as a significant aspect of the built environment in response to the essential need for individuals to navigate spaces effectively. Wayfinding refers to the process of orientation and movement within a space, and when applied effectively, it enhances pedestrian accessibility, safety, and experience. The thesis aims to contribute to understanding how urban spaces can be designed in terms of scale by examining the impact of wayfinding and human scale in urban areas.

The study investigates the effects of human scale on wayfinding in commercial areas, focusing on the examples of Eminönü and Maslak Central Business Districts (CBD) in Istanbul. The combination of these two concepts provides a significant ground for understanding how people experience complex urban environments and how they can navigate these areas more comfortably in bustling commercial districts like Eminönü and Maslak.

The thesis aims to explore how pedestrian wayfinding skills in urban areas can be correlated with environmental scale, how pedestrian wayfinding behavior differs from one scale to another within the human scale, and which scale provides a clearer sense of direction. Additionally, it deeply examines how urban elements affect pedestrian wayfinding behavior and scale perception.

The research methodology adopts a mixed approach combining qualitative and quantitative methods, including spatial analyses, field studies, and numerical calculations. The physical characteristics of the study areas are presented in detail through analyses such as land use, figure-ground relationship, urban elements, and street closure. Eminönü and Maslak, as the two major commercial centers of Istanbul, are selected for their distinct characteristics and their roles as interconnected endpoints of Istanbul's main commercial axis.

The analysis of subject routes revealed that in both Eminönü and Maslak, subjects tended to choose main routes based on factors such as street width, building height, and street closure. They typically started walking from open areas and proceeded by choosing streets with higher enclosure ratio. Moreover, subjects who started walking from higher elevations were inferred to have better perception and visibility toward their destination endpoint.

Another significant finding is that streets with high enclosure ratio, in the human scale, contribute to enhancing individuals' wayfinding skills and spatial perception. Participants in both study areas comprehensively perceived the enclosure/scale of the area during their walks. When comparing walking speeds of participants in Eminönü and Maslak, it was observed that due to the high enclosure ratio, walking speed was slower in Eminönü. Conversely, participants in Maslak walked faster and found their directions more comfortably.

In conclusion, data obtained from participant field study suggest that the scale of urban areas is inversely related to pedestrian movement speed and wayfinding skills, open and expansive spaces facilitate wayfinding/perception, urban spaces at the human scale strengthen direction perception/skills, and specific urban elements restrict pedestrian movement and reduce spatial perception. These findings propose design strategies for the urban design domain aiming to enhance residents' quality of life and make cities more sustainable, such as creating open spaces, providing perspectives from elevated points, and minimizing obstructive elements.

Keywords: wayfinding, human scale, street enclosure, spatial perception, orientation, Eminönü, Maslak.

TİCARİ ALANLARDA İNSAN ÖLÇEĞİNİN YÖN BULMAYA ETKİLERİ: EMİNÖNÜ-MASLAK MERKEZ İŞ ALANI MERKEZLERİ ÖRNEĞİ

ÖZET

Kentsel alanların tasarımı, insan davranışını ve deneyimini belirleyen önemli bir faktördür. Özellikle son yıllarda, kentlerin insan odaklı olarak yeniden şekillendirilmesine yönelik çalışmalarda artış gözlenmektedir. Bu dönüşüm sürecinde, yerleşim yerlerinin yaya dostu olması ve bireylerin rahat, güvenli ve erişilebilir bir çevrede yaşamaları ön planda tutulmaktadır. İnsan ölçeği kavramı, modern kentsel tasarımın temel ilkelerinden biridir ve insanların fiziksel çevrelerini algılama, bu çevrelerde hareket etme ve bu çevrelerle etkileşim kurma biçimlerini şekillendirir. İnsan merkezli kent planlamasının temel prensiplerinden biri olan "insan ölçeği" kavramı, yapılan çevrenin insan ihtiyaçları ve deneyimleriyle uyumlu olmasını hedefler. Bu noktada yapılı çevrede kişilerin duyduğu önemli ihtiyaçlar arasında “yön bulma” kavramı oldukça önemli bir kavram olarak karşımıza çıkmaktadır. Yön bulma, bir mekan içerisinde yönelme ve bir noktadan diğerine ulaşma hareketini ifade eder ve etkili bir şekilde uygulandığında yaya erişilebilirliğini, güvenliğini ve deneyimini artırır. Yapılan tez çalışması, yön bulma eylemi ile insan ölçeği kavramının kentsel alanlardaki etkisini inceleyerek, kentsel mekanların ölçek bağlamında nasıl tasarlanabileceği konusunda katkı sağlamayı amaçlamaktadır.

Yapılan çalışma, insan ölçeğinin ticari alanlarda yön bulma üzerindeki etkilerini, İstanbul'un Eminönü ve Maslak Merkezi İş Alanları (MİA) merkezleri örneğinde incelemektedir. Yön bulma, fiziksel mekanlarda gezinme ve hedefe ulaşma sürecini ifade ederken, insan ölçeği, insan kullanımı için uygun oran ve boyutlarda tasarım yapmayı ifade eder. Bu iki kavramın birleşimi, yoğun ticari faaliyetlerin gerçekleştiği Eminönü ve Maslak gibi alanlarda, insanların karmaşık kentsel ortamları nasıl deneyimlediğini ve bu alanlarda nasıl daha rahat hedefe yönelme gerçekleştirebileceğini anlamak için önemli bir zemin sağlar.

Buradaki temel amaç, insan ölçeğinin ticari bölgelerde yön bulma eylemi ve deneyimi üzerindeki etkilerini analiz etmektir. Yapılan tez çalışması, yaya yön bulma becerilerinin kentsel alanlardaki çevresel ölçekle nasıl ilişkilendirilebileceğini, insan ölçeğinde yaya yön bulma davranışının bu ölçeğin ötesindeki alanlardaki davranıştan nasıl farklılaştığını ve hangi ölçeğin daha net bir yön algısı sağladığını incelemeyi amaçlamaktadır. Ayrıca, kentsel unsurların yaya yön bulma davranışını ve ölçek algısını nasıl etkilediğini de derinlemesine incelemektedir. Bu sorulara yanıt arayarak çalışma, kentsel tasarım ve kullanıcı deneyimi üzerine daha geniş bir tartışmaya katkıda bulunmayı hedeflemektedir.

Çalışma, İstanbul'un iki önemli ticari merkezi olan Eminönü ve Maslak'ın mekansal gelişimlerini kapsamaktadır. Bu iki çalışma alanı, hem farklı ölçeklerde iki alan olması hem yoğun ve önemli ticari faaliyetleri barındırması, hem de İstanbul'un ana ticaret aksının-omurgasının iki uç bağlantılı noktası olması sebebiyle çalışma alanı olarak seçilmiştir. Eminönü'nün merkezi konumu metro, vapur, tramvay ve otobüs hatlarıyla

güçlü ulaşım bağlantılarına sahipken, Maslak, İstanbul Teknik Üniversitesi'nin ana yerleşkesi gibi önemli yapılarıyla ve Büyükdere Caddesi üzerindeki ana ulaşım güzergahlarıyla karşımıza çıkmaktadır. Tarihi bağlamı ve yoğun kentsel dokusuyla Eminönü, 90'larda küçük bir köyden modern ve çok katlı yapılaşmaya evrilen Maslak ile keskin bir tezat oluşturarak, farklı kentsel ölçeklerin yön bulma davranışı üzerindeki etkilerini karşılaştırmalı olarak anlamamıza olanak tanımaktadır.

Araştırma metodolojisi, niteliksel ve niceliksel yöntemleri bir araya getiren karma bir yaklaşımdır. Mekansal analizleri, denek çalışmalarını ve numerik hesaplamaları içermektedir. Araştırmada arazi kullanım, figür-zemin ilişkisi, kentsel öğeler ve sokak kapalılığı gibi analizlerle çalışma alanlarının fiziksel özellikleri ayrıntılı bir şekilde sunulmuştur. Eminönü ve Maslak çalışma alanları, çeşitli kentsel özellikler açısından farklılıklar göstermektedir. Eminönü, tarihi ve ticari önemi nedeniyle dar sokakları bitişik nizam yapılarıyla dikkat çekerken, Maslak modern bir iş bölgesi olarak dağınık yüksek binalar ve geniş caddelerle tanımlanmaktadır. Eminönü, tarihi ve dini simge yapılarıyla zengin bir kentsel dokuya sahiptir. Bu bölgenin dar sokakları, yaya faaliyetlerini teşvik etmekte, ancak aynı zamanda kullanıcılarda karmaşık bir kentsel algı yaratmaktadır. Maslak ise finans merkezi rolünü yerine getiren geniş caddeleri ve yüksek binalarıyla araç öncelikli bir alandır ve kullanıcılara dağınık bir kentsel yapı sunar. Eminönü'nde orta yükseklikte binalar baskınken, Maslak'ta yüksek binaların ağırlıkta olduğu görülmektedir. Yapılan tez çalışmasının kilit analizi olan sokak kapalılığı ise, iki alanın farklı ölçek ve kapalılık farklılıklarını ortaya koymaktadır. Eminönü genelindeki sokaklarda insan ölçeğiyle örtüşen yüksek kapalılık oranları görülürken, Maslak'taki sokaklarda ise oldukça düşük kapalılık oranı görülmektedir. Bu analizler, Eminönü'nün daha insan odaklı ve yaya dostu bir yapıya sahip olduğunu, Maslak'ın ise daha araç odaklı ve açık kentsel alanlarla tanımlandığını ortaya koymaktadır.

Araştırmanın alan çalışması kapsamında, kentsel ticari alanlarda insan ölçeği ile yön bulma arasındaki ilişkiyi incelemek amacıyla, hafta içi öğleden sonraları ve güneşli/açık havalarda denek grubu çalışması gerçekleştirilmiştir. Bu çalışma, daha önce bu alanlarda bulunmamış veya sadece bir kez ziyaret etmiş, alana aşina olmayan 60 denek (Eminönü'de 30 katılımcı, Maslak'ta 30 katılımcı) ile gerçekleştirilmiştir. Çalışmanın denek grubu büyüklüğü çalışma alanlarında yapılan yaya sayımı doğrultusunda hesaplanmıştır. Bu yoğunluklara göre denek katılımcı sayısı, her iki alanda da yaklaşık olarak yaya yoğunluğunun yaklaşık %1'i alınarak belirlenmiştir. Çalışma kapsamında katılımcıların kişisel verileri çalışmaya dahil edilmemiş ve deneklerin çalışma alanlarında izledikleri rotalara dayanan çıkarımlara odaklanılmıştır. Bu nedenle çalışmada katılımcıların sadece cinsiyet, yaş ve eğitim düzeyi dağılımı verilmiştir.

Alan çalışmasının senaryosunda, deneklerin yön bulma hareketlerini gerçekleştirebilmeleri için çalışma alanlarının dinamikleri doğrultusunda bir başlangıç ve bitiş noktası (A ve B) belirlenmiştir. Her iki çalışma alanında da 15 denek A noktasından B noktasına, diğer 15 denek ise B noktasından A noktasına yani tam tersi şekilde yürütülmüştür. Denek çalışması boyunca, çalışma formu yalnızca araştırma sahibinin elinde bulunmuş ve çıktılarını kendisi not etmiştir. Çalışma kapsamında deneklerin izlediği rota, yürüme süreleri ve tercih ettikleri sokaklara verdikleri puanlar forma işlenmiştir. Yapılan denek çalışması sonucunda katılımcıların izlediği yön bulma hareketleri gözlenmiş ve araştırma kapsamında detaylı olarak analiz edilmiştir.

Yapılan denek sonuçları incelendiğinde, Eminönü ve Maslak çalışma alanlarında deneklerin yön bulma tercihlerinde belirli eğilimler gözlemlenmiştir. Eminönü'nde, tercih edilen sokakların çoğu, alanın merkez kısmında bulunmakta olup, denek rota tercihleri belirli bir bölgede yoğunlaşmıştır. Denekler genellikle ana güzergahları tercih etmiş ve tercihlerini sokak genişliği, bina yüksekliği ve sokak kapalılık oranı gibi faktörlere dayandırarak gerçekleştirmişlerdir. Benzer şekilde, Maslak'ta da deneklerin tercihleri ana güzergahlar üzerinde yoğunlaşmış ve denekler belirli sokak profillerini tercih etmişlerdir. Eminönü'nde, denekler açık alanlardan yürümeye başlayıp yüksek kapalılık oranına sahip sokakları tercih ederek ilerlemişlerdir. Maslak'ta da bu durum çok benzer gözlenmiştir. Ayrıca, denek rotalarından, yüksek kottan yürümeye başlayan deneklerin, hedefe ulaşma konusunda daha iyi bir algıya ve görüş açısına sahip olduğu çıkarımı da yapılmıştır.

Çalışmadaki bir diğer önemli bulgu ise, yüksek kapalılık oranına sahip insan ölçeğindeki sokakların, kişilerin yön bulma becerilerini geliştirmelerine ve alanı daha üst ölçekte algılamalarına katkıda bulunması olarak karşımıza çıkmaktadır. Her iki çalışma alanında da, denekler yürüyüşleri sırasında bir sokaktan diğerine geçişte alanın kapalılığını/ölçeğini bütüncül olarak algılamış ve sokakları birbiriyle bağlantılı olarak benzer kapalılıkta puanlamıştır. Bu noktada, belirli bir sokaktaki kapalılık hissiyatının ardışık sokaklarda devam ettiğini ve takip eden sokaklarla şekillendiği çıkarımı yapılmıştır. Her iki bölgede de hiç seçilmeyen sokaklar genellikle çıkmaz sokaklar veya bölgenin baskın sokak profili dışındaki sokaklar olarak gözlenmiştir. Eminönü ve Maslak çalışma alanlarında deneklerin yürüme hızları karşılaştırıldığında, yüksek kapalılık oranı nedeniyle Eminönü'nde yürüme hızının daha yavaş olduğu görülmüştür. Buna karşılık, Maslak'ta denekler daha hızlı yürümüş ve daha rahat yönlerini bulmuşlardır. Alanın ölçeğini/kapalılığını olumsuz etkileyen faktörler arasında, Eminönü'nde banklar, sandalyeler, bayraklar ve dükkan levhaları gibi unsurlar, Maslak'ta ise inşaat alanları etrafındaki bariyerler ve yol üstü park edilmiş araçlar yer almaktadır. Ayrıca, Eminönü'nde kısa sokaklar ve açık renkli binalar, Maslak'ta geniş kaldırımlar ve gün ışığı, alanın kapalılık hissiyatını azaltan faktörler olarak denekler tarafından belirtilmiştir.

Sonuç olarak, deneklerle gerçekleştirilen alan çalışmalarından elde edilen veriler, kentsel alanların ölçeğinin yaya hareket hızı ve yön bulma becerileriyle ters orantılı olduğunu, açık ve geniş alanların yön bulmayı/algılamayı kolaylaştırdığını, insan ölçeğindeki alanların yön algısını/becerisini güçlendirdiğini ve belirli kentsel öğelerin yaya alanını kısıtladığı durumlarda mekansal algıyı azalttığını göstermiştir. Bu bulgular, kentsel tasarım alanına, kent sakinlerinin yaşam kalitesini artırmak ve kentleri daha sürdürülebilir hale getirmek için, açık alanların yaratılması, yüksek noktalardan perspektif sağlanması ve hareketi unsurların azaltılması gibi tasarım stratejileri önermektedir. Bu öneriler, kent mekanlarının daha tanımlı, yönlendirici ve yaya dostu hale getirilmesine katkı sağlamayı amaçlamaktadır. Bu çalışma, gelecekteki kentsel planlama ve tasarım projelerine yön verecek önemli bir kaynak olarak değerlendirilebilir.

Anahtar Kelimeler: yön bulma, insan ölçeği, sokak kapalılığı, mekansal algı, yönelme, Eminönü, Maslak.



1. INTRODUCTION

The complex and dynamic interactions that exist between people and their urban environments are referred to as city and human relationships. Cities are social constructions that shape individuals' behavior, attitudes, and identities in addition to being physical environments. A city's culture, history, politics, economy, and technology all impact how individuals interact with their environment. To design urban environments that are sustainable, livable, and inclusive, it is important to understand the link between people and cities. Individuals' perception and sense of belonging to the place they live are the results of their relationship with the environment/city. According to Relph (1976), a sense of place is "an essential component of human experience" that helps individuals to understand their relationship with the environment. The term "sense of place" refers to people's psychological and emotional ties to a specific place. Having a sense of place vision, also known as spatial awareness or spatial perception, is the ability to understand and navigate the three-dimensional world around us.

Humans have developed complex cognitive procedures that allow them to perceive, interpret, and navigate the physical environment. The role of managing sensory inputs consists of vision, hearing, touch, and proprioception (the awareness of one's own position and movement) with higher-level mental processes like memory, attention, and decision. Wayfinding is one of the terms that comes when managing sensory inputs and perceiving the space. It is a process of using spatial and environmental cues to navigate from one location to another (Arthur & Passini, 1992). Through the use of landmarks, maps, or other cues, humans have used wayfinding methods to navigate their environment for thousands of years. These methods are important because they help to educate and inform individuals about their new surroundings to assist them in getting familiar with the features, services, and functions of the areas they are in (Lynch, 1960).

There are some factors such as environmental cues, and cognitive, emotional, cultural, and physical factors that affect wayfinding. But wayfinding is also a concern for those

who live, work, and visit complex facilities and outdoor environments (Carpman & Grant, 2002). The absence of strong images in urban spaces reduces spatial legibility, comprehensibility, and imaginability making it difficult for users to navigate and move. Establishing environments that are meaningful, memorable, and unique, is usually applied in urban planning and architecture. The arrangement of buildings, streets, public spaces, and infrastructure are all examples of the built environment's physical features, which are known as urban texture. While developing/planning commercial areas physically, the presence of the guide elements and characteristic/remarkable elements in the urban texture allows people to move fluently and confidently.

The concept of “human scale” is closely related to the concept of “wayfinding” and it is an important concept in the design of built environments. Human scale refers to the size and proportion of buildings, streets, and other elements of the built environment designed to be comfortable and accessible to people. Human-scale design prioritizes the needs and experiences of people by creating spaces that are easy to navigate, aesthetically pleasing, and conducive to social interaction. This approach enhances the overall functionality and livability of urban areas (Gehl, 2010).

As wayfinding refers to the process of navigating a space using physical cues and other information to find one's way, the two concepts are closely related. From this point of view, it is thought that different scaled elements in urban areas are an effective feature of wayfinding.

1.1 Aim, Research Problem and Research Questions

This study attempts to explore the main title of human-environment interaction, the perception of the sense of way, spatial perception, and a movement to reach a certain start and destination point in the urban environment from the perspective of the human scale.

The main aim of this study is to examine how the human scale impact wayfinding in commercial areas. By examining the relationship between the size and proportion of built environment elements and the ease with which individuals navigate these spaces.

In this context, it is aimed to seek answers to the following research questions:

- How can pedestrians' wayfinding skills in urban areas be correlated with the scale of the environment?
 - How does pedestrians' wayfinding behavior in urban areas at a human scale differ from behavior in areas beyond this scale? Which scale facilitates a clearer perception of direction?
 - How do urban elements affect pedestrians' wayfinding behavior and perception of scale?

1.2 Scope of the Research

This study focuses on human and environment interaction and examines how the human scale affects wayfinding and pedestrian behaviour. Research study structured around three main parts; wayfinding, human scale, and the relationship between wayfinding and human scale. In the first part, the study explores wayfinding by examining its role within urban scale, reviewing relevant theories, analyzing cities designed wayfinding-oriented, and investigating the interaction between wayfinding and commercial areas. In the second part, the study explores into the concept of human scale by investigating its integration with the city, exploring related theories and concepts, analyzing human-oriented cities, examining the link between human scale and street enclosure, and understanding its impact on commercial areas.

And in the last part, the study focuses on the relationship between wayfinding and human scale, aiming to uncover how these two aspects interact and influence each other in urban environments. By addressing these themes, the study seeks to provide a comprehensive understanding of how human scale influences pedestrian behavior and wayfinding, with a particular focus on commercial areas.

Two study areas were selected for field study: Eminönü and Maslak, representing the starting and ending points of Istanbul's CBD axis. These areas exhibit distinct scale attributes from a human perspective. The selection of Eminönü and Maslak provides a comprehensive comparison of different urban textures and scales. Eminönü represents the historical and traditional urban fabric with narrow streets and dense pedestrian activity, while Maslak exemplifies modern commercial development with

wide streets and high-rise buildings. This contrast allows for a detailed examination of how urban scale and texture influence pedestrian wayfinding.

The study primarily focuses on pedestrian movement due to the commercial nature of the selected areas. Eminönü, with its historical streets, has limited vehicular traffic, creating a pedestrian-dominated environment. Despite being a modern commercial hub, Maslak also experiences significant pedestrian activity, especially around business centers and commercial complexes. Based on the observation that both areas, though different in their urban texture, share a common feature of high pedestrian density, making them ideal for studying pedestrian wayfinding.

The focus on wayfinding in commercial areas addresses a critical aspect of modern urban design. In the 1960s, pedestrian pathways were a central concern, but, with the development of the CBD axis, contemporary developments often prioritize vehicular traffic and commercial interests. In this study, Eminönü represents the early pedestrian activities and Maslak represents the development of these activities. The study aims to shed light on how this shift has affected pedestrian experiences and wayfinding.

1.3 Research Methodology

The thesis study has been built on the foundations of human and environment interaction and human scale on wayfinding and has been shaped on concepts from different disciplines such as urban and regional planning, urban design and psychology. In this context, the methods used in the study are given in five main stages (Figure 1.1).

In the first stage, study areas were identified and their locations, boundaries, and interactions with surrounding areas were examined. The historical and spatial characteristics of each area were also explored, focusing on changes over time and the reasons behind them, including socio-economic and cultural factors.

In the second stage, the urban pattern attributes of the study areas were analyzed to understand their dynamics and provide a basis for field studies. The analyses included Land Use, Figure-Ground, Urban Elements, Landscape and Landmarks, Street Width, Building Height, and Street Enclosure. Land Use Analysis examined ground floor usage, while Figure-Ground Analysis visualized building density and open space.

Urban Elements Analysis incorporated Lynch's five elements, evaluating landscape features and symbolic structures. Street Width and Building Height Analyses informed the Street Enclosure Analysis, crucial for understanding perceived scale. The results highlighted significant differences and similarities between the study areas.

In the third stage, the main scenario and details of the subject study were given. Pedestrian counts and density were used to determine the size of the subject group. The starting and ending points for the wayfinding scenario were decided based on previous analyses. The specifics of when and how subjects would walk, including the days, times, and scenarios, were detailed in this part. The study involved 60 subjects on sunny weekday afternoons. Personal data were excluded, focusing on the routes taken. Only the gender, age, and education distribution of the subjects were provided.

In the fourth stage, the subjects' walked routes were examined and categorized into five main parts: choices of links/streets, main routes, dominant side routes, side effects impacting the sense of enclosure, and never chosen links/streets. These detailed analyses provided insights into the subjects' wayfinding preferences and revealed how the spatial characteristics and scale of the study areas influenced their preferences.

In the fifth and final stage, the evaluations of the results of testing the wayfinding and human scale concepts at different scales were handled holistically.

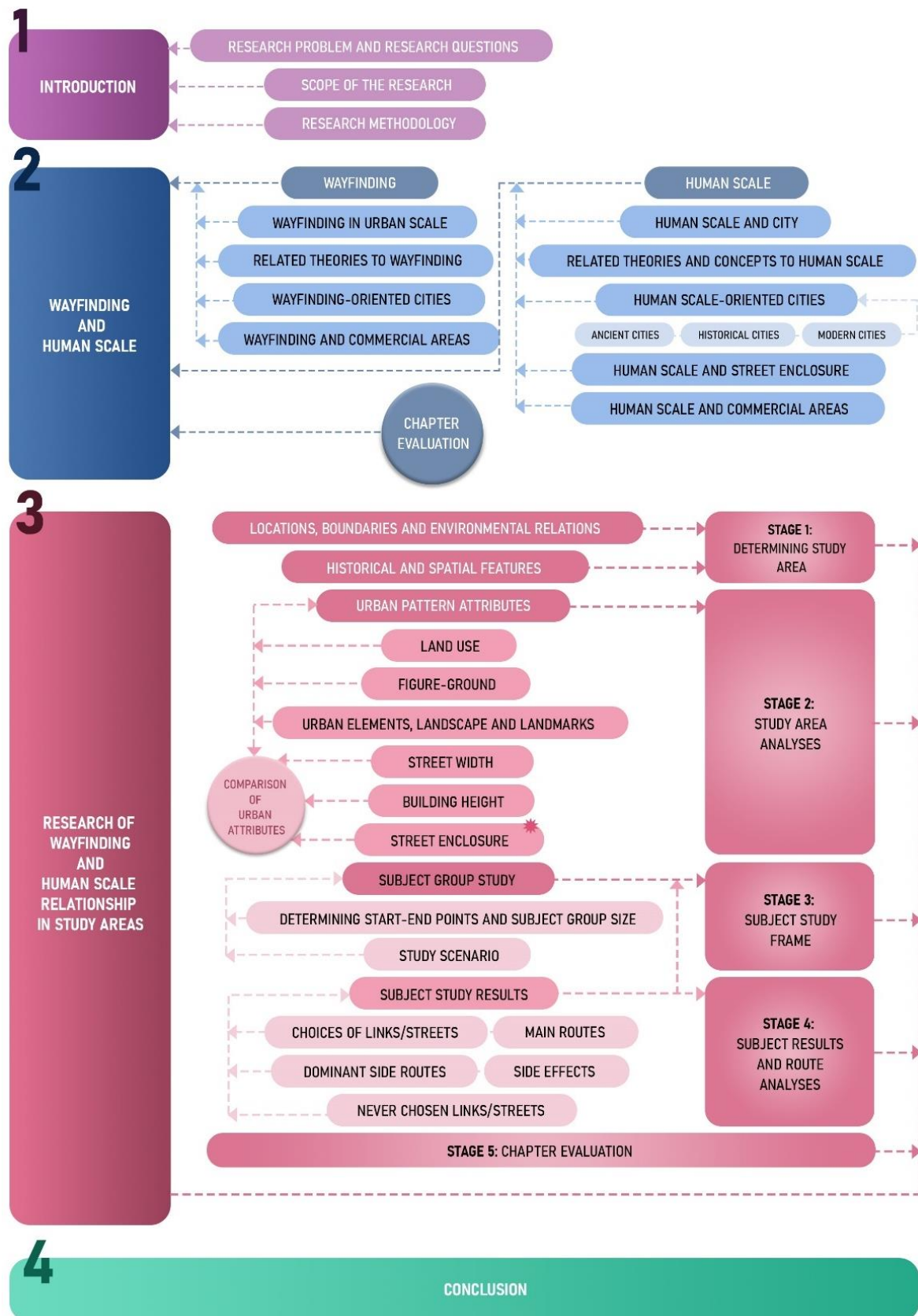


Figure 1.1 : Methodology of the study.

2. WAYFINDING AND HUMAN SCALE

Human behavior and experience are significantly affected by the design of urban areas. There has been an increasing interest in developing more human-centered cities in recent years, with an emphasis on constructing places that are comfortable, safe, and accessible for pedestrians. A crucial feature of urban planning that is closely related to the human-centered cities is wayfinding. The process of orienting oneself throughout a space and navigating from one point to another is referred to as wayfinding. Effective wayfinding can improve pedestrian accessibility, safety, and overall experience (Gehl, 2010). An important approach that effecting wayfinding is the human scale concept, which prioritizes the needs and experiences of persons within the built environment (Salingaros, 2019). The human scale concept, at its foundation, attempts to construct cities that are proportional to humans, both in terms of physical size and sensory experience. This involves constructing buildings, streetscapes, and gathering places that are neither too large nor too overwhelming, but rather fit easily around people and foster interaction and community.

In the first section of the theoretical background, wayfinding examined by its role within the urban scale, relevant theories reviewed, and cities designed wayfinding-oriented analyzed in detailed. In the second part, the concept of human scale examined by its integration within the city, related theories and concepts explored, human-oriented cities analyzed, and the link between human scale and street enclosure examined in detailed.

And final part focused on the relationship between wayfinding and human scale, aimed to uncover how these two aspects interact and influence each other in commercial areas. By addressing these, the study aims to provide a comprehensive understanding of wayfinding and human scale concepts.

2.1 Wayfinding

Wayfinding is a widely discussed and referenced concept in numerous fields, including architecture, interior design, urban planning, and landscape architecture. It refers to the cognitive and physical processes that individuals utilize to navigate and orient themselves in the built environment (Passini, 1984). A wayfinding system can have a substantial impact on the operation, accessibility, and user experience of constructed places.

Wayfinding is critical in architecture for developing buildings and structures that are easy to navigate and understand for residents and visitors. The placement of entrances and exits, clear signage, sensible circulation patterns, and visual cues are all important factors in navigating people around a facility (Norman, 2013). Hospitals, airports, and major commercial complexes, for example, frequently necessitate thorough wayfinding planning to assist individuals in navigating complicated and multi-level locations (Wayfinding Systems Australia, 2020) (Figure 2.1).



Figure 2.1 : Wayfinding at the airport (Url-1).

The importance of navigation in establishing pedestrian-friendly cities and enhancing walkability is also emphasized in urban planning. Streetscapes, sidewalks, and public areas with clear signage and landmarks can improve urban environments' navigability and safety, encouraging people to walk and explore their surroundings (Gehl, 2010) (Figure 2.2). Furthermore, by providing clear routes and instructions for pedestrians and cyclists, wayfinding can play an important role in promoting sustainable

transportation options such as walking and cycling (National Association of City Transportation Officials, 2016).



Figure 2.2 : Outdoor wayfinding (Url-2).

Wayfinding design is critical in interior design because it guides people through complicated interior spaces such as commercial buildings, educational institutions, and healthcare facilities. Individuals may easily navigate large and complicated environments with clear signage, sensible circulation patterns, and cautious placement of landmarks (Woolley, 2017) (Figure 2.3). Wayfinding can also be utilized as a strategic tool in hospitality and retail environments to guide clients through a location, promote discovery, and improve the overall experience (O'Reilly, 2018).

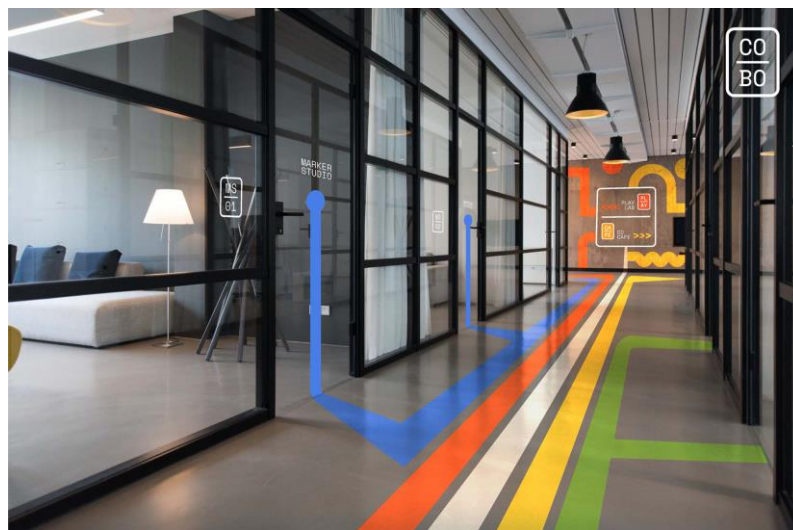


Figure 2.3 : Interior wayfinding (Url-3).

Similarly, wayfinding is crucial in landscape architecture for establishing accessible and user-friendly outdoor places. Parks, public plazas, and recreational places frequently necessitate effective wayfinding systems to direct visitors to various sites of interest, services, and facilities (Crompton, 2001) (Figure 2.4). Signage, maps, and landmarks can all help to create a sense of place and improve the overall user experience in outdoor locations.



Figure 2.4 : Wayfinding in a park (Url-4).

2.1.1 Wayfinding in urban scale

Wayfinding is a key component of urban design that seeks to create a system that assists individuals in navigating complex urban areas. A good wayfinding system, according to Petrucci (2018), improves the navigability of a city, decreases tension and anxiety, and improves accessibility for all users, particularly those with disabilities or limited mobility. It entails the examination and study of many parts of the built environment, such as signs, landmarks, and physical features, in order to construct a comprehensive wayfinding system that allows people to easily navigate a city.

Wayfinding can assist in identifying potential navigation and accessibility challenges in the urban environment. According to Passini (1984), a good system could reduce the confusion involved with moving through unknown places, hence increasing the quality of life for city dwellers. It also encourages accessibility because people can find their way to their chosen location quickly. This is especially crucial for persons with disabilities or restricted mobility, who may require extra assistance navigating the city.

According to Schwantes and O'Brien (2011), urban planners can evaluate the built environment to identify problematic locations and propose solutions to improve wayfinding and accessibility. Adding clear signage, landmarks, and physical elements can assist in guiding people through new parts of a city while also making the experience more enjoyable (Figure 2.5). Another essential component of wayfinding analysis is taking into account the requirements and abilities of various user groups.



Figure 2.5 : Example of urban wayfinding (Url-5).

According to Lynch (1960), urban planners must address the different needs of the community, including those with disabilities, the elderly, and children, in order to ensure that the navigation system is accessible to all. To accommodate users with visual or hearing disabilities, alternate signage, tactile maps, or audio instructions can be created.

Furthermore, wayfinding analysis may assist in the improvement of urban safety. Wayfinding systems, according to Büyüköztürk and Saraltun (2020), can assist in preventing accidents and create a safer environment by offering clear directions and indicating potential risks, such as uneven terrain or steep inclines.

In conclusion, wayfinding is an essential component of urban design that assists people in navigating complex urban areas. A well-planned navigation system can improve accessibility, decrease tension and anxiety, and promote safety. Urban planners may create a comprehensive wayfinding system that is accessible to all users by considering the different needs of the people, making cities more pleasurable and navigable for everyone.

2.1.2 Related theories to wayfinding

Wayfinding is a complex cognitive process that involves understanding and navigating through the environment. Several theories provide insights into how people perceive, interpret, and navigate spaces. These theories include Gestalt Theory, which emphasizes the holistic perception of environmental elements; Template Theory, which focuses on matching sensory input with pre-existing mental templates; Constructivist Theory, which highlights the active construction of mental representations based on prior knowledge; Kevin Lynch's Theory, which stresses the importance of urban legibility and the creation of mental maps; Cognitive Map Theory, which describes internal spatial representations used for navigation; and Siegel and White's Theory, which outlines the stages of acquiring spatial knowledge through landmarks, routes, and surveys. Together, these theories offer a comprehensive understanding of the cognitive processes underlying wayfinding and inform the design of more navigable urban environments.

Gestalt Theory

The gestalt psychology movement offers an interesting perception on how perception and cognition work (Wertheimer, 1923). According to a set of concepts outlined in this theory, people perceive numerous aspects in their surroundings by grouping them together and viewing them as a single, cohesive whole. Gestalt psychology holds that our minds instinctively group sensory information into coherent patterns, which enables us to recognize and understand complicated sights efficiently (Figure 2.6). This idea states that people perceive and navigate their surroundings based on the holistic organization of environmental aspects, as compared to viewing them as separate, unrelated elements, when it comes to wayfinding.

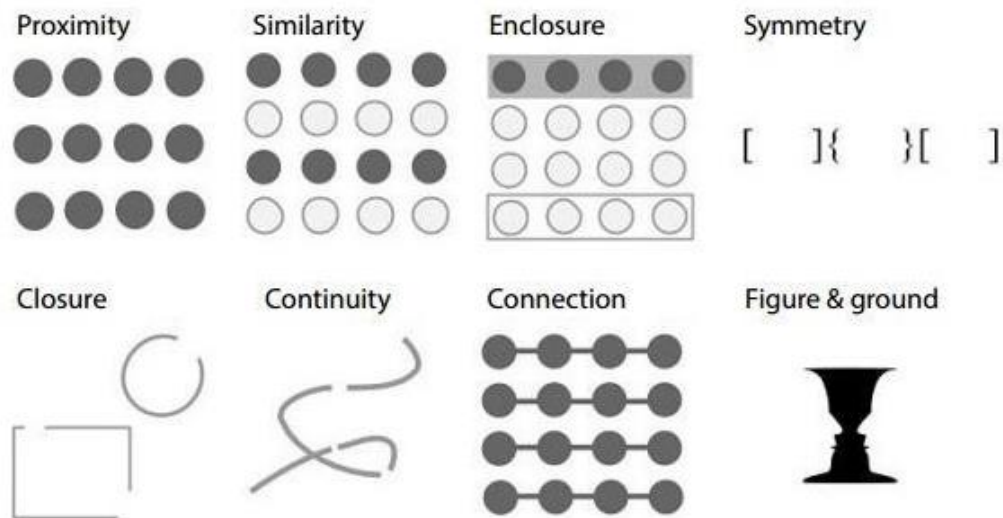


Figure 2.6 : Gestalt principles (Url-6).

Urban planners and designers can create surroundings that take advantage of people's fundamental cognitive desires, improving comprehension and encouraging simple navigation for both locals and visitors, by embracing the ideas from the Gestalt Theory (Koffka, 1935).

Template Theory

According to the template theory, which Neisser put forth in 1967, the process of matching sensory data with pre-existing mental templates, often referred to as schemata, is what allows people to perceive patterns in their surroundings. According to Neisser, schemas are cognitive building blocks that are essential to the perceiving process. These mental templates serve as models or idealized representations of well-known objects, patterns, or concepts. People compare incoming sensory information to these pre-established schemata when they are presented with sensory inputs, which enables them to quickly detect and evaluate the surroundings depending on how similar it is to these mental templates (Neisser, 1967). For instance, when navigating through an urban area, people may quickly recognize and get oriented by comparing the distinctive architecture of a well-known landmark with their mental model of that landmark. The significance of template theory goes beyond wayfinding as it affects other aspects of cognitive processing and human perception, leading to a better understanding of how people perceive and interact with their environment (Wright, 2017). Researchers and practitioners can improve legibility, spatial comprehension, and overall user experience in various settings, from urban planning to user interface

design, by designing environments that correspond with people's existing schemata (Figure 2.7).

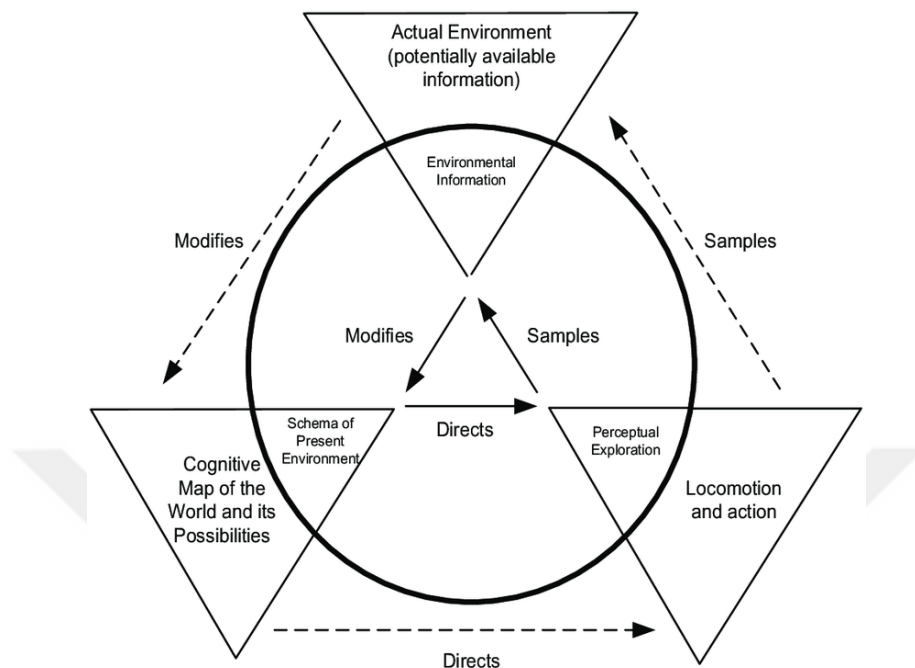


Figure 2.7 : Neisser's perceptual cycle model (Salmon et al., 2018).

By recognizing the significance of mental templates in perception, researchers and practitioners can. Throughout considering this, template theory is a useful paradigm for examining the complex dynamics of human perception and cognition in a variety of environments.

Constructivist Theory

As applied to wayfinding, constructivist theory emphasizes the active cognitive processes required in connecting sensory input from the environment with individuals' previous knowledge and conceptual frameworks. When navigating unfamiliar circumstances, humans actively engage in the interpretation and structuring of sensory inputs based on previous experiences and mental models, according to Gregory (1980). This dynamic interaction between incoming sensory input and pre-existing knowledge allows individuals to build meaningful mental representations of their surroundings, allowing for precise navigation and orientation. Recognizing the constructive nature of wayfinding allows urban planners and designers to develop surroundings that respond to individuals' cognitive processes while also improving readability and

ensuring efficient navigation experiences. Furthermore, constructivist theory emphasizes the significance of perceiving users as active actors in their wayfinding trip, supporting the development of user-centered wayfinding systems that accept varied mental models and prior experiences (Norman, 1986).

Designers can foster a deeper awareness of how people interact with their surroundings by considering the constructive character of wayfinding, leading to the establishment of easier to navigate and user-friendly urban landscapes. Thus, constructivist theory provides essential insights that may be applied to the design of wayfinding systems, ensuring that people are able to navigate and understand complicated urban landscapes successfully.

Kevin Lynch's Theory

Lynch's wayfinding approach is concentrated on the significant impact that the legibility and character of the urban environment had on the cognitive process of constructing mental maps during navigation. Lynch claims that a readable city combines identifiable patterns of symbols in a systematic manner, enabling people to easily recognize and group landmarks, roads, and other components of the urban fabric. People can create mental maps that help them with orientation and wayfinding by comprehending and interpreting the urban environment as a coherent and meaningful whole. Such readability improves spatial cognition and makes navigating the urban environment more efficient and natural (Lynch, 1960).

Cognitive Map

Tolman's cognitive map theory is very essential to the concept of wayfinding since it proposes that all mobile organisms, including humans, rely on internal spatial representations known as cognitive maps to navigate their surroundings (Tolman, 1948) (Figure 2.8). A cognitive map is a mental model of one's surroundings that includes important information such as spatial layout, landmarks, and possible paths. Individuals use this internal cognitive map to build an understanding of their current position and the potential paths to their destination when they engage in wayfinding. Individuals can use cognitive mapping to figure out spatial relationships, plan routes, and modify their movements based on their mental representation of the surroundings.

The study of cognitive maps in the context of wayfinding gives light on the complex relationship between perception, memory, and spatial cognition, providing essential insights into how people successfully orient themselves and reach their destinations.

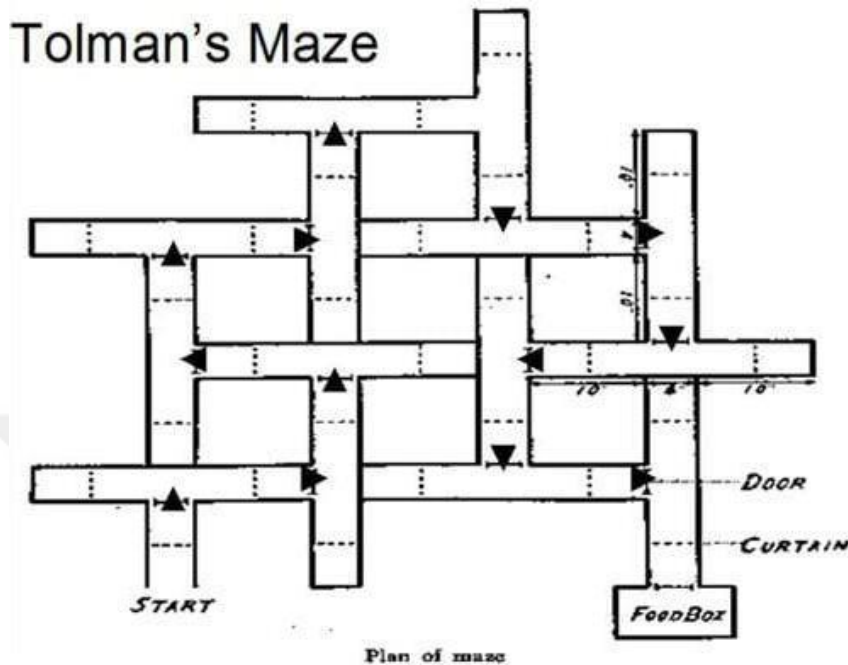


Figure 2.8 : Tolman and Honzik's cognition maze (Url-7).

Siegel and White's Theory

Siegel and White's wayfinding theory includes four distinct stages that people go through during the navigating process. People actively observe and memorize notable landmarks in their environment during the first stage (Siegel & White, 1975). These landmarks are important reference points in the next stage of wayfinding. Individuals mentally organize these landmarks into clusters in the second step, generating what the researchers call "minimaps." These minimaps are very helpful in assisting persons in establishing intermediate goals and maintaining a feeling of orientation as they navigate through the environment. Finally, when people get more experience and exposure to their surroundings, they develop a broad and complete survey knowledge of the environment. This survey knowledge allows for a deeper understanding of the general layout and spatial relationships, allowing for more efficient wayfinding. The role of landmarks and their cognitive organization in the navigation process is emphasized in Siegel and White's theory (Figure 2.9).

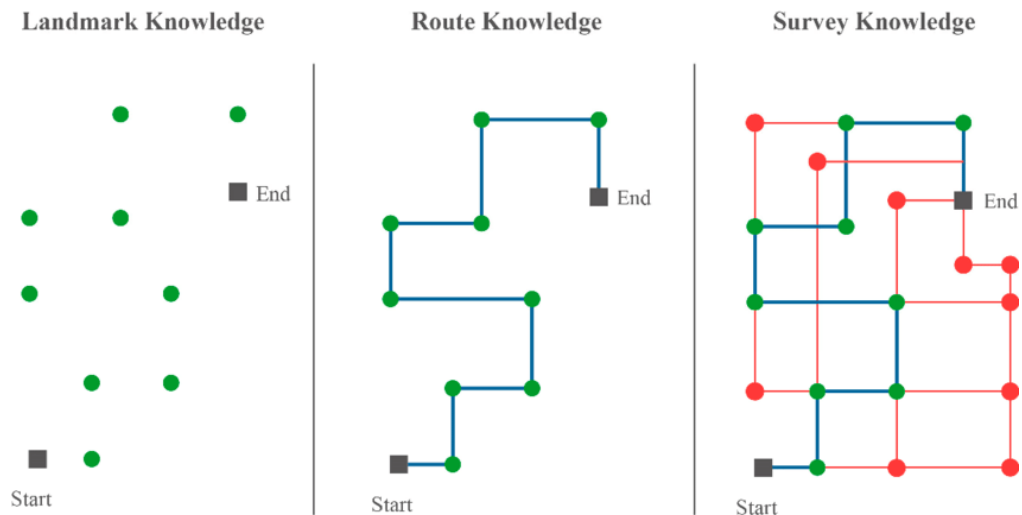


Figure 2.9 : Landmark-route-survey knowledge theory (Siegel & White, 1975).

Urban planners and designers can intentionally incorporate recognized landmarks and establish clear spatial arrangements that facilitate persons in building these mental representations by acknowledging the importance of minimaps and survey knowledge. Urban surroundings can become more wayfinding-friendly by increasing the accessibility and recognizability of landmarks, allowing individuals to rely on Siegel and White's stages to navigate with ease and trust.

There are certain parameters included in these wayfinding concepts and theories. In the figure below, the ones marked in green show the theories where the parameter is mentioned, the ones marked with yellow means that parameter is not directly (semi) mentioned, and those marked in red where the parameter is not mentioned in theory (Figure 2.10). Gestalt Theory prominently mentions parameters such as "Cognition", "Coherent patterns", "Legibility" and "Perceptual organization" indicating a strong emphasis on how people perceive and organize visual information. Template Theory similarly highlights "Cognition", "Matching" and "Schemata" suggesting a focus on pattern recognition and memory. Constructivist Theory and Cognitive Map both emphasize "Cognition", "Landmarks" and "Spatial cognition" reflecting their concern with how individuals construct knowledge and understand space. Kevin Lynch's Theory uniquely emphasizes "Imageability" and "Sensory information" which are crucial for urban design and navigation. Siegel and White's Theory also focuses on "Cognition", "Orientation" and "Spatial relationships" underscoring the importance of cognitive processes in spatial navigation and understanding. The most commonly

mentioned parameters across the theories are "Cognition", "Environmental cognition" and "Spatial relationships" marked in green, frequently mentioned in multiple theories. The least commonly mentioned parameters are "Adaptation" and "Schemata" which are often marked in red, indicating they are not mentioned in most theories.

	Gestalt Theory	Template Theory	Constructivist Theory	Kevin Lynch's Theory	Cognitive Map	Siegel and White's Theory
Adaptation						
Cognition						
Coherent patterns						
Environmental cognition						
Imageability						
Internal spatial representation						
Landmarks						
Learning						
Legibility						
Matching						
Meaningful representations						
Mental maps						
Mental models						
Navigation strategies						
Orientation						
Perceptual organization						
Previous knowledge						
Route planning						
Schemata						
Sensory information						
Spatial cognition						
Spatial perception						
Spatial relationships						
Urban design						
Urban planning						
User interface design						

Legend:  mentioned  not directly (semi) mentioned  not mentioned.

Figure 2.10 : Wayfinding theory/concept parameters.

2.1.3 Wayfinding-oriented cities

The concept of wayfinding takes up an aspect of significant relevance in the complicated texture of urban development, attracting increased interest as communities worldwide battle with the complexities of navigating modern urban landscapes. Wayfinding, instead of being limited to the practical objective of tracking paths, represents a comprehensive paradigm that combines a variety of visual cues, identifiable landmarks, technical developments, and design principles ideally suited to user preferences. In today's interconnected world, intelligent integration of wayfinding principles plays a role that goes beyond functional utility, shaping not only the accessibility and operability of urban spaces but also connecting with the very essence of a city's identity and experiential values.

Modern cities such as Tokyo, Copenhagen, and New York have been selected due to their effective wayfinding solutions that have evolved alongside their development. These cities exemplify how urban growth creates a demand for sophisticated navigation systems, which they have successfully met. Similarly, Maslak in Istanbul has emerged as a modern urban center with a growing need for effective wayfinding. Its development mirrors these cities in its approach to integrating navigational aids, ensuring accessibility, and enhancing the urban experience for residents and visitors alike.

Tokyo, Japan

Tokyo's dedication to wayfinding is visible not only in its efficient subway system, but also in its extensive pedestrian network. The city has a network of covered walkways known as "skywalks," which connect major train stations, shopping districts, and office buildings (Bray, 2021). These elevated walkways not only protect walkers from adverse weather, but they also have clear signs, maps, and visual cues that allow people to easily travel between different parts of the city (Japanese Times, 2020). The integration of interior and outdoor navigational features in Tokyo offers a comprehensive approach to improving urban navigation (Anderson, 2019).

This vibrant and modern megacity has used cutting-edge technology and design knowledge to reimagine urban wayfinding. The city's subway stations are real works of art in terms of navigational clarity, using a blend of Japanese characters and Roman

letters to ensure comprehensibility for both locals and international visitors (Tokyo Metro Co., 2021). Tokyo's commitment to wayfinding includes cutting-edge technologies such as digital signage that displays real-time train information and interactive touchscreen kiosks that provide extensive route planning (Smith, 2020). To create an immersive navigating experience, these digital interventions seamlessly interact with traditional navigational features such as station landmarks and directional signage (Urban Design Lab, 2018).

The Tokyo Skytree, an internationally known broadcasting and viewing tower, is a spectacular illustration of Tokyo's wayfinding prowess (Figure 2.11). The architectural genius of the tower extends beyond aesthetics, functioning as a visual compass for navigating the wide cityscape (Nikkei Asia, 2022). Its towering presence serves as a worldwide landmark, not only aiding in orientation but also cultivating a sense of connection with the urban sprawl (Doe, 2018). Tokyo's blend of innovative technology, renowned monuments, and demanding wayfinding design guides millions of people around the maze-like metropolis (Johnson, 2019).



Figure 2.11 : Tokyo-Skytree (Url-8).

Copenhagen, Denmark

Copenhagen, known for its dedication to sustainable urban living, is an example of a bicycle-friendly city that seamlessly integrates wayfinding into its fabric. The city's wide network of dedicated cycle tracks is supplemented with thoughtfully designed signage that directs cyclists along efficient routes while emphasizing sites of interest. The emphasis on cyclist wayfinding in Copenhagen extends to elements such as bike-

friendly traffic lights, which prioritize cyclist safety and convenience, creating a happy coexistence between different modes of transportation (Pucher & Buehler, 2008).

In addition, the city's distinctive "Cycle Snake" bridge, a serpent-like cycling route built above the harbor, not only provides an attractive route for cyclists but also acts as an architectural landmark that assists orientation (City of Copenhagen, 2014) (Figure 2.12). This planned interplay between architectural innovation and navigational assistance exemplifies Copenhagen's commitment to a holistic approach to wayfinding (Jensen, 2013). Copenhagen's wayfinding approach, as a monument to the city's spirit, goes beyond physical design, influencing the cultural mindset that celebrates cycling as a way of life (Beatley, 2012).



Figure 2.12 : Cykelslangen Copenhagen (Url-9).

New York City, United States of America

The complex craft of navigation takes on a gigantic scale in the bustling core of New York City, matching the enormous size of the metropolis itself. The city's unique grid system, designed in the early nineteenth century, is an example of masterful urban planning that has endured the test of time (Reps, 1965). The ordered organization of numbered streets and avenues of Manhattan, combined with an increasing number of identifiable monuments such as Central Park, Times Square, and the Empire State Building, provides a fundamental navigational framework (Jacobs, 1995). The

combination of geometric clarity and visible features produces an intuitive canvas for both locals and tourists to navigate the city with relative ease (Miller, 2015).

Furthermore, the Metropolitan Transportation Authority (MTA) has created a complex web of subway lines, bus routes, and commuter rail services to serve the city's diverse population (MTA, 2020). Despite its complexity, the subway system has an identical signage system with color-coded lines and unambiguous station names, providing quick and seamless intermodal transit (Garcia, 2011) (Figure 2.13). The known subway map, a masterpiece of information design that abstracts the city's complex layout into an accessible and clear visual guide, demonstrates the design uniformity (Vignelli, 1972). Wayfinding tactics in New York City combine architectural brilliance, landmark importance, and comprehensive transit systems to create a navigational symphony among the urban noise (Solomon, 2009).



Figure 2.13 : New York City metro signage system (Url-10).

2.1.4 Wayfinding and urban topography

Urban topography offers a comprehensive perspective that significantly aids in wayfinding within cities, encompassing both natural features like hills, rivers, and valleys, as well as artificial structures such as bridges and tunnels (Passini, 1984; Schwantes & O'Brien, 2011). These elements play crucial roles in guiding navigation and improving spatial orientation across urban landscapes.

Natural features like hills provide elevated vantage points that afford panoramic views of the cityscape, allowing individuals to establish their spatial bearings and locate key

landmarks from a distance (Lynch, 1960) (Fig 2.14). This elevated perspective not only enhances visibility but also helps in planning efficient routes and navigating complex urban layouts with greater ease. For instance, cities built on hilly terrain often leverage these elevated points for strategic placement of landmarks or orientation points visible from various parts of the city, thereby aiding in wayfinding (Norman, 2013).



Figure 2.14 : Looking at the city from the hill/higher elevation (Url-11).

Similarly, bodies of water such as rivers or lakes influence urban wayfinding by creating natural divisions that necessitate the construction of bridges or tunnels to connect different districts or neighborhoods (Gehl, 2010). These water bodies serve as natural barriers that shape the spatial organization of cities, influencing the development of transportation networks and pedestrian pathways. The integration of bridges and tunnels not only facilitates movement but also serves as recognizable landmarks that contribute to the legibility and navigability of urban environments (Schwantes & O'Brien, 2011).

In urban planning and design, understanding and leveraging these topographical features are crucial for developing effective wayfinding systems that align with the physical characteristics of the terrain (Passini, 1984). By strategically incorporating topography into wayfinding strategies, cities can optimize navigation pathways, improve accessibility, and enhance the overall urban experience for residents and visitors alike (Gehl, 2010). This approach not only addresses practical navigation needs but also enriches the cultural and aesthetic dimensions of urban spaces, making cities more navigable and inviting to explore (Lynch, 1960).

Thus, topography provides a multi-faceted contribution to urban wayfinding by offering elevated perspectives, defining spatial boundaries, and integrating distinctive landmarks, all of which collectively enhance orientation and facilitate efficient navigation throughout complex urban environments.

2.2 Human Scale

Measuring and designing things to match humans' physical and cognitive characteristics is known as the “human scale”. Humans interact with their surroundings through their physical dimensions, capabilities, and limitations (Figure 2.15). Human scale is an important aspect of design that flourished in the Middle Ages but has been largely ignored in the Industrial and Technological Ages. Its reemergence conforms with the return of consideration for people's comfort (Mackesy-Buckley, 2012). It is a scale that a person feels comfortable and appropriate in both public and private spaces. In general, most things are designed for the human scale. For example, steps, doorways, railings, work surfaces, seating, shelves, fixtures, walking distances, and other features that are appropriate for the average person can be found in buildings scaled to human physical capabilities (Url-12). Human scale in architecture can also describe buildings with good sightlines, acoustic properties, task lighting, and ambient lighting.

Human beings is genetically programmed by nature to perceive objects and conditions through their senses and to evaluate them through their own body. The human scale is a system that individuals use to measure time and space. Individuals frequently lose their benchmark and sense of their own dimensions in a large, dense built environment. The human scale is designed to help people understand their physical existence in time and space, as well as to provide a standard against which their relationships with things could be measured. However, there are many superhuman things in our environment that cannot be measured by the human scale. In other words, there are limits to the human scale. However, the superhuman scale should be distinguished from the inhuman scales associated with the artificial environment's massiveness and hyperdensity (Tonuma, 1981).

The human scale is a measurement system created by the organic human being in predestined harmony with nature. It is also a spiritual as well as a physical value

system. In this reference, the human scale differs from specialized, unfunctional, mechanistic scales. A human can be defined as a value system, and the human scale as a value measurement system (Tonuma, 1981). Humans interact with their surroundings based on their sensory abilities as well. Perceptual psychology and cognitive psychology, for example, are not exact sciences because human information processing is not a purely physical act and perception is influenced by cultural factors, personal preferences, experiences, and expectations (Kempf-Leonard, 2005).

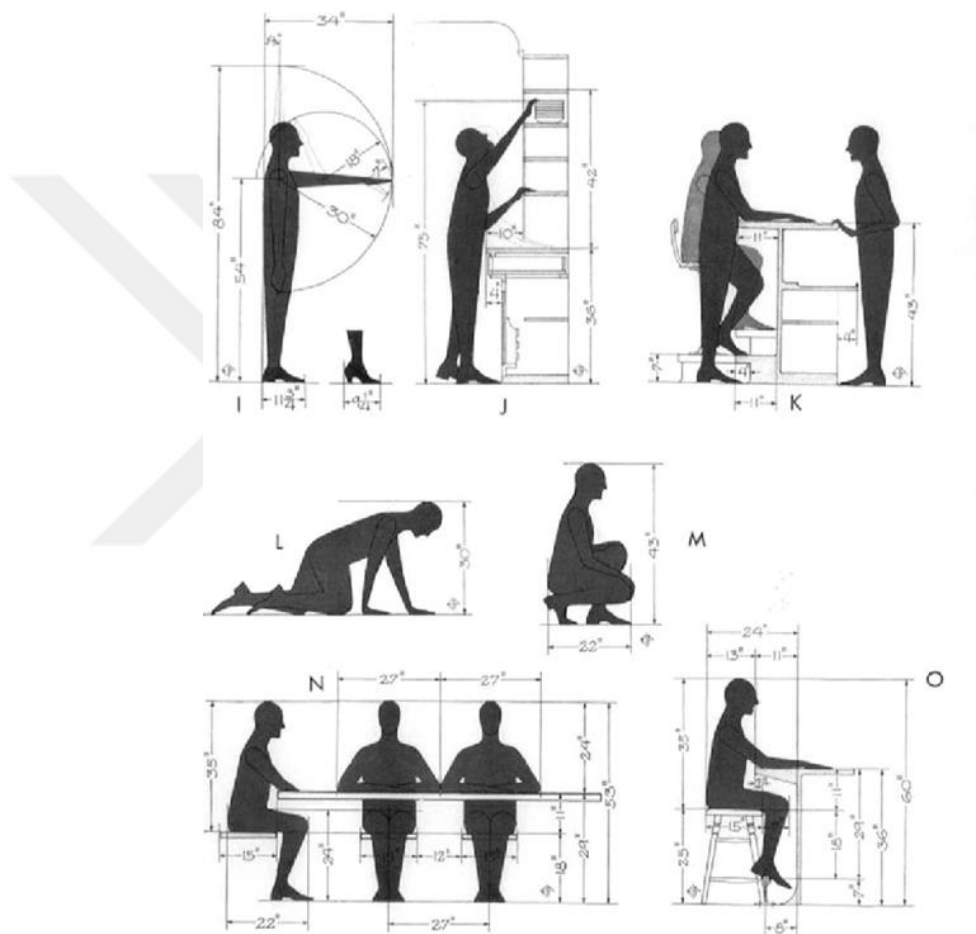


Figure 2.15 : Illustration by Ernest Irving Freese “The Geometry of the Human Figure” (1938).

2.2.1 Human scale and city

Complex and comprehensive entities that consider many factors such as size, function, culture, and history are called cities. A city is a living organism that reflects the values, aspirations, and achievements of its inhabitants, not just a collection of buildings and infrastructure. Cities are the most important human creations because they provide an

environment for social interaction, cultural exchange, economic growth, and technological innovation. They have a unique capacity to bring individuals together and foster a sense of community, which is critical for human well-being (Mumford, 1937).

Human scale in cities is the idea that cities should be designed to meet the needs and preferences in different scales, of those who live in them (Figure 2.16). Over the years, urban designers, architects, and planners have widely debated the concept of human scale. This concept emphasizes the importance of providing people with a comfortable, accessible, and safe space to use and enjoy. The idea behind this concept is that cities should be designed to encourage walkability, social interaction, and a sense of community. It is a design approach that highlights the value of designing urban spaces and buildings to meet the needs of people rather than prioritizing cars or other modes of transportation (Jacobs, 1961).

One of the most important aspects of the human scale concept is the importance of designing cities with walkability-oriented areas. The concept of walkability is essential to the human scale concept. This includes creating streets and sidewalks safe and comfortable to walk on, as well as various measures like benches, trees, and public art to encourage people to persist and interact with one another (Appleyard, 1981).

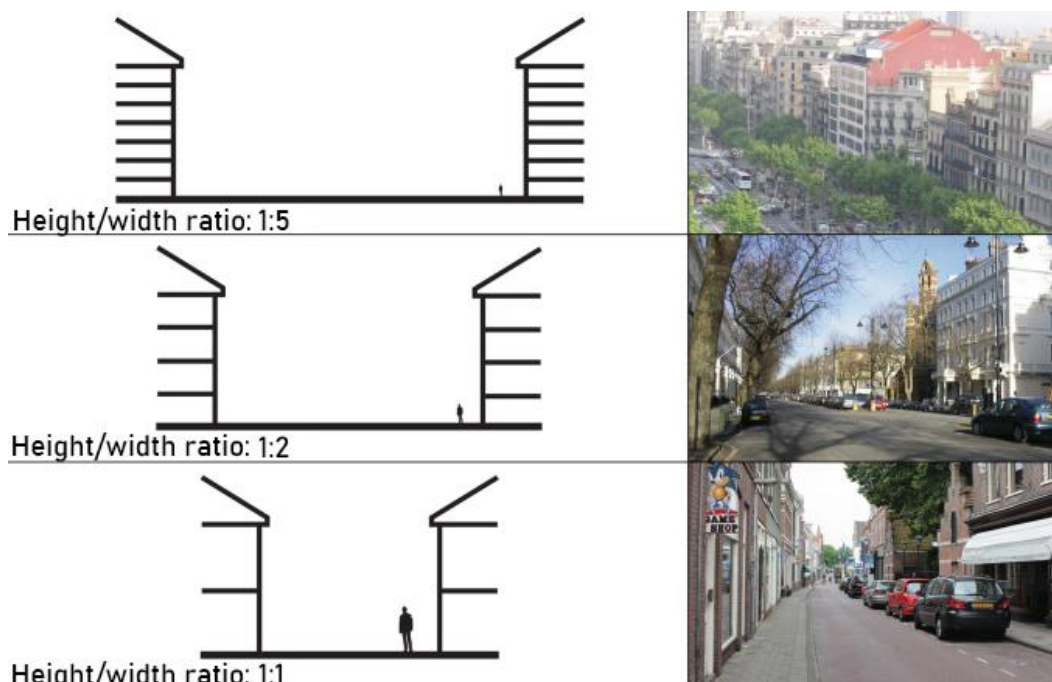


Figure 2.16 : Human scales in different ratios (Friedman, 2021).

Another important aspect of the human scale concept is the requirement to design structures that are proportional to humans. This requires designing structures that aren't too big or too high, but rather scale to fit comfortably around individuals (Figure 2.17). Buildings designed at a human scale can have several advantages, such as reducing energy consumption, improving indoor air quality, and encouraging a sense of community among urban dwellers (Alexander et al., 1977).

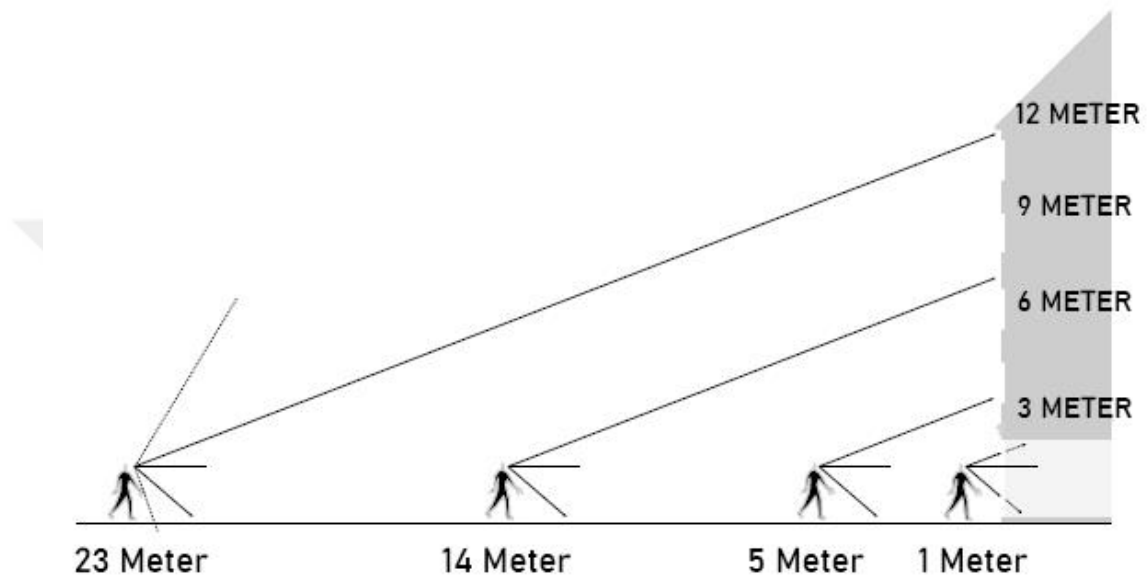


Figure 2.17 : Pedestrian perception of buildings (Url-13).

The concept of mixed-use development is another aspect of the human scale concept. The integration of residential, commercial, and industrial uses in a single space is referred to as mixed-use development. This can help to reduce traffic congestion, promote sustainable living, and make the community more vibrant and diverse. The concept of human scale emphasizes the significance of public spaces. People can gather, socialize, and participate in various activities in public spaces such as parks, plazas, and squares. These spaces can help residents develop a sense of community and belonging (Calthorpe, 1993).

Finally, the concept of human scale emphasizes the importance of designing cities for sustainability. This reaches a particular urban environment to reduce resource consumption and waste generation while promoting renewable energy sources and sustainable transportation options like walking, cycling, and public transportation.

According to research, sustainable urban design can have several beneficial effects on both human health and the environment, such as reducing air pollution, improving water quality, and mitigating the effects of climate change (Jacobs, 1961).

Overall, the concept of human scale and the city have a deeply intertwined and complex relationship. It emphasizes the importance of creating cities that are accessible, safe, and comfortable for people to use and enjoy. Cities can become more livable and sustainable by emphasizing walkability, mixed-use development, and public spaces (Gehl, 2013).

The relationship between the concept of human scale and the city can be understood through various parameters. These parameters are as follows.

Walkability: The concept of walkability refers to a city's potential for promoting and facilitating walking as a means of transportation. Cities that are developed with human scale in mind boast of a walkable environment, which must feature regularly maintained sidewalks, safe intersections, and pedestrian crossings where necessary (Jacobs, 1961).

Density: The population density of a city refers to the number of people who live in a certain area. A densely populated city is more likely to have a human scale because it encourages social contact, diversity, and economic opportunity (Glaeser, 2011).

Mixed-Use Development: The process of mixing several types of land uses within a single building or neighborhood is known as a mixed-use development. This could comprise a mix of residential, business, and industrial areas. A human-scaled city would prioritize mixed-use development to promote neighborhood vibrancy and variety (Calthorpe, 1993).

Public Space: Any area that is open and available to the public, such as parks, plazas, and streets, is considered public space. A human-scaled city would prioritize the creation and maintenance of public space to promote community interaction and social involvement (Gehl, 2010).

Sustainable Transportation: Sustainable transportation options include those that have a low environmental effect and encourage healthy lifestyles. To reduce dependency on automobiles and promote physical exercise, a human-scaled city would

prioritize sustainable mobility options such as walking, cycling, and transit services (Litman, 2019) (Figure 2.18).

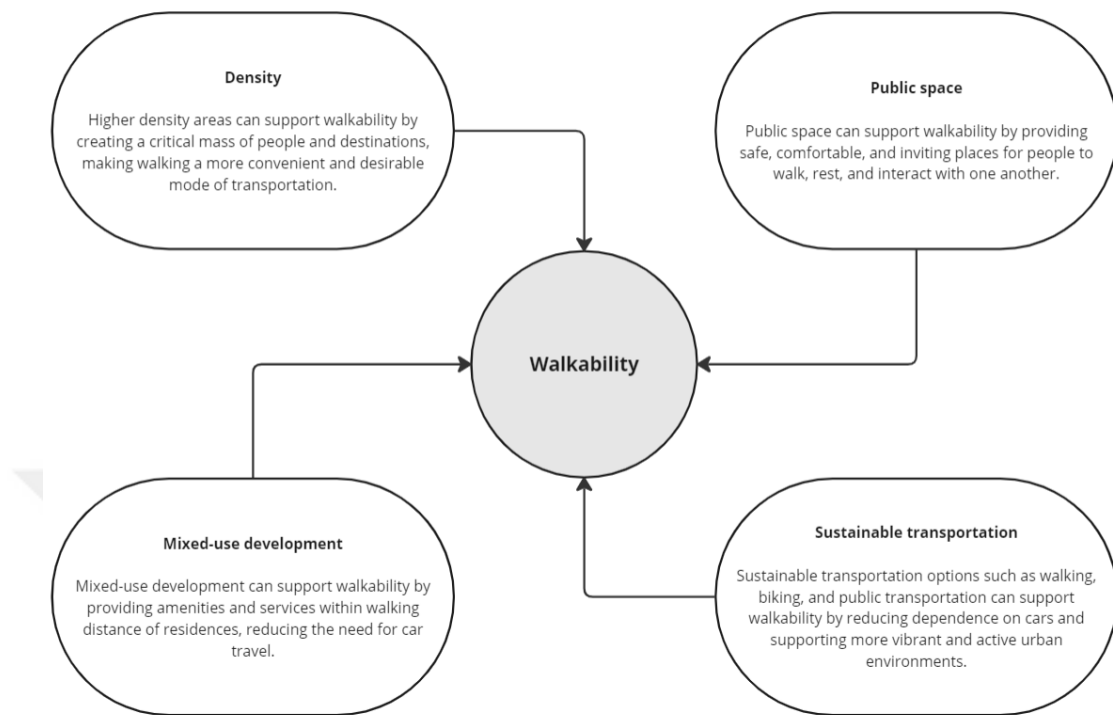


Figure 2.18 : Diagram of 'Human Oriented City'.

2.2.2 Related theories and concepts to human scale

Human scale in urban planning emphasizes designing environments that cater to human proportions and needs, fostering comfort, accessibility, and social interaction. Several theories and concepts contribute to this understanding. Jan Gehl's theory advocates for designing cities around people rather than vehicles, promoting public spaces that enhance social life. Kevin Lynch's theory highlights the importance of a legible urban structure with clear paths, edges, districts, nodes, and landmarks. Christopher Alexander's theory focuses on creating spaces that support human activity by reflecting human dimensions and needs. The Smart Growth Theory emphasizes sustainable, mixed-use development that fosters walkable communities. The 15-Minute City concept aims to provide all essential services within a short distance from residences, promoting a sustainable and livable urban environment. The New Urbanism Movement advocates for human-scaled, walkable neighborhoods that encourage social interaction and healthy living. These theories collectively underscore the importance of designing urban environments that prioritize human experience and well-being.

Jan Gehl's Theory

Jan Gehl is a Danish architect and urban designer who has gained international acclaim for his work promoting sustainable and human-centered urban planning. He devoted his career to improving the quality of urban life by reorienting city design toward pedestrians and cyclists rather than cars. The human scale theory of Jan Gehl emphasizes the importance of designing cities for people and human needs rather than just cars and buildings. The city, according to Gehl, should be built and adapted to human proportions to facilitate human interactions. He contends that the human scale encompasses not only physical dimensions but also the quality of life that people enjoy in cities (Gehl, 2011).

Gehl believes that the spaces between buildings should be taken seriously as places for relaxation, socializing, and performance (Gehl, 2011) (Figure 2.19). Gehl's theory is based on his observations of cities around the world as well as his work as an urban designer in Copenhagen. He believes that creating a human-scale city necessarily requires a shift in mindset away from traffic and buildings and toward people and public life. Jan Gehl's human scale theory highlights the importance of designing cities for people and their needs. It promotes a shift in mindset from a vehicle to a human-centered approach to urban design (Gehl, 2013).

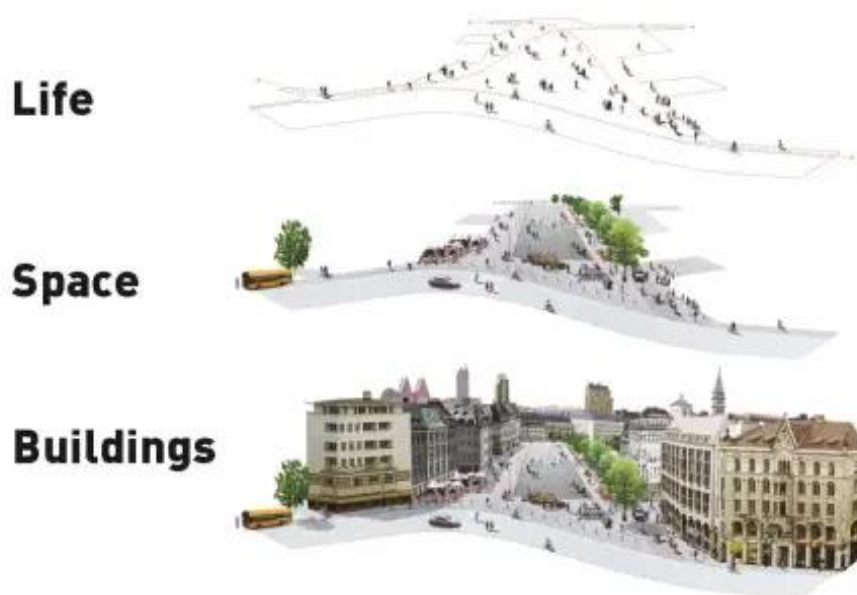


Figure 2.19 : Jan Gehl's "Life, Space, Buildings" representation (Url-14).

Montgomery (2013) in "Happy City: Transforming Our Lives Through Urban Design" supports Gehl's theory by illustrating how well-designed public spaces enhance social interactions and community well-being. Montgomery highlights examples of urban spaces that prioritize pedestrians and foster a sense of community, echoing Gehl's belief that cities should be designed to meet human needs rather than accommodating vehicles.

Kevin Lynch's Theory

Kevin Lynch is an American urban planner and writer. He introduced the concept of "imageability," or how people perceive and navigate urban environments. Lynch's theories and ideas influenced urban planning and design significantly. Kevin Lynch's theory is explained in his 1960 book "The Image of the City." Lynch argues in this book that cities are more livable and pleasant when they have a legible and cohesive urban structure that allows people to easily understand and navigate their surroundings. He identified the five components of urban fabric: paths, edges, districts, nodes, and landmarks (Figure 2.20). These elements should be combined to form an urban environment in which people can connect and feel a sense of place (Lynch, 1960).

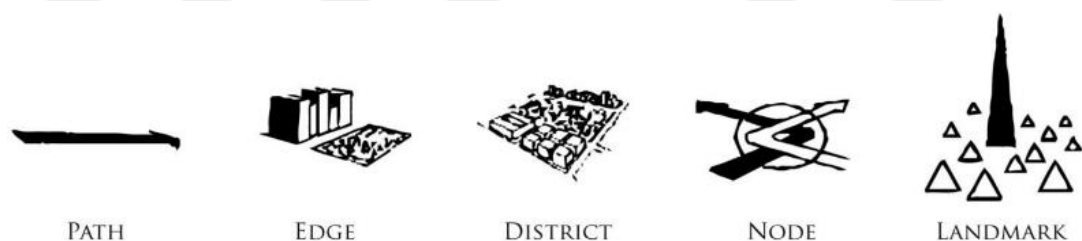


Figure 2.20 : Kevin Lynch's design theory 5 elements (Lynch, 1960).

Kevin Lynch's 5 urban design elements, which are routes, edges, districts, nodes, and landmarks, are closely linked to the concept of human scale in urban planning. These relations are examined one by one as follows.

Paths: They are vital in establishing a human-scaled environment because they allow pedestrians to travel through the city securely and comfortably. Walking as a primary form of transportation can be encouraged through well-designed walkways, which can promote general health and well-being.

Edges: They are particularly important on human scale because they provide a sense of enclosure. Well-defined edges can serve to create more personal and comfortable urban environments, helping individuals feel more connected to their surroundings.

Districts: Districts, or places having a particular personality and identity, contribute to the human scale idea as well. These districts may create a sense of belonging and community by fostering a more human-centered environment that prioritizes individuals' needs and experiences.

Nodes: Human scale also includes nodes, which are points of intersection or convergence. These nodes can act as gathering areas, facilitating social interaction and community building.

Landmarks: Landmarks are easily visible and unforgettable components of the urban landscape, and they are also intimately tied to the human scale. Landmarks can serve as points of reference and direction, assisting individuals in navigating the city while also conveying a feeling of identity and character (Montgomery, 2013).

Christopher Alexander's Theory

Christopher Alexander is a designer and architect who advocates for the human scale in architecture. He believes that architecture should put people first and that architecture should be designed to support and enhance human activity and experience. Alexander's concepts are based on the observation that people feel more at ease and comfortable in spaces that are proportionate to their needs and scale. Buildings and spaces, he believes, should be designed to the scale of the human body, with proportions and dimensions based on the size and shape of the human body (Alexander, 1977).

This approach is referred to as "human scale," and it aims to make buildings and spaces more comfortable, instinctive, and conducive to human activity. It is a philosophy that has influenced the design of many buildings and urban environments. Alexander's approach to architecture reflects his human-scale thinking, emphasizing the importance of creating places that are "alive" and "interactive." His perception is that buildings should be designed to reflect the needs and desires of the people who will use them, with a focus on creating welcoming, accessible, and responsive spaces for

human activity. Alexander proposes that we construct a human scale rather than a mechanical scale. Designing spaces that are proportionate to human dimensions and needs can improve the well-being of individuals and communities. Overall, Alexander's work on the human scale makes an important contribution to the field of architecture by emphasizing the importance of designing buildings and spaces that are not only functional but also emotionally and psychologically impactful (Alexander et al., 1977).

Nikos Salingaros elaborates on Alexander's human-centered approach in his own work, emphasizing that 'Alexander's patterns provide a framework for creating urban environments that feel more natural and comfortable to people. By focusing on human scale and the patterns of human activity, architects and urban planners can design spaces that support social interaction and community well-being' (Salingaros, 2005)

Smart Growth Theory

In the 1990s, the term "smart growth" was coined in the United States. Smart growth is a planning approach that encourages mixed-use development, compact, pedestrian-friendly communities, and the preservation of open space to encourage sustainable urban development (Porter, 2002). Smart Growth America (2015) states that "smart growth is about creating communities that better balance the needs of people and nature" through the creation of walkable neighborhoods, the preservation of green spaces, the provision of transportation options, and the promotion of economic development. Smart growth and human scale are interrelated concepts in urban design that emphasize the importance of creating livable, sustainable, and equitable communities for people. They are intimately connected because smart growth prioritizes compact, mixed-use development that is walkable and bikeable, as well as human centered (Smart Growth America, 2015).

The 15-Minute City Concept

The 15-minute City is an urban planning and design concept that emphasizes individuals' ability to access all essential services, such as schools, healthcare facilities, groceries, and entertainment, within a 15-minute radial distance from their houses. The concept originated in Lyon, France, and has since been adopted and adapted by cities all over the world (Veltz, 1994). Carlos Moreno, a professor at Paris' Sorbonne

University, first proposed the concept in 2019. He argued that the 15-minute city could assist in the resolution of urban congestion, pollution, and social isolation, resulting in more livable and sustainable urban environments. The concept has since received attention, with cities such as Paris and Barcelona announcing plans to build 15-minute neighborhoods (Moreno, 2019) (Figure 2.21).



Figure 2.21 : Barcelona and Paris city plan (Url-15).

In urban planning, the 15-minute city concept is closely linked to the human scale. According to the concept, cities should be designed so that residents can get to all their daily needs, such as food, work, education, and recreational activities, within a 15-minute walk, bike ride, or public transportation ride from their homes. This approach aims to make cities more livable and sustainable by reducing the need for long commutes, encouraging active transportation, and creating more vibrant and linked neighborhoods. Werthmann argued that designing more pedestrian-friendly, human-scale cities can promote more equitable and environmentally friendly urban development that prioritizes the needs of local communities. One of the key strategies proposed for achieving this goal is the 15-minute city concept (Werthmann, 2010).

The New Urbanism Movement

The New Urbanism movement advocates for creating human-scaled, walkable neighborhoods that promote sustainability, social interaction, and healthy living. New Urbanism is a planning and development approach that emphasizes traditional neighborhood design benefits such as mixed-use areas, walkable streets, and accessible public spaces (Talen, 2016) (Figure 2.22). In other words, human-scaled urban design is essential to New Urbanism. Placemaking and public spaces are important to New Urbanists. New Urbanist streets are designed for people rather than

cars, and they accommodate multimodal transportation such as walking, cycling, public transportation, and driving. It's believed that plazas, squares, sidewalks, and cafes should be available for daily interaction and public life. The goal of New Urbanism is to create sustainable, human-scaled places where people can live healthy, happy lives. New Urbanists create beautiful, walkable, and vibrant places that benefit businesses, local governments, and residents. The New Urbanism movement is open to anyone who works to create, restore, or protect a great place (Url-16).



Figure 2.22 : Seaside, Florida (Url-17).

There are certain parameters included in these human-scale concepts and theories. In the table below, the ones marked in green show the theories where the parameter is mentioned, the ones marked with yellow that parameter is not directly (semi) mentioned, and those marked in red where the parameter is not mentioned in theory (Figure 2.23). Jan Gehl's Theory prominently mentions parameters such as "Human Interactions", "Livability" and "Pedestrian oriented" indicating a strong emphasis on creating human-centered, livable urban spaces. Kevin Lynch's Theory similarly highlights "Navigation" and "Understanding surroundings" suggesting a focus on how people perceive and navigate urban environments. Christopher Alexander's Theory emphasizes "Alive city" and "Sustainability" reflecting a concern with integrating natural elements into urban planning. Smart Growth Theory and the 15-Minute City Concept both show a balanced approach, mentioning parameters like "Human interactions", "Pedestrian oriented", and "Sustainability" directly. The 15-Minute City Concept, for instance, emphasizes "Accessibility" and "Walkability" which are crucial for creating compact, efficient urban areas. The New Urbanism Movement focuses on "Public Transportation" and "Sustainability", underscoring the importance of environmentally friendly and accessible urban designs. The most commonly

mentioned parameters across the theories are "Human Interactions", "Livability", and "Sustainability", which are frequently mentioned in multiple theories. Conversely, parameters like "Alive city", "Equity" and "People and nature balance" are less commonly mentioned, often marked in red, indicating they are not addressed in most theories.

	Jan Gehl's Theory	Kevin Lynch's Theory	Christopher Alexander's Theory	Smart Growth Theory	The 15-Minute City Concept	The New Urbanism Movement
Accessibility						
Alive City						
Cycling						
Economic Development						
Equity						
Green Spaces						
Human Interactions						
Livability						
Navigation						
Needs of People						
Pedestrian Oriented						
People and Nature Balance						
Public Spaces						
Public Transportation						
Sense of Place						
Sustainability						
Understanding Surroundings						
Walkability						

Legend:  mentioned  not directly (semi) mentioned  not mentioned

Figure 2.23 : Human scale theory/concept parameters.

2.2.3 Human scale-oriented cities

Urban planning is a complicated discipline that necessitates careful consideration of numerous issues, including social, environmental, and economic concerns. Human-oriented design, which prioritizes the requirements and well-being of people over the demands of vehicles and machines, is one approach to urban planning that has gained popularity in recent years. This approach to city design emphasizes the importance of walkability, public transportation, and public spaces in producing socially cohesive, environmentally sustainable, and livable urban areas.

It is clear from the history of cities that urban structures and planning to influence human behavior and how cities operate. The Roman Empire had colony towns, which had a resolved and organized layout of main streets, forums, public buildings, and barracks, which reinforced their military role. Medieval cities' compact structure, with short walking distances, squares, and marketplaces, facilitated their function as centers of trade and craftsmanship. In the years following 1852, Haussmann's strategic urban renewal of Paris, particularly the broad boulevards, supported military control of the population while also providing a platform for a unique "boulevard culture" that sprouted promenades and cafe life along the city's wide streets (Gehl, 2013).

This study of human-oriented planned city examples looked at ancient, historical, and modern cities from throughout the world that prioritizes human needs in urban development. It examined how each city's unique qualities, such as its layout, transportation infrastructure, and public spaces, contribute to a human-oriented environment. It is possible to obtain a clearer knowledge of how urban planning can be used to build environments that emphasize human well-being and enhance social cohesiveness, environmental sustainability, and livability by exploring these human-oriented planned city examples.

For instance, cities like Mohenjo Daro and Teotihuacan, which no longer exist today, offer valuable insights into urban planning focused on the human scale. In these ancient cities, the absence of modern transportation alternatives meant that walking was the primary mode of movement, imposing certain necessities on city design that catered to human proportions and needs. This historical context can be linked to contemporary examples such as the historic area of Eminönü in Istanbul, where the

urban layout continues to reflect a pedestrian-friendly environment. By examining these past and present examples, it can better understand how urban planning can foster human-centered development.

2.2.3.1 Ancient cities

Numerous cities were created to emphasize the needs of their inhabitants over other considerations in ancient civilizations around the world. These walkable cities were usually planned with a focus on public spaces and community areas that encouraged social interaction and civic engagement. Mohenjo-Daro, for example, was a significant metropolis in the Indus Valley Civilization that was founded approximately 2500 BCE in modern-day Pakistan. The city was built up in a grid structure, with public squares and courtyards serving as common gathering places (Mackay, 1938). Similarly, Athens, the ancient Greek city, was planned to be a human-centered metropolis, with a concentration on public places that encouraged interaction between people and civic engagement. The agora, or marketplace, was the focal point of civic activity in the city, surrounded by public buildings and temples (Hansen, 2006).

This examination of ancient human-oriented city examples focused on historical cities from all over the world that represent this approach to urban development. Examining these and other ancient human-centered city examples can help one develop a better understanding of how urban planning can emphasize human well-being and social cohesion, even in the context of ancient civilizations.

Athens, Greece

Athens has been recognized for its human-centered architecture, with an emphasis on public areas and pedestrian-friendly streets. The Acropolis, the city's ancient heart, is a prime example of human-scale design, with buildings and public spaces built to be accessible and hospitable to people (Figure 2.24). In this examination of Athens' human-oriented architecture, the city's distinctive features, such as pedestrian walkways, public squares, and historic buildings, evaluate how these aspects contribute to a livable and sustainable environment (Hansen, 2006). One of Athens' most distinguishing characteristics is its pedestrian-friendly streets, which encourage strolling and create a more human-centered environment. Most car traffic is restricted in the city's historic center, making it easier for inhabitants and visitors to navigate the

surrounding area by walking (Kropf, 2011). This approach to urban planning is compatible with the principles of human-centered design, which stress walkability and pedestrian access.

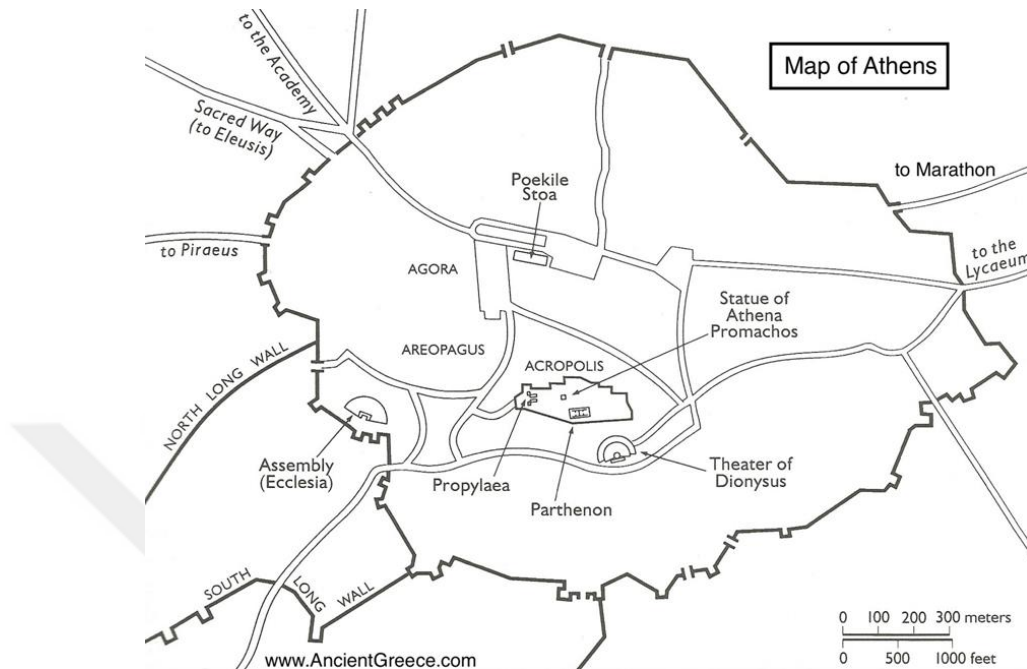


Figure 2.24 : Ancient Athens city map (Url-18).

The city's historic agora, or marketplace, which was the focus of civic life in ancient Athens, is another significant aspect of the city's human-centered architecture (Figure 2.25). The agora was bordered by public structures like temples and functioned as a venue for political and cultural events (Hansen, 2006). The historic buildings of Athens, especially the Parthenon, are instances of human-scale design, with proportions and dimensions meant to be harmonious with the human form. This design approach produces a more comfortable and welcoming environment for people, as well as a sense of connection between the physical environment and the human experience (Kropf, 2011).

Athens' human-centered design emphasizes the city's devotion to building a livable and sustainable environment that prioritizes people's needs. Evaluating Athens' distinctive qualities, such as its pedestrian-friendly streets, public spaces, and ancient structures, acquires a better understanding of how urban planning can be used to create a more human-centered environment.

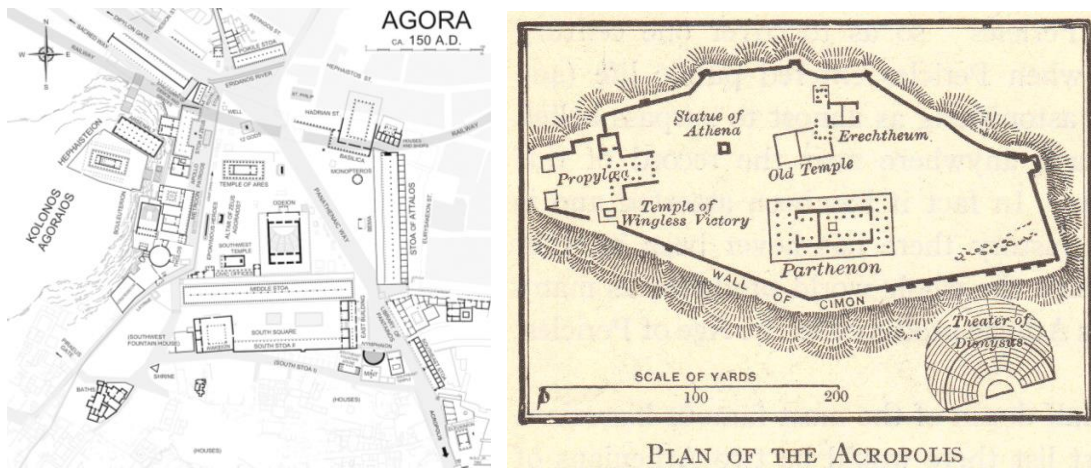


Figure 2.25 : (Left) Ancient Athens agora map (Camp, 2021) & (Right) Ancient Athens acropolis map (Url-19).

Mohenjo-Daro, Pakistan

Mohenjo-Daro is an ancient city in modern-day Pakistan that has been felicitated for its human-scale design, which addressed the needs of its inhabitants and created a living and sustainable environment (Figure 2.26). In this examination of Mohenjo-Daro's human-oriented architecture, the city's distinctive features, including its street grid system, public spaces, and sanitary infrastructure, analyze how these aspects contribute to a human-oriented environment.



Figure 2.26 : Location of Mohenjo-Daro (Url-20).

One of Mohenjo-Daro's most distinguishing features is its street grid layout, with the city's principal pathways oriented with the cardinal directions and connecting at right angles (Mackay, 1938). This approach of urban planning results in a predictable and

easily accessible environment, which is compatible with human-centered design principles that promote accessibility and ease of mobility.

The city's central citadel, which served as a gathering place for residents and tourists, is another essential component of Mohenjo-Daro's human-centered architecture (Mackay, 1938). The fortress was surrounded by public facilities such as temples and public baths that served religious and civic functions. The sewage system in Mohenjo-Daro is an example of how human-centered design can contribute to a livable and sustainable environment. The city had a complex drainage and public bathroom system that was linked to a centralized sewage system (Mackay, 1938). This approach to urban planning contributed to a better and more livable environment for citizens by preventing illness spread.

The human-centered architecture of Mohenjo-Daro demonstrates the city's dedication to providing a livable and sustainable environment that emphasizes the needs of its inhabitants. Examining Mohenjo-Daro's distinctive features, such as its street grid system, public spaces, and sanitary infrastructure, acquire a better understanding of how urban planning can be applied to create a more human-centered environment (Figure 2.27).

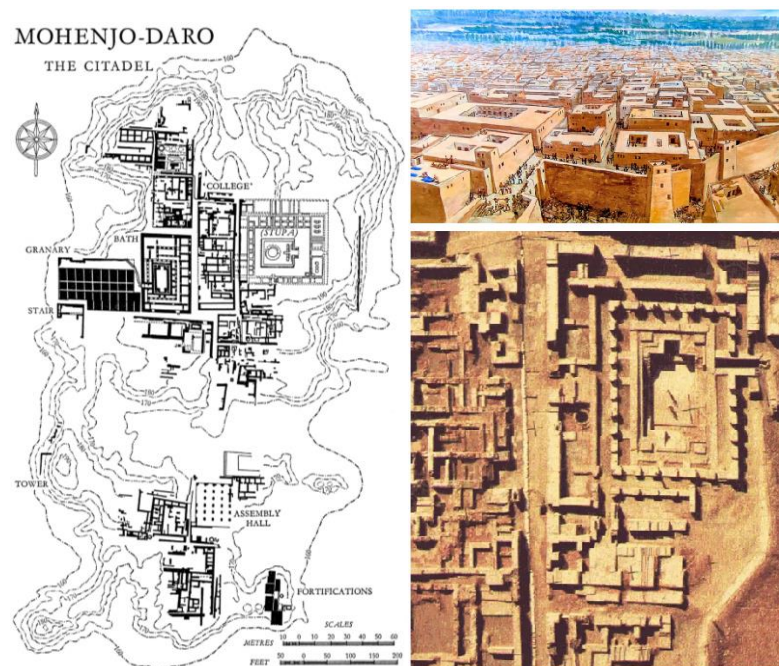


Figure 2.27 : Mohenjo-Daro citadel plan (Middleton, 2017).

Teotihuacan, Mexico

Teotihuacan is an ancient Mesoamerican city known for its human-scale design that prioritizes its residents' needs and well-being. The layout and architecture of the city were carefully designed to accommodate its citizens' daily life, with public areas and pedestrian-friendly streets at the heart of its design (López Luján, 2005). The Sun and Moon Pyramids are great instances of human-scale design, with dimensions meant to harmonize with human shape and scale (Carmona, 2019). Furthermore, the city's enormous public plazas, such as the Plaza of the Moon and the Plaza of the Sun, served as locations for public events and rituals, stressing Teotihuacan's significance in community and public life (López Luján, 2005) (Figure 2.28).

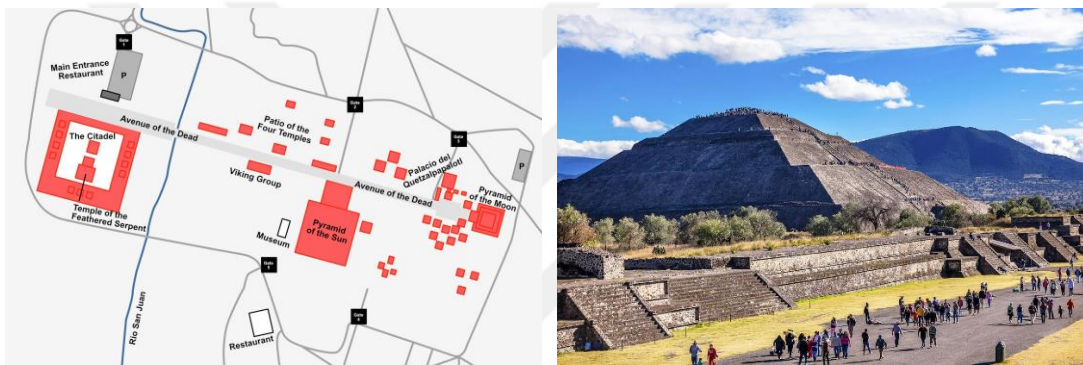


Figure 2.28 : Teotihuacan city (Url-21).

Ecology and sustainability were prioritized in urban planning. The overall consumption of natural resources was reduced by creating a comprehensive water management system that collected and delivered rainfall to the city's residents (Carmona, 2019). Furthermore, the city's wide network of pedestrian walkways and bike pathways encouraged active modes of transportation while decreasing dependence on automobiles (López Luján, 2005).

Teotihuacan's human-scale design and sustainable urban planning show the commitment to creating a pleasant and harmonious environment for its residents. The city reflects the principles of human-centered design and serves as a model for sustainable urban planning by addressing the needs and well-being of its citizens.

2.2.3.2 Historical cities

Venice, Italy

Venice is known for its human-scale design that promotes pedestrian experience over automotive traffic. The historic heart of the city is built on a network of canals and bridges, encouraging residents and visitors to explore the city on foot (Campanella, 2018) (Figure 2.29). The absence of cars not only makes the city more accessible and safer for walkers but also produces a more pleasant and calm environment (Howard, 2018).

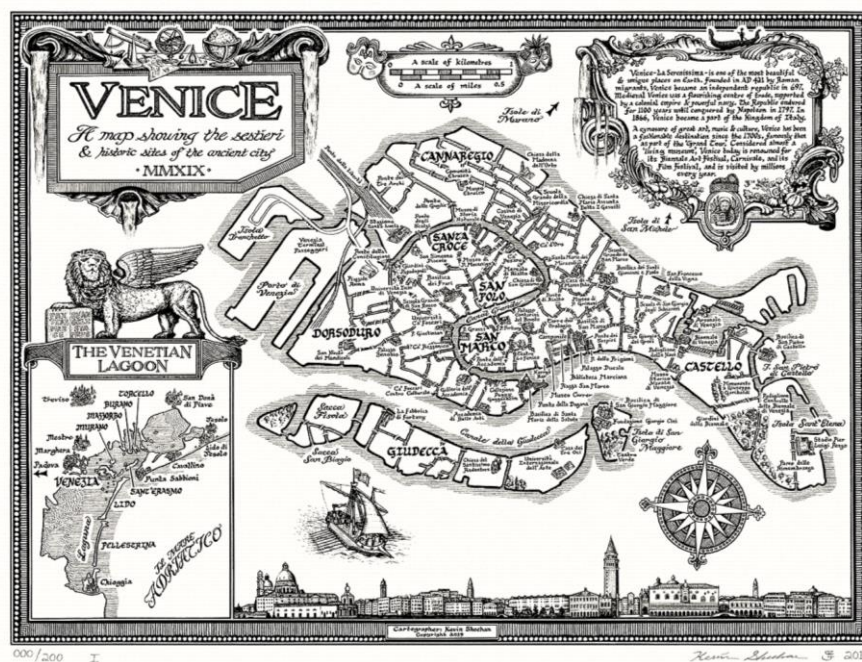


Figure 2.29 : Venice pervititch map (Url-22).

Venice has an extensive number of open spaces and plazas that serve as focal points for community activity in addition to its pedestrian-friendly streets. For centuries, the Piazza San Marco, for example, has served as the city's political, religious, and cultural hub (Howard, 2018). The piazza's mix of ancient structures, outdoor cafes, and street performers creates a lively and friendly environment for both locals and visitors (Figure 2.30).

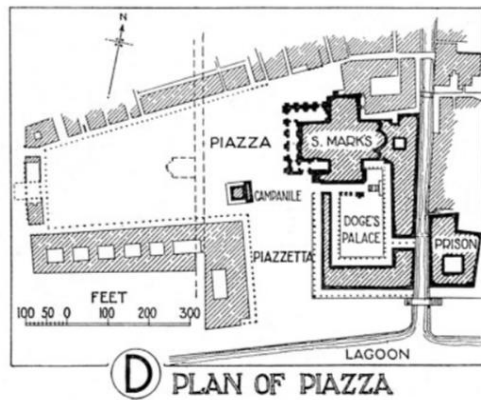


Figure 2.30 : Piazza San Marco (Fletcher, 1921).

The historic structures and architecture of the city are constructed on a human scale, with proportions and dimensions that are meant to be harmonious with the human form. Venice's narrow streets and alleyways were designed to foster closeness and connection between the physical environment and the human experience (Campanella, 2018). With its ornate façade and detailed detailing, the city's distinctive Gothic and Renaissance architecture demonstrates a human-centered design style that prioritizes beauty and craftsmanship (Howard, 2018).

Venice's human-scale design and pedestrian-focused urban planning produce a livable and sustainable environment. The city reflects the principles of human-centered design and serves as a model for sustainable urban planning by addressing the needs and well-being of its citizens.

Paris, France

Paris is known for its human-scale design and pedestrian-friendly streets. The city's center sections are distinguished by small, twisting alleyways that invite walking exploration (Jacobs, 1992) (Figure 2.31). Paris also has an extensive public transit system that includes buses, subways, and trains, making it easier for residents and visitors to get around without driving (LeGates & Stout, 2019).

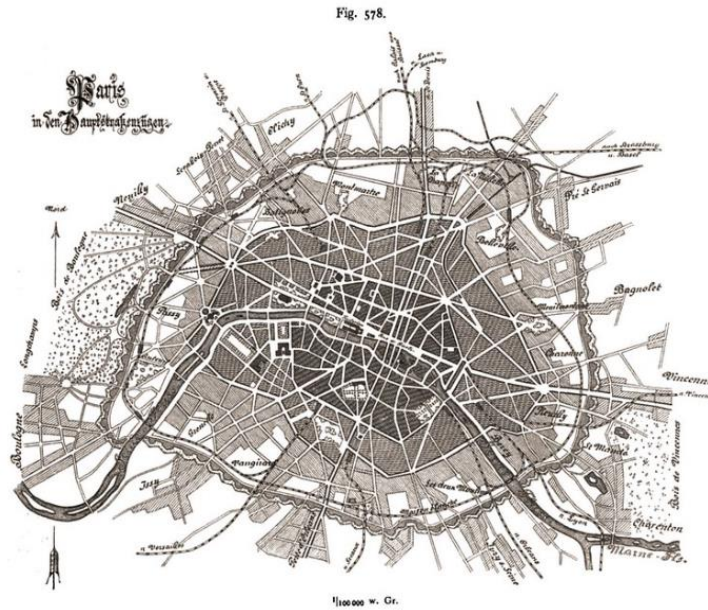


Figure 2.31 : Paris city map (Goecke, 2019).

One of Paris' most distinguishing qualities is its large number of public parks and green areas, which offer relief from the city's bustle and encourage outdoor activity. The Jardin des Tuileries, for example, is a popular city park with sculpted gardens, fountains, and strolling routes (Jacobs, 1992). The park's architecture stresses synergy with the natural environment, offering visitors a calm and quiet experience (Figure 2.32).



Figure 2.32 : The Jardin des Tuileries.

Paris is additionally known for its historic buildings and architecture, which are created on a human scale and in harmony with their surroundings. The 19th-century Haussmannian architecture style has wide boulevards and elaborate buildings created

to showcase the city's beauty and grandeur (LeGates & Stout, 2019). The Gothic and Renaissance architecture of the city, particularly in the historic Île de la Cité quarter, demonstrates a human-centered design style that values beauty and craftsmanship (Jacobs, 1992).

Human-scale design and pedestrian-focused urban planning in Paris lead to a livable, sustainable environment that is both functional and aesthetically beautiful. The city reflects the principles of human-centered design and serves as a model for sustainable urban planning by addressing the needs and well-being of its citizens.

Fez, Morocco

Fez is known for its vibrant and bustling medina, a UNESCO World Heritage site dating back to the 9th century. The city's design is human-oriented and emphasizes walkability and accessibility. The narrow lanes of the medina are surrounded by shops and kiosks, providing a dynamic ambiance that promotes walking exploration (McGill, 2018) (Figure 2.33).



Figure 2.33 : Fez city map (New York Times, 2007).

Fez's traditional Islamic architecture, which is designed to create a sense of harmony with the surrounding nature, is one of its most defining aspects. Buildings in the city are made of natural materials such as adobe, wood, and plaster, which help maintain the temperature and produce a comfortable living environment (Pouzol, 2001). Mosques in the city, such as the Al-Qarawiyyin Mosque and the Bou Inania Madrasa, are outstanding instances of human-scale design, with elaborate tilework and carved wood elements that demonstrate a high level of craftsmanship (McGill, 2018).

Fez is also distinguished by its various public areas and markets, which facilitate social interaction and cultural exchange. The city's central market, or souk, is a maze of paths and squares filled with a broad array of shops and merchants (Pouzol, 2001). The souk is intended to be walked through, and its layout reflects a human-centered strategy that prioritizes accessibility and ease (Figure 2.34).

The human-scale design of Fez, combined with traditional Islamic architecture, creates a distinct and livable urban setting that reflects the city's rich cultural past. Fez serves as a paradigm for sustainable urban development in the Middle East and North Africa by emphasizing walkability, social engagement, and cultural preservation.

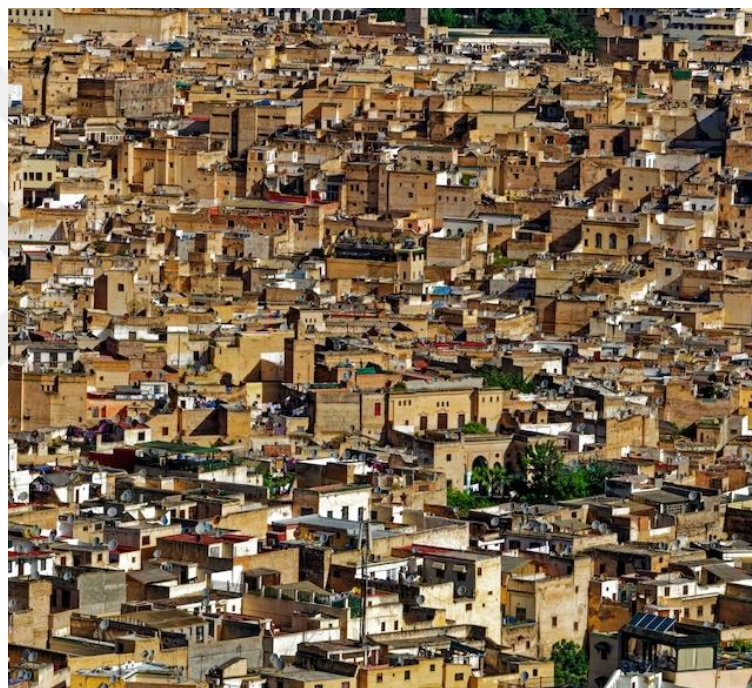


Figure 2.34 : Buildings of Fez (Url-23).

2.2.3.3 Modern cities

Barcelona, Spain

Barcelona is known for its unique and creative architecture, most of which is created with a human-scale approach in mind. Antoni Gaudi, one of the city's most famous architects, was a proponent of organic architecture, which is distinguished by an emphasis on natural shapes and materials (Duffy, 2018). With its soaring spires and elaborate decorations meant to provoke awe and surprise in visitors, Gaudi's most

famous masterpiece, the Sagrada Familia Cathedral, is a perfect example of human-scale design (Figure 2.36).

Barcelona is also noted for its network of public spaces and pedestrian-friendly streets, which contribute to a vibrant and pleasant urban environment, in addition to Gaudi's work. La Rambla, the city's most well-known avenue, is a lively pedestrian walkway lined with stores, cafés, and street entertainers (Guan, 2020). La Rambla is a successful example of urban planning that prioritizes pedestrians and public areas, fostering a sense of community and social interaction (Figure 2.35).



Figure 2.35 : Map of La Rambla (Wikipedia, 2023).

The human-scale design of Barcelona reflects the city's commitment to sustainability. The city has invested in a network of bike lanes and public transportation options in order to reduce the need for automobiles and promote sustainable mobility (Guan, 2020). The city's green spaces, like Park Guell and Ciutadella Park, improve physical and mental health by providing chances for recreation and relaxation in the middle of a chaotic metropolitan setting (Figure 2.36).

Barcelona's human-scale architecture and commitment to sustainability have established it as a model for livable and thriving cities worldwide. Barcelona has built an urban environment that is accessible, inclusive, and pleasurable for people of all ages and backgrounds by promoting pedestrians, public spaces, and sustainable transportation options. The city's approach to urban planning emphasizes the necessity of taking human requirements and experiences into account when creating communities that will be sustainable and resilient in the future.



Figure 2.36 : La Sagrada Familia and Park Güell (Url-24).

Copenhagen, Denmark

Copenhagen is well-known for its human-centered approach to urban planning, which places people's needs and experiences ahead of cars and other vehicles (Figure 2.37). The city has invested in a network of bike lanes and pedestrian-friendly streets, which has helped to minimize car traffic and promote environmentally friendly means of transportation (Harrison, 2018). Copenhagen's emphasis on cycling has made it one of the world's most bike-friendly cities, with more over half of commuters pedaling to work or school (City of Copenhagen, 2021).

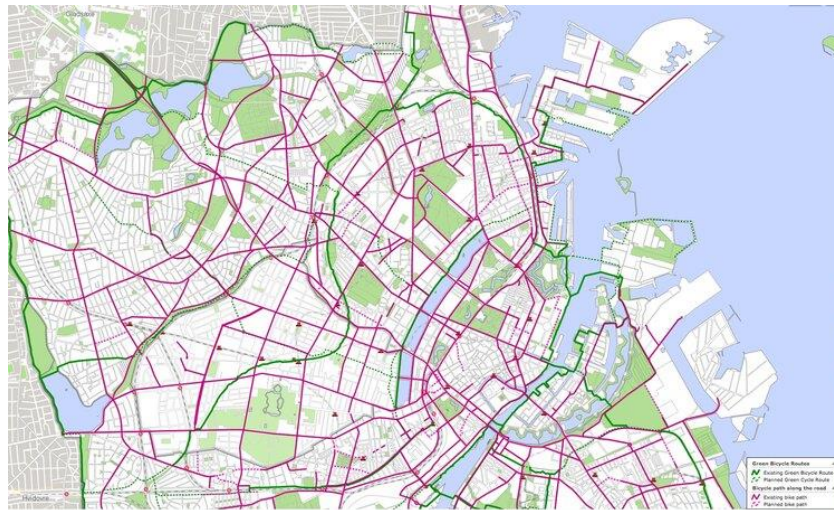


Figure 2.37 : Copenhagen bicycle route map (Url-25).

The human-scale design concept is also reflected in the city's public spaces. Copenhagen has several big parks, notably the Tivoli Gardens, which attracts people of all ages and backgrounds (Harrison, 2018) (Figure 2.38). Another example of good

urban planning that stresses public areas and accessibility for people is the city's waterfront, which has been renovated in recent years.

Human-centered design reflects Copenhagen's devotion to sustainability. The city has set ambitious targets to achieve carbon neutrality by 2025 and has invested in renewable energy and green infrastructure (City of Copenhagen, 2021). The city's approach to sustainability is inseparably linked to its emphasis on people, with an understanding that a livable and sustainable city must prioritize its residents' needs and experiences.

Copenhagen's human-centered approach to urban planning has made it a global example for other communities. Copenhagen has built an urban environment that is accessible, inclusive, and satisfying for people of all ages and backgrounds by promoting sustainable transportation, public spaces, and a dedication to sustainability.



Figure 2.38 : Copenhagen Tivoli Gardens (Url-26).

Vancouver, Canada

Vancouver has long been regarded as a leader in human-centered urban development. The city is well-known for its walkable areas, public transportation, and abundance of green space (Steward, 2014). The city's approach to urban planning encourages accessibility, sustainability, and social inclusion, making it one of the world's most livable cities.

The wide network of bike lanes and pedestrian-friendly streets in Vancouver demonstrates the city's dedication to sustainable transportation (Figure 2.39). In addition, the city has invested in a world-class public transportation infrastructure that includes buses, trains, and ferries (City of Vancouver, 2021). These initiatives have

contributed to reduced car traffic and the promotion of alternate forms of transportation, making the city more accessible and enjoyable for residents.



Figure 2.39 : Vancouver transportation map (Mees et al., 2010).

The human-scale design concept is also reflected in the city's public spaces. Stanley Park, one of Vancouver's largest parks, acts as a gathering place for people of all ages and backgrounds (Figure 2.40). Another example of good urban design that prioritizes public areas and accessibility for people is the city's waterfront, which has been transformed in recent years (Steward, 2014).

The city of Vancouver's dedication to sustainability can be seen in its human-centered design. The city has set ambitious targets to become the world's greenest city by 2020, and has made significant investments in renewable energy, green infrastructure, and sustainable building techniques (City of Vancouver, 2021). Vancouver's approach to sustainability is closely related to its emphasis on people, with an understanding that a livable and sustainable city must prioritize its residents' needs and experiences.

Vancouver's human-centered approach to urban planning has made it a global example for other cities. Vancouver has built an urban environment that is accessible, inclusive, and pleasurable for people of all ages and backgrounds by promoting sustainable transportation, public spaces, and a dedication to sustainability.



Figure 2.40 : Vancouver Stanley Park (Url-27)

2.2.4 Human scale and street enclosure

The link between human scale and street enclosure is critical because it has a direct impact on the quality of the built environment and how people interact with it. Human scale refers to the design and arrangement of urban environments in a size and proportion that people find comfortable and accessible. It focuses on developing surroundings that meet human needs by encouraging walkability, social engagement, and a sense of belonging (Alexander et al., 1977; Lynch, 1984). Street enclosure, on the other hand, is the spatial arrangement of streets and buildings that define and enclose the public domain. It is impacted by building height, setback, and alignment, which all contribute to the character and ambiance of streetscapes.

Spatial enclosure refers to the physical definition of spaces within urban or rural environments, contributing significantly to the creation of a distinct sense of place. It is characterized by the alignment and coherence of fronting facades, which establish boundaries and enclosure like outdoor rooms. The concept is influenced by the height-to-width ratio of the defined space, where the ratio of space is tighter (1:1 ratio) resulting in a stronger sense of place (Figure 2.41). This ratio is determined by the relationship between the width of the space and the cone of vision of the human eye, with greater enclosure achieved when the street wall dominates the visual field over the open sky. The manipulation of spatial enclosure is a fundamental aspect of designing urban transects, wherein the degree of enclosure is adjusted through various means, including the selection of frontage types, establishment of build-to lines specifying minimum building frontage and height, and the strategic placement of trees to create canopy-based enclosure on wide thoroughfares. Ultimately, spatial enclosure

plays a crucial role in shaping the character and identity of urban and rural environments, influencing the perception and experience of inhabitants and visitors alike (Marquet, 2015).

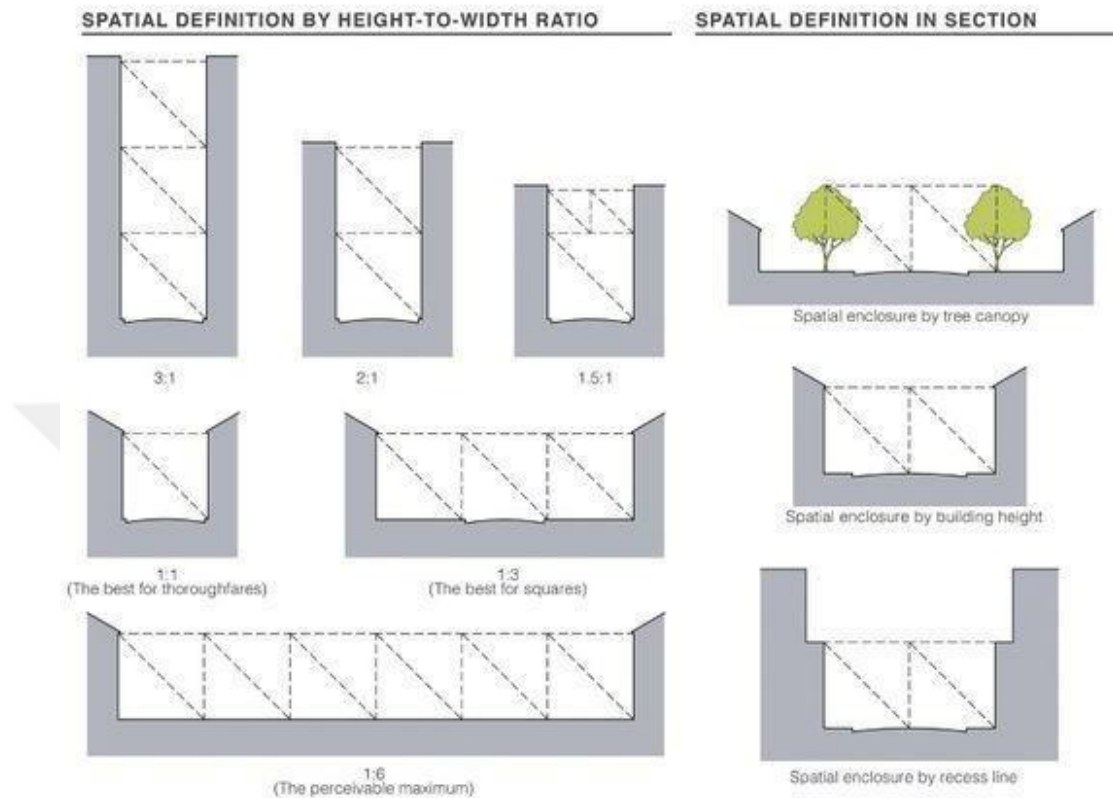


Figure 2.41 : Spatial definition by height to width ratio and street enclosure by section.

The enclosure of urban streets is intricately defined by two key variables: the height of vertical elements bordering the street and the width of the street itself. This ratio, termed the enclosure ratio, is a pivotal determinant of street ambiance and perception (Ewing & Handy, 2009). Carmona et al. (2003) posit that as building heights along a street increase, the expanse of sky visible to observers diminishes, intensifying the feeling of enclosure. Conversely, streets characterized by high ratios (4:1 ratio) tend to evoke negative perceptions among individuals due to a sense of confinement. Optimal and desired enclosure, where the ratio stands at 1:1, engenders the most positive perceptual experience, while ratios below 1:2 are associated with diminished perceptibility (Carmona et al., 2003). Alexander et al. (1977) advocate for street widths not exceeding building heights to maximize positive perceptual effects. Additionally, buildings limited to four floors or lower facilitate a positive connection between street level and upper floors (Alexander et al., 1977). Jacobs (1993) suggests a minimum

height-to-width ratio of 1:2 for buildings to effectively define streetscapes (Figure 2.42). In low-density urban contexts, where building facades wield less influence, trees assume a crucial role in shaping street perception. Trees flanking both sides of streets adjust the height-to-width ratio to human scale, bolstering the perception of enclosure, particularly in expansive thoroughfares. Optimal enclosure, characterized by balanced proportions, enhances visual complexity, reduces spatial distances, and fosters a sense of security (Jacobs, 1993). Gehl (2010) advocates for street design principles that enhance visual quality and perceptibility. Recommendations include limiting street width to no more than 10 meters and constraining building heights to 4-5 floors, thereby optimizing the enclosure ratio (Gehl, 2010).

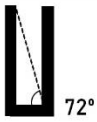
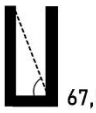
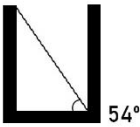
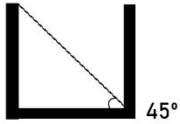
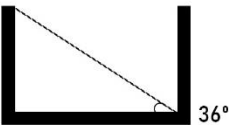
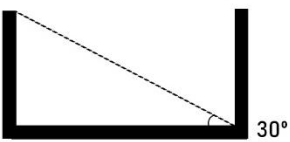
Enclosure ratio: (Height:Width)	Sense of spatial definition	Degree of Enclosure
4:1	Claustrophobia and confinement	 72°
3:1	Strong and feel like concrete canyon. very narrow sky view.	 67,5°
3:2	Strong and clear sense of enclosure. Strong influence within the enclosure.	 54°
1:1	High and strong place making potential, Comfort and safety and meaningful of enclosure itself.	 45°
1:1.5	High and strong place making potential, Comfort and safety and meaningful of enclosure itself.	 36°
1:2	Good and enough for place making and view od sky equal to visual field, Comfort and safety and meaningful of enclosure itself.	 30°
1:4	Weak, place making potential is low, discomfort and lack of psychological shelter.	 18°

Figure 2.42 : The relationship between the enclosure degree and the ratio of the street space (Alkhresheh, 2007).

The interaction between human scale and street enclosure is synergistic. A well-designed street enclosure contributes to human scale by creating a sense of enclosure and encouraging a pedestrian-friendly environment suitable for social interaction and activity (Jacobs, 1961). Streets with high enclosure levels feel more intimate and pleasant, encouraging individuals to stay, explore, and interact with their environment. In contrast, human scale factors impact the design of street enclosures. Designing streets and buildings on a human scale improves street life and fosters a sense of place (Gehl, 2010). Designers can create welcoming and accommodating streetscapes by including human-oriented pathways, street furniture, and architectural accents at eye level.

To summarize, the link between human scale and street enclosure is critical for developing thriving, people-centered urban spaces. Cities may improve the overall urban experience by constructing streets and structures that emphasize human needs and promote enclosure.

Additionally, other elements defining human scale should be highlighted beyond street enclosure. Factors such as the proportion and height of doors and windows, building materials, and the articulation of facades also play essential roles in ensuring environments are designed to human scale. Incorporating these details enhances the accessibility, aesthetics, and functionality of urban spaces, further enriching the pedestrian experience and contributing to the sense of place.

2.3 Chapter Evaluation

The relationship between wayfinding and human scale is crucial for creating functional and user-friendly urban environments. Human oriented design, which focuses on designing spaces and structures that suit human proportions and needs, forms the foundation for creating accessible and comfortable environments. It encompasses both physical dimensions and the quality of life that people experience in cities. Human scale principles emphasize walkability, community interaction, and sustainable practices, aligning with the concept of wayfinding.

Wayfinding, the cognitive and physical processes individuals use to navigate in built environments, plays a crucial role in enhancing accessibility and user experience.

Effective wayfinding systems consider signs, landmarks, and physical features to create a comprehensive navigation system. Wayfinding theories delve into the intricate interplay of cognitive and physical processes that individuals employ to navigate and orient themselves within complex environments. These theoretical frameworks offer valuable insights into the ways people perceive and interact with their surroundings, influencing the design of architectural spaces and urban planning strategies. Urban examples such as Tokyo, Copenhagen, and New York City demonstrate successful wayfinding through innovative technologies, landmark integration, and efficient grid systems. The integration of wayfinding with mixed-use areas further enhances user experience by providing reference points for navigation in dynamic environments.

Urban theorists like Jan Gehl, Kevin Lynch, and Christopher Alexander have contributed theories that highlight the importance of human-centered design and the creation of spaces that foster community and well-being. Gehl's human scale theory promotes a shift from vehicle-centered to human-centered urban design. Lynch's theory of imageability focuses on how people perceive and navigate urban environments, emphasizing legibility and landmarks. Alexander's theory aims to create buildings and spaces that are comfortable and instinctive for human activity. The concept of the "15-minute City" further emphasizes the integration of human scale principles and wayfinding. By ensuring essential services are accessible within a short radius, this concept promotes walkability and encourages a more connected community.

The relationship between wayfinding and human scale is integral to creating livable, accessible, and sustainable urban environments. Designing spaces that align with human proportions and needs, coupled with effective wayfinding strategies, results in cities that prioritize community, well-being, and ease of navigation.

In exploring the relationship between these concepts and commercial areas;

Considering their diversity and complexity, commercial areas provide specific challenges for wayfinding. Commercial areas are urban zones that integrate several business and retail establishments into a single location. Multiple functions coexisting can result in greater pedestrian and vehicular traffic, making efficient wayfinding vital for both residents and visitors. Commercial zones, according to Kothari and Moudon

(2020), frequently lack visual cues and identifiable borders, which can hinder spatial legibility and direction. As a result, people navigating these contexts may struggle to create reliable cognitive maps and mental representations of their surroundings. Furthermore, the presence of multiple activities and destinations within commercial areas might provide information overload, complicating navigation processes (Bishop & Lange, 2019). Urban planners and designers must consider the strategic placement of landmarks, visible signage, and well-defined pedestrian paths to encourage legibility and create a seamless navigation experience for all users to improve wayfinding in commercial areas.

Additionally, the social aspect of wayfinding in commercial areas influences user experiences. In commercial areas, the presence of varied community members and interactions can impact wayfinding behaviors and preferences. Social landmarks, such as popular meeting places or cultural venues, become critical reference points for navigating in these dynamic situations (Krishna & Weir, 2020). Furthermore, social interactions can be a vital source of navigational information because people frequently request help or directions from other pedestrians or local residents (Aplin et al., 2018). In these areas, incorporating placemaking tactics that stimulate social interactions and community participation can foster a stronger sense of place and improve wayfinding experiences.

Human-scale and commercial areas are important components of urban planning because they concentrate on people's needs and experiences. Cities can generate social cohesiveness, economic prosperity, and environmental sustainability by building a constructed environment that is walkable, accessible, and planned for human interaction (Jacobs, 1961). Commercial areas and public spaces are critical for creating a human-scale environment. Residents in these regions have access to key services such as grocery stores and medical facilities within walking distance of their homes. They also improve pedestrian circulation, which can lead to increased economic activity and social engagement (Lynch, 1984). Human-scale design is also essential for developing livable, sustainable cities. Urban planners can create an environment that promotes physical exercise, decreases dependency on cars, and creates a feeling of community by promoting walkability, public spaces, and interaction between individuals (Gehl, 2010).

Human-scale design and commercial areas are important components of urban planning because they focus on individual needs and experiences. Cities can generate social cohesion, economic prosperity, and environmental sustainability by developing environments that are built for human interaction and fostering commercial areas that give access to critical services.



3. RESEARCH OF WAYFINDING AND HUMAN SCALE RELATIONSHIP IN STUDY AREAS

In the theoretical framework, the concepts of wayfinding and human scale have been examined in detail with their related theories, in the context of urban scale. The field study is designed based on these concepts. The main objective of the subject group study is to test the mutual effects of the concepts of human scale on wayfinding in study areas. The methodology of this chapter is structured in five different stages:

In the first stage, study areas were identified, and the location, boundaries, and environmental relations of these areas were examined in detail. In this process, the geographical location of each area was determined, the boundaries were clarified, and the interactions with surrounding areas were analyzed. Additionally, the historical and spatial characteristics of the two selected study areas were examined in detail. In this context, the changes each area has undergone throughout history and the reasons for these changes were investigated, considering factors such as socio-economic developments, and cultural dynamics.

In the second stage, the urban pattern attributes of the study areas were analyzed. The purpose of these analyses is to understand the dynamics of the study areas in detail and to form a basis for field studies by evaluating them. The analyses followed a comprehensive and systematic approach to understanding the urban structure and functioning of both study areas. The analyses prepared include Land Use Analysis, Figure-Ground Analysis, Urban Elements, Landscape and Landmarks Analysis, Street Width Analysis, Building Height Analysis, and Street Enclosure Analysis. Land Use Analysis examined the ground floor usage of the study areas on a building basis. To reference the Gestalt theory mentioned in the literature review, Figure-Ground Analysis visualized the building density and open space relationships of the areas, and the resulting texture was interpreted in detail. In the Urban Elements Analysis, Lynch's five elements (path, edge, district, node, and landmark) discussed in the literature review were included, and the distribution of landscape features and symbolic

structures in the areas was evaluated. Street Width Analysis examined street widths, Building Height Analysis analyzed building heights, and based on these two analyses, Street Enclosure Analysis was calculated in detail for each street in the area. Street Enclosure Analysis is a key analysis for the thesis as it represents the perceived scale, thus representing the concept of human scale throughout the study. The results of these analyses were compared for both study areas, highlighting their significant differences and similarities.

In the third stage, the main scenario and details of the subject study were presented. To determine the size of the subject group to be included in the study, pedestrian counts/density in the field were considered. Subsequently, the points where subjects would walk for wayfinding purposes (starting and ending points) were determined based on the analyses conducted in the second stage. The details of when and how the subjects would walk in the study areas, including the specific days and times and the scenarios they would follow, were also provided. The study was conducted with 60 subjects (30-30) on weekday afternoons in sunny weather. Personal data of the subjects were excluded from the study, focusing only on inferences based on the routes they followed in the study areas. Thus, only the distribution of gender, age, and education level of the subjects was provided in this part.

In the fourth stage, the results of the routes walked by the subjects were examined in detail and categorized under specific main parts. The routes walked by the subjects were grouped into five main parts: choices of links/streets, main routes, dominant side routes, side effects (affecting the sense of enclosure), and never chosen links/streets. Detailed analyses under these parts enabled a deep understanding of the subjects' wayfinding and preferences and a comprehensive examination of the spatial perception of the study areas.

In the fifth stage, the conclusions from the first four stages of the section were presented. Detailed and comparative inferences were made based on the results of testing the concepts of wayfinding and human scale in different scales.

3.1 Locations, Boundaries and Environmental Relations

Two areas were chosen as study areas. The first study area is the Eminönü region of Fatih district, and the second is the Maslak region of Sarıyer district. Fatih is the starting point of the main trade axis of the Istanbul province. Istanbul's main trade axis is starting from Fatih and extending to Beyoğlu, Beşiktaş, Levent and Sarıyer. And Sarıyer is considered the end point of this trade axis. So Eminönü and Maslak study areas are the start and the end point of this axis (Özler, 2007). If we conceptualize this axis as a spinal column; Eminönü serves as the foundation of this axis, feet, whereas Maslak constitutes the apex, head, thereby forming an integrated entity, body. Apart from being physically located at the two extreme points of the axis, these two regions differ from each other in terms of urban texture. While the Fatih district is one of the first built-up regions of Istanbul and has largely preserved its historical texture, the Maslak region is a region that was built later, has high-rise buildings, and is deprived of its historical texture.

In exploring these two study areas in detail;

First, Fatih district is situated to the northwest, bordered by the Eyüpsultan district, with the Golden Horn to the north, the Sea of Marmara to the south, and Zeytinburnu district to the west. Covering an area of 15.62 km², Fatih historically encompasses the entire region where Istanbul was established, known as the historical peninsula (Suriçi). It currently serves as the central district of Istanbul province. Notably, Fatih covers the seven hills of Istanbul, a poetic theme in various works. The borders of Fatih are defined by historical walls, the Golden Horn, and the Sea of Marmara. A portion of the walls, from Ayvansaray to Yedikule, has undergone restoration and acts as a boundary between Fatih and Eyüp and Zeytinburnu districts. Unfortunately, the sea walls along the Golden Horn and the Marmara coast have suffered damage over time and are no longer intact. Between 1928 and 2008, Fatih, along with Eminönü, comprised two districts on the historical peninsula. However, in 2008, Eminönü was reintegrated into Fatih, making it the sole district covering the entire historical peninsula. Fatih, with 57 neighborhoods and no rural settlements, holds a unique position in Istanbul's administrative structure (Url-28).

Eminönü is located on the western side of the Golden Horn in the part of Istanbul known as the Historical Peninsula. It is entirely within the historic walls, which constitute the historical core of Istanbul, forming one of the liveliest areas in the central zone. Alongside the Fatih district, Eminönü became the central district of Istanbul in the early years of the Republic. Although Eminönü's population continued to increase until 1955, its significant neighborhoods underwent a transformation from residential areas to commercial zones, leading to a decrease in population. Comprising a total of 33 neighborhoods, Eminönü holds a crucial position at the entrance of the Golden Horn, constituting a significant portion of the port that has existed since the founding of the city, along with Sirkeci. It serves not only as a focal point of urban life but also as the center of one of the world's most important ports (Url-29).

Within the boundaries of the Eminönü study area; Tahtakale neighborhood, Rüstem Paşa Neighborhood, Hobyar neighborhood, Sururi neighborhood and Mercan neighborhood are located (Figure 3.1). When considering Rüstempaşa neighborhood as the focal point, it is surrounded by the Golden Horn to the north, Hobyar neighborhood to the east, Sururi neighborhood to the southeast, and Mercan and Tahtakale neighborhoods to the south. Among these five neighborhoods within the study area, Tahtakale stands out with its characteristic features. Positioned southwest of the Spice Bazaar, between Mercan neighborhood, Rüstem Pasha Mosque, and Hasırcılar Avenue, Tahtakale is a neighborhood that has maintained its identity as a port-side district, situated just behind significant trading docks. This characteristic has persisted throughout the Byzantine and Ottoman periods and continues to define it as a prominent commercial and business district to this day. Tahtakale currently witnesses a highly dynamic commercial life, and it remains one of the few neighborhoods in Istanbul where the ancient street layout is well-preserved, characterized by steep slopes and narrow streets accommodating both vehicular and pedestrian traffic (Url-30).

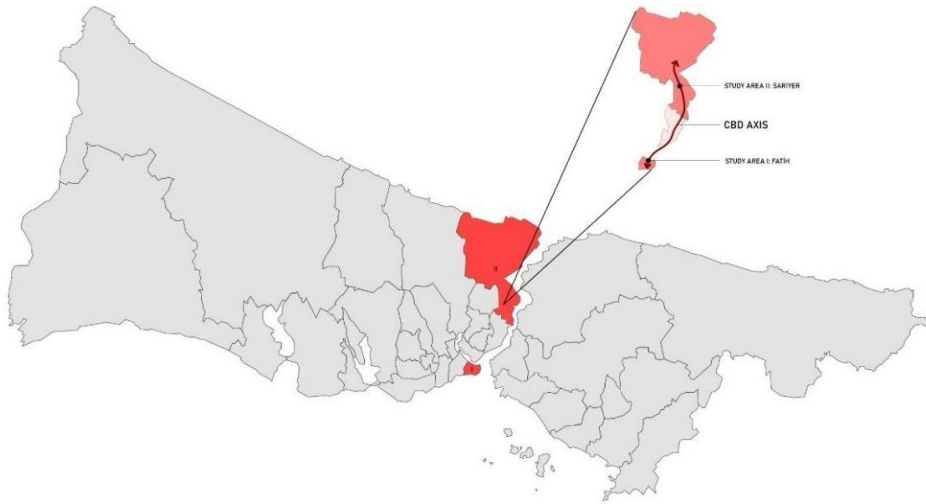
Second, Sarıyer district is surrounded by Beşiktaş and Kağıthane districts from the south, Eyüpsultan districts from the west, the Bosphorus from the east and the Black Sea from the north. Sarıyer district consists of 38 neighborhoods in total. The district, which took its final form after Bahçeköy Municipality was dissolved in 2009 and became a neighborhood of Sarıyer district, and Ayazağa, Maslak and Huzur

neighborhoods within the borders of Şişli were included in this district in 2012, is one of the northernmost districts of Istanbul (Url-31).

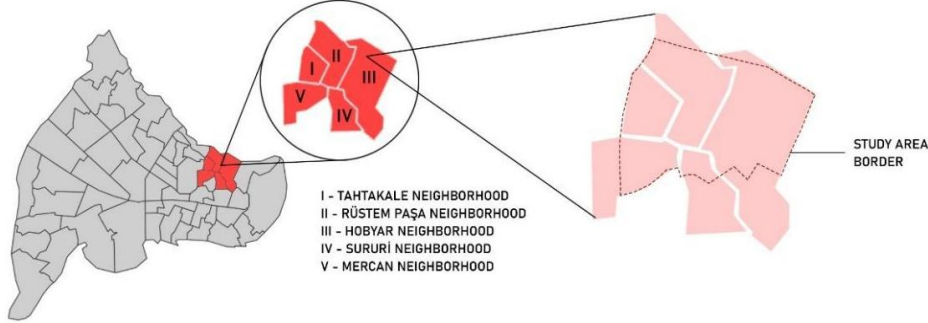
Until the 1960s, the regions of Sarıyer along the Bosphorus were summer resorts that became more crowded in the summer. The increasing frequency of ferry services over time was an important factor in the development of coastal districts. Later, road transportation improved because of the construction of Büyükdere Street coming from Maslak and the widening of the coastal road following the coast. Thus, because of the direct connection of the districts to each other, the process of developing the existing districts along these transportation axes and opening the empty areas between these districts for settlement began. Residences and mansions belonging to upper income groups appeared in the coastal area, and slums emerged on the slopes of the high area extending in the form of a ridge. These constructions, which occurred on the slopes overlooking the Bosphorus, on the one hand, destroyed the natural structure of the district, and on the other hand, significantly disfigured the appearance of the region (Url-31).

Within the boundaries of the Maslak study area; is a neighborhood of the Sarıyer district of Istanbul (Fig 3.1). The neighborhood includes skyscrapers and business centers, as well as the main campus of Istanbul Technical University and the Military Academies. While Maslak was initially a small village, it has shown rapid economic development since the 1990s. While Maslak was a place consisting of a gas station and a few buildings until 25 years ago, today it is one of the important places of Istanbul and Turkey, hosting the headquarters of many international companies, with its modern skyscrapers, heavy traffic, and strong winds. The population in Maslak increases significantly during working hours, outside of which the resident population is sparse (Url-32).

LOCATION OF STUDY AREAS



STUDY AREA I : FATİH



STUDY AREA II : SARIYER

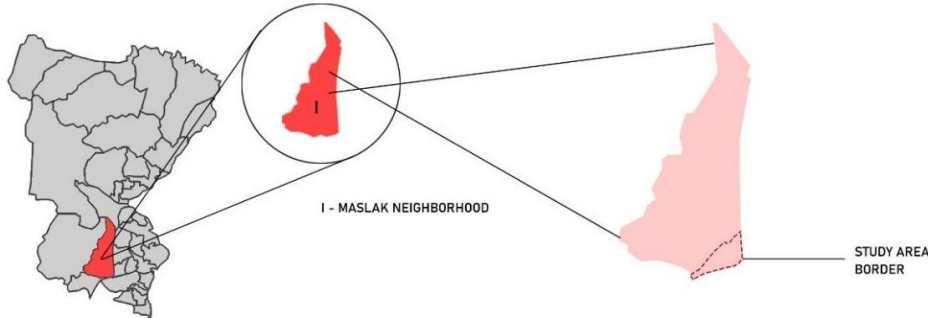


Figure 3.1 : Locations of study areas.

When looking at the spatial relations of Eminönü and its surroundings; There is the Golden Horn in the north of Eminönü, Vezneciler in the south, Sirkeci in the east, and Unkapanı and Vefa regions in the west (Figure 3.2). There are 3 streets on a single axis that cuts the area on the east and west axes. These are; Ragıp Gümüşpala Street, Reşadiye Street and Kennedy Street. The Golden Horn Bridge and Galata Bridge are the most important connections that shape the environmental relations of the district.

While the Galata Bridge connects Eminönü to the Karaköy region of Beyoğlu district, the Golden Horn bridge connects it to the Galata region of Beyoğlu. When the public transportation lines in the area are examined, it is seen that Eminönü has metro, ferry, tram and bus lines. The Golden Horn Bridge is of great importance by connecting the two sides with the metro line. M2 Haliç metro stop is located on this bridge. There are 8 main ferry lines in Eminönü. These; Eminönü-Haliç line, Eminönü-Karaköy line, Eminönü-Üsküdar line, Eminönü-Haydarpaşa line, Eminönü-Karaköy line, Eminönü-Beşiktaş (Long Bosphorus line) line, Eminönü-Kadıköy line and Eminönü-Bursa (BUDO) line. Apart from these lines, the Eminönü-Kasımpaşa line and Bosphorus tours depart from Eminönü as side lines. The only ferry line departing from Sirkeci is the Sirkeci-Harem line. The T1 Kabataş-Bağcılar tram line passes from the east side of the area, and the T5 Eminönü-Alibeyköy tram line passes from the west. T1 line starts from Kabataş, passes through Galata Bridge to Eminönü and continues from Sirkeci towards to Bağcılar. Eminönü stop is the 5th stop of this line with 31 stops. The first stop of the T5 line is Eminönü. This 14-stop line, which will be fully opened in 2023, is the line connecting Alibeyköy Bus Terminal to Eminönü. Bus lines make the area accessible with many lines, mostly along the Golden Horn coast and via the Galata Bridge. With the new public square project, 2023, many bus lines have been moved to the newly built Eminönü Bus Platforms located at the foot of the Golden Horn Bridge. Thus, the opportunity to travel from a large bus stop area is provided. The nodes in the area show the regions where these public transport axes intersect and concentrate.

One of the important locations around Eminönü is Gülhane Park. Gülhane Park was the outer garden of Topkapı Palace during the Ottoman Empire and contained a grove and rose gardens. It was turned into a park and opened to the public in 1912. Its total area is about 163 acres. It was restored by Istanbul Metropolitan Municipality in 2003. Nowadays, it actively receives visitors (Url-33). The second one is Istanbul University Beyazıt Campus. The university campus was previously used as the Ministry of War. In 1923, this building was given to Istanbul University. The most famous part of the main campus is the main gate. Another important historical architectural structure is the Istanbul University Beyazıt Fire Tower, which is one of the most important elements of the Istanbul's silhouette and can be seen from many parts of the city (Url-34).

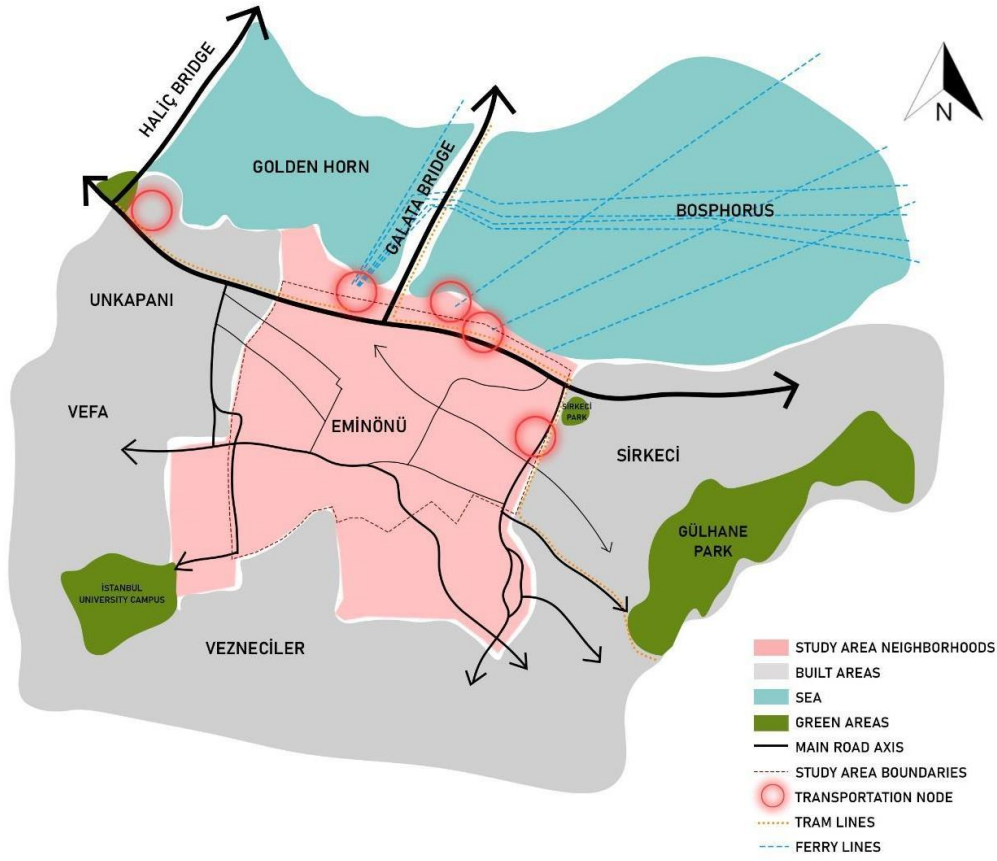


Figure 3.2 : Eminönü study area environment and spatial relations.

When looking at the spatial relations of Maslak and its surroundings; There is PTT Evleri in the north of Maslak, Reşitpaşa and Huzur in the south, Çamlıtepe, Darüşşafaka and Pınar in the east, and Ayazağa neighborhood in the west (Figure 3.3). Maslak is among the largest neighborhoods of Istanbul with a surface area of 4,975 km². On the European Side of Istanbul, Büyükdere Street, which starts from Şişli Mosque and passes in front of Mecidiyeköy, Esentepe, Zincirlikuyu, Levent, Sanayi Neighborhoods and connects to Maslak Junction, is located in the south of the study area and has great importance in terms of transportation network in the area. This street continues from south to north, takes Fatih Forest on its left, and extends to Hacıosman Bayırı. When the public transportation lines in the area are examined, it is seen that Maslak has metro, bus and minibus lines. M2 Atatürk Oto Sanayi and İTÜ - Ayazağa metro stops are located in Maslak district. These two stops are located on Büyükdere Street. In addition, the M2 line connects both study areas, Eminönü (Golden Horn stop) and Maslak. Bus lines also pass from bus stops on Eski Büyükdere and Büyükdere Streets throughout the area. Bus is the most preferred transportation alternative after the metro. The number of people using buses, especially during rush

hours, is at a significant level. Beşiktaş-Sarıyer and Beşiktaş-Tarabya/Yeniköy minibus lines passing through Maslak are another transportation alternative that facilitates access for those coming to the area. The nodes in the area show the regions where these public transport axes intersect and concentrate.

Istanbul Technical University (ITU) Green Campus, Ayazağa Campus, is located in the south of the study area. This campus, located in the Maslak region which is the financial center of Istanbul, was established in 1982. It is the main campus of the İstanbul Technical University, which has 4 other campuses. There is also a ITU Arı Teknokent in the campus where many faculties and social facilities are located (Url-35). The Green Campus Project was implemented in 2018 to make the campus a barrier-free campus where natural life is protected, sustainable landscape understanding prevails, bicycle and pedestrian priority. ITU Ayazağa Campus, which hosts a campus life that is at peace with nature and has ecological sensitivity and ranks 26th among European universities, was chosen as Turkey's greenest and most sustainable campus (Url-36).

Another important area in Maslak is Atatürk Auto Industry Site. The construction of the industrial site where automobile repair shops and maintenance services are located was started in the 1970s in order to bring together the rapidly increasing number of repair shops in the city and causing visual pollution. Maslak, which was considered to be outside the city at that time, was chosen to create an organized industrial area, and after the first stage, the 2nd stage was completed in the 1980s and the 3rd stage was completed in the 1990s. It is the largest industrial site in Istanbul and Turkey with an area of 268,000 m² (Url-37). In the east of the area, National Intelligence Organization (MIT) Istanbul Regional Directorate Service Building and campus stand out. The campus, which was built in line with the needs, vision and growth trend of the organization, campus named Fortress, was opened in 2020 on the 94th anniversary of National Intelligence Organization (Url-38).

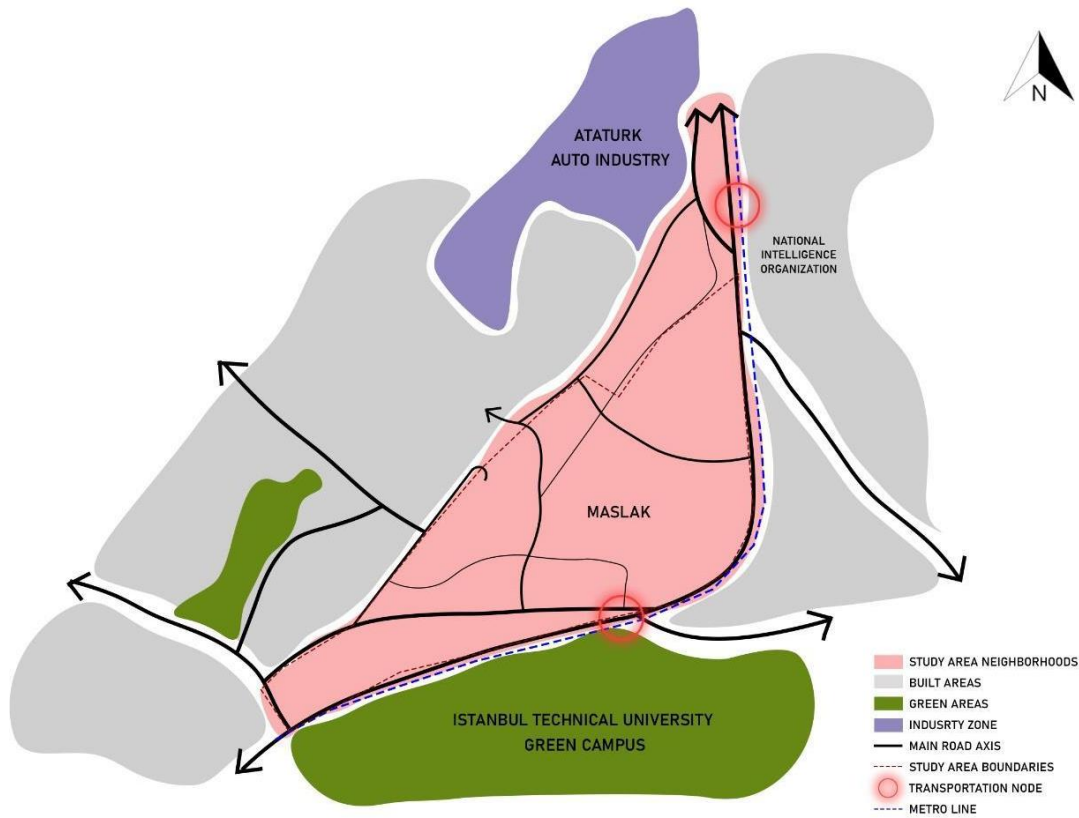


Figure 3.3 : Maslak study area environment and spatial relations.

3.2 Historical and Spatial Features

The examination of the evolution of Istanbul's central business district (CBD) axis (trade axis), which encompasses the areas of Eminönü and Maslak, is fundamental to understanding the historical development of chosen study areas.

The evolution of Istanbul's commercial centers is a significant subject, in the scope of the thesis, encompassing a wide timeframe from the city's historical texture to areas where modern commercial hubs located. Before the 1950s, Istanbul's commercial hub resided in the Eminönü district within the Fatih District, serving as the primary trading point where various commercial goods were import, export and sold. Between 1956 and 1958, a pivotal moment in the city's planning occurred with the construction of Barbaros Boulevard from Beşiktaş to Zincirlikuyu, acting as a crucial axis for the expansion of the main commercial hubs into different areas. In 1967, the construction of skyscrapers was incentivized in the city, leading to the rise of such structures notably in the Maslak district, marking a significant shift in the city's commercial landscape towards vertical development and modernization. During the 1970s,

particularly with the convergence of the Taksim-Şişli-Büyükdere axis and the Mecidiyeköy-Gayrettepe axis intersecting with Büyükdere in Zincirlikuyu, the northern part of Istanbul evolved as an extension of the historical peninsula's commercial hub. Simultaneously, the reduction of military zones in the north of the city, Sarıyer-Maslak, led to a clustering of multi-storey developments in these areas in the post-1970s. Following this period, efforts were made to preserve the "Old City" identity of the Historical Peninsula while transitioning it into a tourism and commercial-oriented area. This era witnessed a significant shift in commercial architecture, with firms increasingly favoring modern office buildings to remain competitive in the market alongside the prominence of tourism. Between the 1990s and the early 2000s, the development of the Maslak district paralleled the growth of the commercial axis, witnessing the emergence of industrial zones, business centers, and luxury residential areas. In the aftermath, Maslak emerged as a significant business and commerce hub on Istanbul's European side. Today, Maslak offers a balanced living environment with skyscrapers, malls, modern transport, and green spaces, reflecting sustainable growth in the city's commercial landscape. In conclusion, the evolution of Istanbul's central business district axis has played a pivotal role in the city's history, characterized by continual transformation influenced by urban planning strategies, economic shifts, and social changes (Göksu & Pilehvarian, 2019) (Figure 3.4).

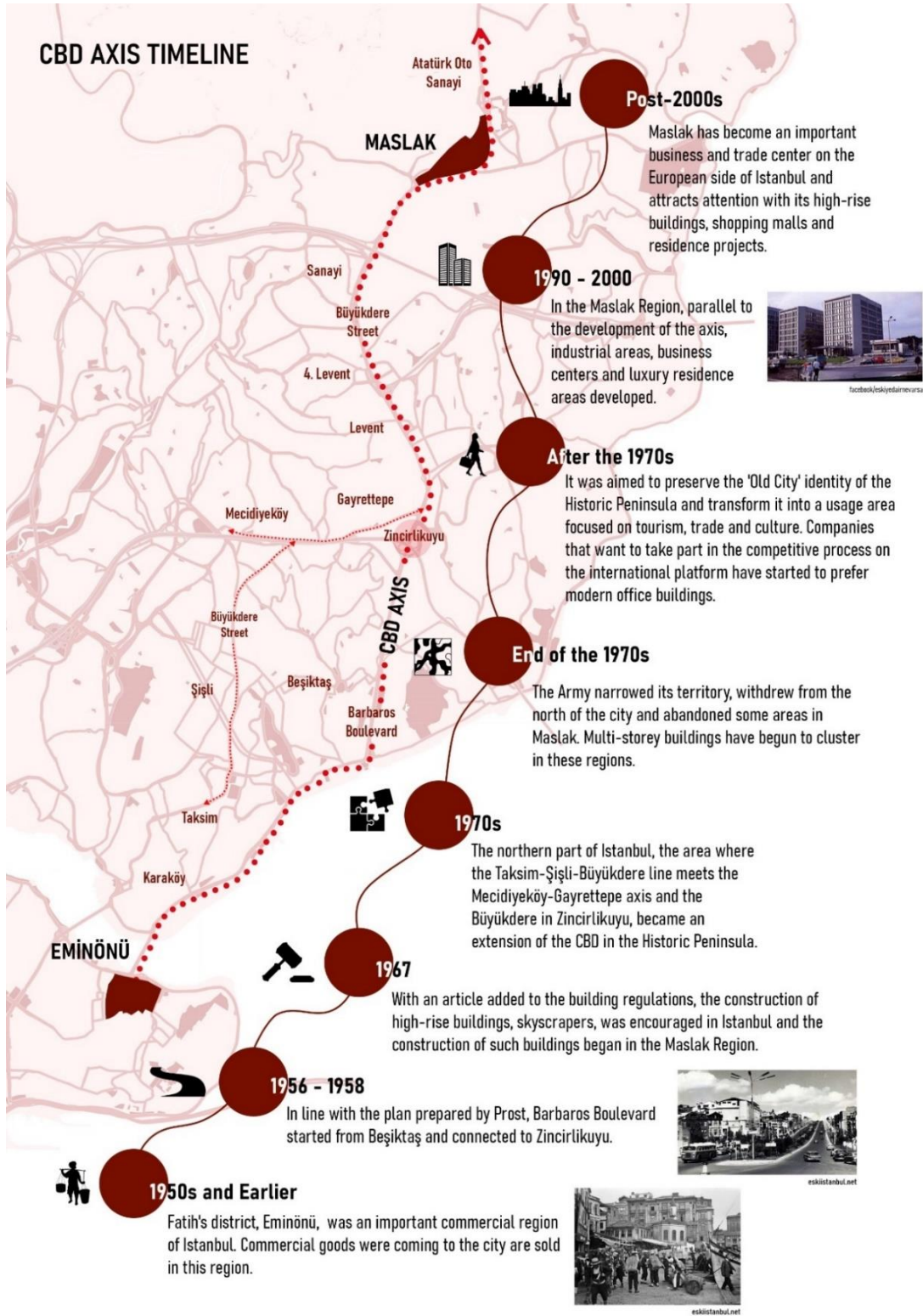


Figure 3.4 : Evaluation of Istanbul's Central Business District (CBD) axis.

Considering the historical context of these two study areas;

Eminönü was important as a center for city imports during the Byzantine and Ottoman periods. It was a busy business center for sailors, merchants and service providers.

Eminönü, the large port district of Istanbul, attracted attention with its religious monuments as well as inns and bazaars. Over time, the appearance of the region has changed greatly with the Galata Bridge and the infrastructure works (Fig 3.5). The arrival of steamboats, railways and trams contributed to the evolution of space. Sirkeci maintained its importance during the Ottoman Period due to its proximity to Topkapı Palace and being the pier of the Sublime Porte. The construction of railways and the opening of Sirkeci Train Station brought vitality to the region. It is also stated that Bahçekapı was an important transit point and was used to transport the grand viziers to the palace (Url-39).

During the Ottoman period, the architectural character of Eminönü Square changed with the construction of Sirkeci Train Station, the Fourth Vakıf Inn, the Postane and the commercial buildings of the reign of Sultan Abdulhamid I. However, the physical structure of the district began to change, especially during the period of governor and mayor Lütü Kırdar in 1938-1949. Eminönü, which became a district in 1928, changed with works such as the arrangement of the buildings in front of the New Mosque, the restoration of the Spice Bazaar and the opening of the Unkapanı - Eminönü road in 1955-1956 (Figure 3.5). During the Golden Horn applications between 1984-1989, Yemiş Pier and its surroundings were eliminated. Pedestrian bridges built in the 1980s destroyed the old character of the district. Sirkeci was the center of cheap hotels and shipping companies in the first half of the 20th century. However, after the 1960s, when cheap hotels shifted to Laleli and Aksaray districts, it came to the fore as a trade and business center. The Bahçekapı district contained residences until the 1960s, but then it completely became a commercial center. Cağaloğlu district, on the other hand, lost its political weight after the declaration of the republic and retained its feature of being a press center. It was connected to Fatih district on March 7, 2008, with Law No. 5747 (Url-29).

In the district of Sarıyer, it is known that certain settlement areas have been inhabited since the Byzantine period. These areas primarily consisted of small rural settlements with a few houses around some holy springs, churches, ancient ports, cisterns, and old castles located particularly along the coasts. The residents of these areas, mainly engaged in fishing, imparted a character of fishing villages to these settlements due to their livelihoods being primarily dependent on fishing. It is said that the Turks first

settled in these villages, particularly in Baltalimanı. Like all rivers flowing into the Istanbul Strait, the mouth section of the Baltalimanı Stream used to be a natural harbor. It is presumed that the construction of the large cistern here was intended to meet the water needs of the moored ships. The development of small villages along the shores of the strait began in the 16th and 17th centuries. During this period, Sarıyer, Yeniköy, and Rumeli Hisarı evolved into developed villages. By the 18th century, mansions belonging to some individuals near the palace began to appear on this coast. In the same century, with the permission of the sultan, some non-Muslim families settled in these villages. In the early 19th century, some villagers from Thrace were brought to Istanbul to teach the art of embroidery and fez coloring, and they were settled between Baltalimanı and Emirgan (Url-31).



Figure 3.5 : Old photo of Tahtakale and Golden Horn (Url-39).

Maslak was a village connected to Beyoğlu until 1930 during the Republican era (Fig 42). Between 1930 and 1954, it was affiliated with Sarıyer. In 1954, it became part of the Şişli district. With industrialization, the village, first becoming a neighborhood and later a district, was attached to Sarıyer along with the neighborhoods of Huzur and Ayazağa in 2012 with Büyükdere Road (Figure 3.6), following the municipal union decree. It is one of the prominent neighborhoods in Istanbul, characterized by the presence of tall and multi-storey buildings. Maslak is considered one of Turkey's rapidly modernizing neighborhoods (Url-32).



Figure 3.6 : Old Büyükdere road.

3.3 Urban Pattern Attributes

The development of cities has been shaped by the complex interaction of urban density and open spaces, integrating various layers such as social, physical, historical, and geographical aspects. People moving through urban spaces are influenced by the quality and quantity of these urban densities and voids. This interaction allows users to perceive space based on these characteristics, influencing their behaviors within the area. Therefore, a thorough analysis of the study area is crucial in the urban planning process.

Analyses conducted within the scope of the study include factors such as land use, figure-ground, urban elements and landmarks, street networks, and widths, building heights, and street enclosures. Examining these factors contributes to understanding the quality of space and the experience of its users. Each feature has a distinct impact on the dynamics of the urban landscape and how people perceive it, wayfinding decision-making in urban planning.

In conclusion, for urban spaces to effectively cater to their users and facilitate natural orientations within the urban fabric, a detailed analysis of the study area is essential in the urban planning process. These analyses serve as crucial tools in understanding how people interact with spaces socially and grasping the physical attributes of those spaces. In this context, decoding the meaning of spatial texture is a fundamental step in creating sustainable urban areas within urban planning practices.

3.3.1 Land use analysis

Land use analysis plays a crucial role in urban planning because it gives important information on the spatial structure and functionality of urban areas. By analyzing existing land uses, urban designers can carefully plan the layout of roadways, buildings, and public spaces to promote efficient movement, dynamic neighborhoods, and cohesive communities. Understanding land use patterns assists in the building of mixed-use developments that include residential, commercial, and recreational spaces, encouraging walkability and minimizing dependency on automobiles. Furthermore, land use analysis influences decisions for the preservation of historical sites, green spaces, and cultural landmarks, so improving the identity and character of cities.

Eminönü study area covers an area of 29.2 hectares. There are 503 buildings/structures in the area. When the ground floor land use of the Eminönü study area is examined, 486 (96.62%) of these buildings have a commercial function, 2 (0.40%) have a tourism function, 13 (2.58%) have a religious function, 1 (0.20%) has a public service function and 1 (0.20%) has a technical function (Figure 3.7). Within the commercial-trade areas, there are cafes-restaurants, pharmacies, basket makers, watchmakers, toy shops, fabric shops, dowry shops, shops selling hobby materials, technological devices and many other products. In addition, this commercial area also hosts Istanbul's wholesalers. When touristic function in the area is examined; There are 2 hotels in the area. These are Orientbank Hotel and Legacy Ottoman Hotel. Orientbank Hotel is housed within a 1912 structure created by architect August Jasmund, the resort, which underwent a significant renovation in 2021, blends modern amenities with a contemporary aesthetic while maintaining the building's historical beauty (Url-40). The Legacy Ottoman Hotel is one of the remaining examples of Ottoman architecture, existing in its past glory. Built-in 1911 to accommodate the demands of the area's office buildings, the structure served as a barrack for the French Allied Forces from 1920 to 1923, when it was known as "Caserne Viktor". It serves as a hotel now (Url-41). Religious buildings in the area are mosques, masjids and tombs. There are 10 mosques, 1 masjid and 2 tombs in the area. These are; Rüstem Paşa Mosque, Nuruosmaniye Mosque, Yeni Mosque, Hidayet Mosque, Vilayet, Mosque, Çandarlı Zade Atik İbrahim Paşa Mosque, Marputçular Mosque, Arpacılar Mosque, Tuti Abdullatif Mosque, Hobyar Mosque, Valide Hanı Masjid, Hatice Turhan Valide

Sultan Tomb and Şeyh Mehmet Geylani Tomb. The only public service building in the area is Hisar Inheritance and Fees Tax Office. This office is affiliated with the Istanbul Tax Office. And there is 1 building in the area which has a technical function. It is Istanbul Grand Post Office's (PTT) building. The Istanbul Grand Post Office is a postal service office building located in Sirkeci Neighborhood in the Eminönü area. This building built between 1905 and 1909, it was created in the first turkish national architectural style by architect Vedat Tek. The Istanbul Postal Museum has been placed in this 4-storey building since 2000. Sirkeci Post Office and office space for regional administration also placed in this building. The Istanbul Grand Post Office is the biggest post office building in Turkey (Url-42). Finally, there is one park that stands out in the area, and that is the New Mosque Park. Located in Rüstempaşa District, between the New Mosque, Spice Bazaar, Flower Market and Hatice Turan Sultan Tomb, this area, which has served as a park for many years, has been renewed due to neglected vegetation and functional areas that have lost their use value. And today the park serves as a recreation area and gathering point.

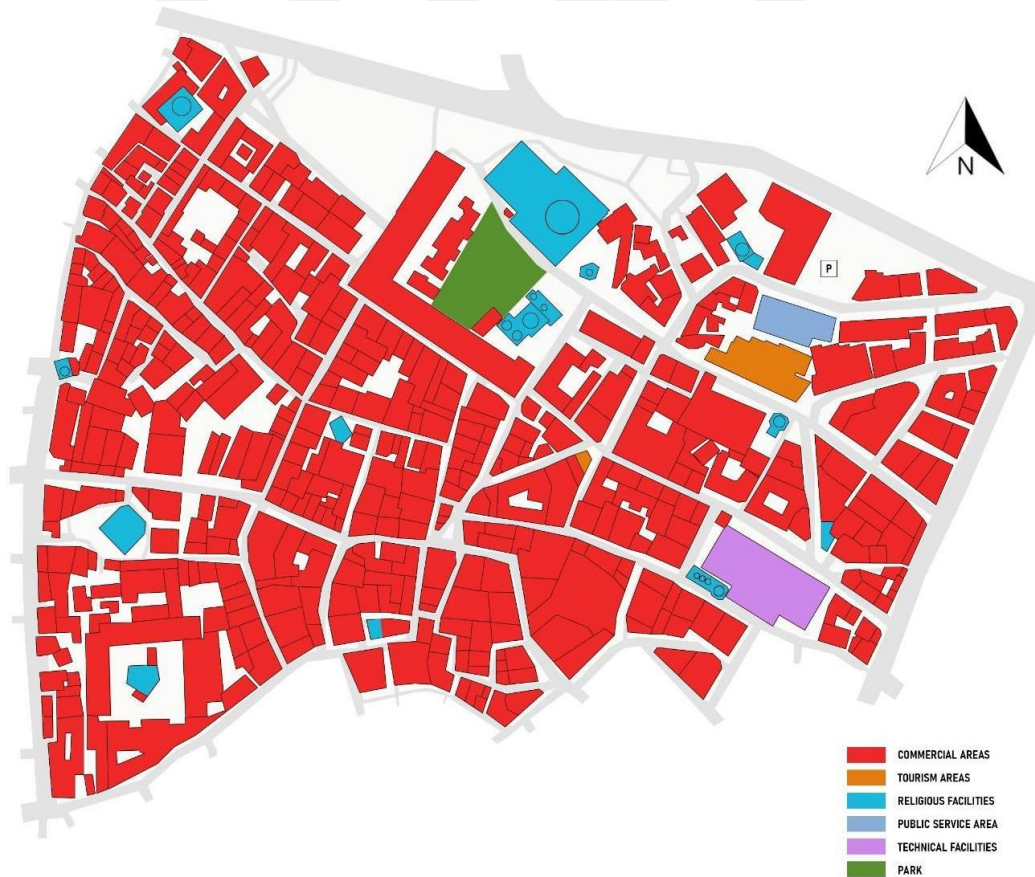


Figure 3.7 : Eminönü land use analysis.

Maslak study area covers an area of 35.5 hectares. There are 166 buildings/structures in the area. When the ground floor land use of the Maslak study area is examined, 153 (95.20%) of these buildings have a commercial function, 2 (1.20%) have a commercial+residential function, 1 (0.60%) have a religious function, 1 (0.60%) have a tourism function, 3 (1.80%) has a car park function and 1 (0.60%) fuel and service station function (Figure 3.8). Within the commercial areas, there are luxury and high-rise plazas where many sectors come together, making Maslak the business and financial center of Istanbul. There are approximately 4000 office spaces in Maslak area (Url-43). When commercial+residential function in the area is examined; There are residential buildings that has commercial functions near their blocks. These are RAMS Beyond İstanbul and Spine Tower. RAMS Beyond İstanbul is a 41-storey residential project developed by Rams Global and Sons, with a 360° panoramic view overlooking the three Bosphorus bridges in Istanbul. There are 524 housing units in the project, which consists of 3 side blocks (Url-44). Spine Tower, on the other hand, is among the symbol buildings of Istanbul, rising as a dynamic structure in the city's skyline thanks to its circular form and gradual rise, with its 47 floors and a height of 191 meters (Url-45). There is 1 Mosque in the study area which is called Maslak Üç Yol Mosque. This mosque is the only religious facility in the whole area and located at the south-west of the area. When touristic function in the area is examined; There is 1 hotel in the area, Hilton Istanbul Maslak. The 5-star Hilton Istanbul Maslak Hotel provides service with a total of 284 guest rooms, a lounge area with a panoramic view of Istanbul and the Bosphorus, an Art Gallery located in the hotel's lobby, a conference area of more than 6000 square meters and various entertainment areas (Url-46).

There are 3 buildings which has a car park function in the area. These multi-storey car parks, located in the middle of the study area, meet the parking needs of the visitors in the area. And there is 1 gas station at the southwest corner of the study area. In addition to being Turkey's first "Ecological" Fuel Station; TSK Mehmetçik Foundation Maslak Fuel Station, which has many features such as being a pioneer in the sector in matters such as environment, safety, quality, and technology, is located on Büyükdere Street and was opened in 2008 (Url-47). In addition, there is a park area in the north of the area and there are passive green areas scattered in the area which has borders to the surrounding roads.



Figure 3.8 : Maslak land use analysis.

3.3.2 Figure-ground analysis

Figure-ground analysis is an essential tool in urban planning, offering a minimalist powerful representation of built and unbuilt spaces within urban texture. Typically, it's made in black&white like X-Ray. These diagrams showcase buildings and masses in black as 'figure', while the white spaces in between represent the 'ground'. This visualization technique serves as a foundational step in analyzing the spatial characteristics of an urban texture, providing insights into building patterns, scale, density, and the nature of the spaces they create. By understanding the relationship between solids and voids, planners and designers can delve into considerations such as legibility, enclosure, exposure, lost spaces, and overall urban character. In essence, figure-ground diagrams serve as a bridge between theoretical analysis and practical design considerations in urban planning (Url-48).

At the figure-ground analysis of the Eminönü study area, it is seen that most of the buildings in the area are attached (Figure 3.9). There are rows of commercial shops at the building blocks where attached buildings are located throughout the area. These shops are intertwined at some points, forming building blocks with indentations and protrusions. Looking at the overall, it is relatively easy to identify major routes between buildings. Since these main roads divide the area into clear sections, a well-defined main road network is read from the analysis. However, small routes are a little more difficult to observe, because the construction in Eminönü dates back many years and still preserves its historical complex texture.

Moving from east to west of the area; It is seen that there are almost no ground openings in the building blocks, in the east part of the area, which has historical large-mass buildings. There are occasionally small ground openings in the building blocks towards the middle of the area. And in the west of the area, the spaces inside the building blocks are more open than the general area and the small-mass buildings are more located in this part. When the building blocks which has courtyards are examined, it is seen that these building blocks consist of inns, like Şark Inn and Büyük Valide Inn at the left bottom part of the area.



Figure 3.9 : Eminönü figure-ground analysis.

When the open spaces in the area are examined, it is generally observed that the building/mass density in the area is higher than the open spaces. Although there are small open spaces throughout the area, there are 2 main open spaces that stand out. These are the Eminönü Square located in the north and the Yeni Camii Park located next to the Yeni Mosque, on the right side of Eminönü Square. While Eminönü Square is defined by the 'L' shaped Mısır Bazaar, commercial adjacent buildings and the road passing through the north of the area; Yeni Camii Park is defined by the space between the Yeni Mosque and Mısır Bazaar.

At the figure-ground analysis of the Maslak study area, it is seen that most of the buildings in the area are detached (Figure 3.10). There are commercial office plazas where detached buildings are located throughout the area. These buildings are mostly located randomly in some parts of the area and do not create defined building blocks. Looking at overall, it is very hard to identify major routes, and no well-defined main road network is read from the analysis. Only in the south part of the area, there is a defined road that can be read from the buildings located on the east-west parallel line can be observed. Moving from east to west of the area; There are larger buildings that have higher towers, in the east part of the area, and smaller and lower buildings are located on the west side of the area.

When the open spaces in the area are examined, it is generally observed that the building/mass density in the area is nearly balanced with the open spaces. There are mostly large open spaces in the area, but there is 1 main open space that stands out in the area which is located in the north part of the study area. This empty area is currently idle space. This area, where Yıldız Technical University's dormitory was previously located, was left as a large empty green area that lost its use after the dormitory was demolished. This area, under the name of Yıldız Technical University Maslak Campus, has not been active since 2017. In line with the strategic goals of the Yıldız Technical University; It is planned to build the university's educational units in an area of 8.473 m² and the techno park area in an area of 6.807 m² of the 15.280 m² area, which is located on Maslak Büyükdere Street (Url-49).



Figure 3.10 : Maslak figure-ground analysis.

3.3.3 Urban elements, landscape and landmark analysis

City Image is a model that approaches urban design mentally and focuses on readability (Lynch, 1960). In the analyzes in this section, to perceive the important points and main situation in the area, the elements of 'Path, Edge, Node, District and Landmark', which Lynch describes as 5 urban elements and states that people understand the environment around them in predictable ways with these elements, are showed. Landmarks were also mentioned and landscape elements were also shown in the analysis.

In the Eminönü study area; The paths area are spread over a wide area and a connected road path can be seen (Figure 3.11). Although these paths are the busiest streets in the area, they are the streets that connect landmarks and transportation nodes. When the edges are examined, it is seen that Eminönü Square is shaped from the borders formed by the main road, Mısır Bazaar, and commercial buildings near the square in the north part of the area. There are fences near some of the buildings and there is a short wall next to the Çandarlı Zade Asif İbrahim Paşa Mosque (round one at the left) which also

creates an edge in the study area. There are 12 node points in the area. These node points are generally located at points where pedestrian movements are concentrated, at important street intersections such as intersections of narrow streets and places where main streets connect to narrow streets, in areas where public transportation points are located, and near touristic/popular locations. Three characteristic districts stand out within the dense commercial texture of Eminönü. One of them is Eminönü Square. The other one is the densest pedestrian area (in the north, including the Yeni Mosque and Mısır Bazaar), where the pedestrian density is high, a gathering point, and which is the entrance area after Eminönü Square. And finally, the Tahtakale area (in the west), which is the densest commercial area, is another district in the Eminönü study area.

There are 10 landmarks in the area. These are; Rüstem Paşa Mosque, Yeni Mosque, Mısır Bazaar, Şark Inn, Büyük Valide Inn, Doğu Bank Business Inn, Vakıfbank, Ziraat Bank, Yapı Kredi Bank and PTT Building. These mosques are used as reference points, especially when giving directions to people in the area. They are visible within the dense urban texture and vitality of Eminönü. Mısır Bazaar is also another landmark. It has a very large scale and is a very popular touristic building in the area. Mısır Bazaar (Spice Bazaar) is one of the oldest markets in Istanbul. In this bazaar, famous for its herbalists, in addition to products in line with the old tradition such as herbal medicines, spices, flower seeds, rare plant roots and bark; Dried nuts, delicatessen products and various food items are sold (Url-50). There are 3 inns as a landmark in the Eminönü study area. These inns are large in scale, visible, and consist of many shops clustered together, compared to other small commercial shops in the area. The buildings of 4 different banks in the area also have landmark characteristics. These banks are among the important landmarks in the area due to historical texture of their buildings, their visibility in terms of scale, and the fact that they are known by most tradesmen and people since Eminönü is a commercial area. When the landscape in the area is examined, it is seen that the landscape in the area is concentrated in Eminönü Square, Yeni Mosque Park, and the middle parts of the building blocks located in the southwest of the study area. In general, the area lacks landscaping and is dominated by concrete.



Figure 3.11 : Eminönü urban elements, landscape and landmark analysis.

In the Maslak study area; The paths are connect the two sub-regions in the north and south (Figure 3.12). These paths are internal roads that are the busiest streets in the area and create meaningful routes by connecting. When the edges are examined, it is seen that Büyükdere Street is an edge that surrounds the entire area. Büyükdere Street, which is multi-lane and has a refuge in the middle, sharply separates the Maslak area from the surrounding areas at the east and south. There are 4 node points in the area. These node points are especially located in areas where public transportation points are located. Since there are many office areas in the Maslak area, the 'Plazas' exit of the M2 metro in the area is extra busy, especially during work hours. Also, there are points where pedestrian movements are concentrated and where the main street connects to a narrow street. Three characteristic districts stand out in the Maslak study area. The busiest business area in the Maslak study area is located in the south and contains Maslak Üç Yol Mosque and well-known office buildings such as Orjin Plaza. There are idle areas as a district, located at two points. They stand out in the study area in general. Finally, the industry area district is located in the area as a part of the extension of the Atatürk Auto Industrial Zone.

There are 6 landmarks in the area. These are; Maslak Üç Yol Mosque, Orjin Plaza, Sun Plaza, Spine Tower, Hilton Hotel, and Normin Center. These landmarks have different reasons for being a landmark. Maslak Üç Yol Mosque is the only religious facility so it is well-known in the area. Also, it has a large scale and characteristic architectural style. Located at the exit of the metro station in Maslak, Orjin Plaza, which has become one of the 'landmark' buildings of Maslak, attracts attention with its social areas and architecture. There are dining venues, a market, and a parking lot inside the plaza (Url-51). Spine Tower is the highest building in the area so it can be seen from a lot of parts of the area. And, Normin Center is another landmark known for its ability to bring together many different activity areas and functions in the Maslak Study area. When the landscape in the area is examined, it is seen that the landscape is concentrated in the idle spaces and some of the middle parts of the study area. Green areas are increasing from south to north. In general, landscape and concrete built-up areas are balanced in the study area.



Figure 3.12 : Maslak urban elements, landscape and landmark analysis.

3.3.4 Street width analysis

Street width analysis is important in urban design since it directly affects many aspects of the urban environment. The suitable width of streets is determined by factors such as pedestrian safety, vehicular traffic flow, accessibility, and the area's overall aesthetic appeal. Narrower streets can encourage slower vehicle speeds, making the area safer for pedestrians and cyclists while also encouraging community and walkability. Wider streets, on the other hand, can accommodate increased traffic volume and emergency vehicle access while prioritizing vehicular movement over other modes of transportation. Thus, a full review of street width is required to balance functionality, safety, and the quality of urban life (Urban Design Associates, 2017).

The most common street width range in the Eminönü study area is 6-7.9 meters (Figure 3.13). It is seen that the second most common road width range in the area is 2-3.9 meters. These narrow streets in the area are generally wide enough to allow only pedestrian use, occasionally have motorcycle traffic, are sometimes dead-end streets, and are generally connected to streets between 6-7.9 meters wide. Ragıp Gümüşpala and Reşadiye Street are located in the north of the area, Ankara Street connects to Reşadiye Street and continues to the south (towards Sirkeci) and Uzun Çarşı Street is located in the lower-left corner of the study area are the widest streets in the area with street widths of 14 meters and above. Traffic is very busy on these streets. While vehicle traffic is dominant on Ragıp Gümüşpala, Reşadiye, and Ankara Streets, pedestrian traffic is also active along the road, with single-lane vehicle traffic on Uzun Çarşı Street which has wide sidewalks on both sides of the road.

The rarest street width range in the area is 10-11.9 meters. The streets between 8-9.9 meters in the area are concentrated in the middle part of the area. The narrowest street in the area is Macuncu Street, which is in the form of a covered passage with 2.15 meters, and the widest street is Ragıp Gümüşpala Street with 8 lanes, (4-4) with 21.18 meters. It is seen that there are streets narrower than 8 meters in general throughout the area.



Figure 3.13 : Eminönü street width analysis.

On the other hand, the most common street width range in the Maslak study area is 8-9.9 meters (Figure 3.14). It is seen that the second most common road width range in the area is 6-9.9 meters. These streets are generally located in the middle part of the study area, are sometimes dead-end streets, and are generally connected to streets between 8-9.9 meters wide. Büyükdere Street, which starts from the south of the area and curves towards the north, and Eski Büyükdere Street, located in the south of the area and above Büyükdere Street, are the widest streets in the area with a range of 14 meters or more. While Büyükdere Street starts with 8 lanes (4-4), decreasing to 6 lanes (3-3), the one-way Eski Büyükdere Street starts with a single lane and continues with 2 lanes. Traffic is very busy on these streets.

The rarest street width range in the area is 2-3.9 meters. The narrowest street in the area is 3.09 meters, and the widest street is Büyükdere Street with 50.36 meters. It is seen that there are streets narrower than 10 meter in general throughout the area.



Figure 3.14 : Maslak street width analysis.

3.3.5 Building height analysis

Building height analysis is essential in urban design since it has a direct impact on the city's visual, social, and environmental elements. The serious consideration of building heights ensures that the urban landscape remains harmonious and balanced, adding to the city's overall aesthetic appeal. Furthermore, building height analysis has an impact on aspects such as sunlight access and vistas, all of which are important in constructing comfortable and habitable urban settings. Building height analysis is critical in forming the physical and social fabric of urban areas.

In this part; The number of floors in the building heights analyses was calculated by inferring from the building heights and assuming that the height of each floor is 3 meters. In other words, buildings that appear to be single-storey from the outside but have the height of a multi-storey building are calculated in this way.

In the Eminönü study area; There are 23 (4.59%) buildings that have a 1-storey, 99 (19.68%) buildings have 2-storey, 119 (23.66%) buildings have 3-storey, 174 (34.59%) buildings have 4-storey, 77 (15.30%) buildings have 5-storey, 3 (0.59%) buildings have 6-storey and 8 (1.59%) buildings have 7 and more storey in the area (Figure 3.15). 4-storey buildings are dominant in the area. 3-storey buildings, following the 4-storey buildings, are also quite dense in Eminönü study area. More than half of the buildings in the area are 3 and 4-storey buildings. 4-storey buildings are generally clustered in the middle of the study area. Although the lowest number of floors in the area is 1 and the highest number is 9, the rarest are 6-storey buildings. Also, with 7 and more storey buildings very rare in the area. In general, the number of building floors decreases from east to west.

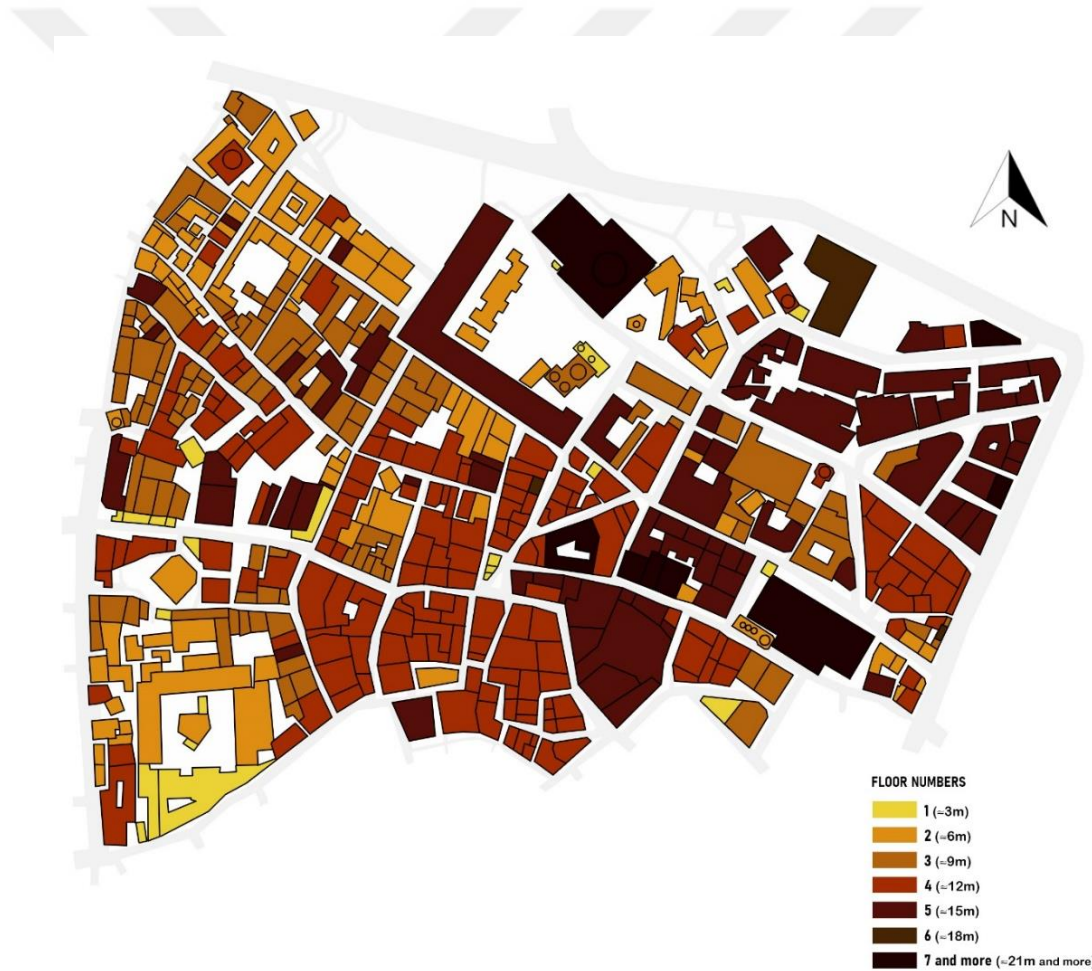


Figure 3.15 : Eminönü number of floors analysis.

In the Maslak study area; There are 45 (27.10%) buildings that have a 1-storey, 22 (13.25%) buildings have 2-storey, 30 (18.07%) buildings have 3-storey, 12 (7.22%) buildings have 4-storey, 9 (5.42%) buildings have 5-storey, 4 (2.40%) buildings have

6-storey and 44 (26.54%) buildings have 7 and more storey in the area (Figure 3.16). 1-storey buildings are dominant in the area. But 7 and more storey buildings, nearly it is the same number as the 1-storey buildings, are very dense in Maslak study area. More than half of the buildings in the area are 1 and 7&more storey buildings. 1-storey buildings are located at the south part of the study area and clustered in some parts together. Although the lowest number of floors in the area is 1 and the highest number is 47, the rarest are 6-storey buildings. Also with 5-storey buildings very rare in the area.

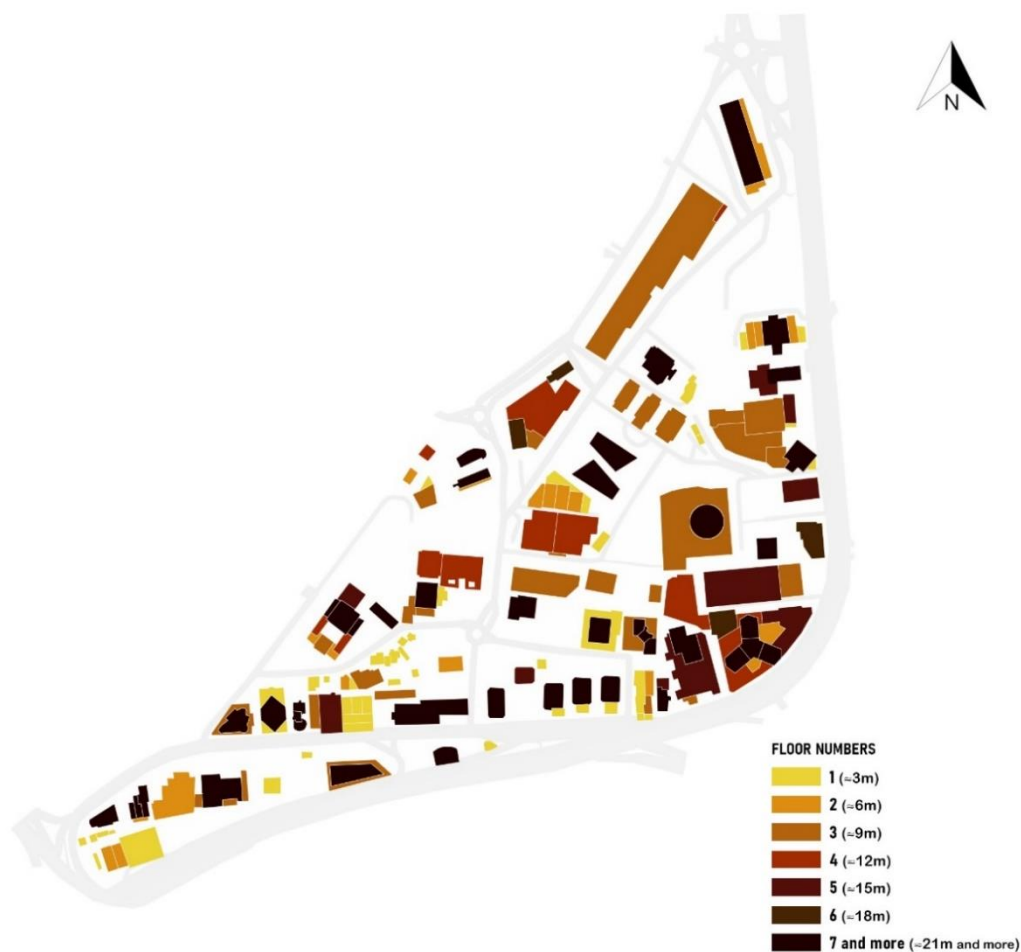


Figure 3.16 : Maslak number of floors analysis.

3.3.6 Street enclosure analysis

Street enclosure analysis is critical in urban design and planning because it gives useful information about the spatial aspects and characteristics of urban streetscapes. Designers and planners can gain a better understanding of how the physical environment influences human experience and behavior in urban settings by studying

street enclosure (Carmona, 2010). Analysis of street enclosure identifies patterns of building placement, heights, and setbacks that contribute to the overall sensation of enclosure along streets (Lynch, 1984). This understanding is critical for designing pedestrian-friendly surroundings that encourage walking and social interaction (Gehl, 2011). Furthermore, street enclosure research can help to influence decisions about street design, land use planning, and public space development, resulting in more lively and livable cities (Whyte, 1988).

Street enclosure analyses for Eminönü and Maslak study areas were made manually in this section. For each street in the study areas, an enclosure ratio was obtained by proportioning the height of the structures/buildings on both sides of the street to the distance between these structures. It is observed from the analyses, that this rate varies from place to place in some streets. This is because the buildings along the street do not form a regular facade or are positioned irregularly or there are no buildings in some parts of the street. Another factor is that street width varies on the same street, in some parts. For this reason, the enclosure rate varies at some focal points.

When the street enclosure analysis in the Eminönü study area is examined in detailed, it is observed that the prevailing ratio in the entire area is 1:1 and above (Figure 3.17). This means that there is a strong and high placemaking potential in the field. However, this ratio increases in some parts of the area, creating a claustrophobic feeling. When the street intersections in the area are examined, streets with very high enclosure rates are getting wide at these points and the enclosure ratio decreases by 2-3 ratio range in general. The street enclosure ratio increases from east to west of the area. The reason for this situation is that while there are 5-7 storey buildings and very wide streets in the east of the area, there are 2-4 storey buildings and very narrow streets in the west of the area. The public space (Eminönü Square) and the wide main road located in the north of the area have the least enclosures in the area, with a ratio of less than 1:5.

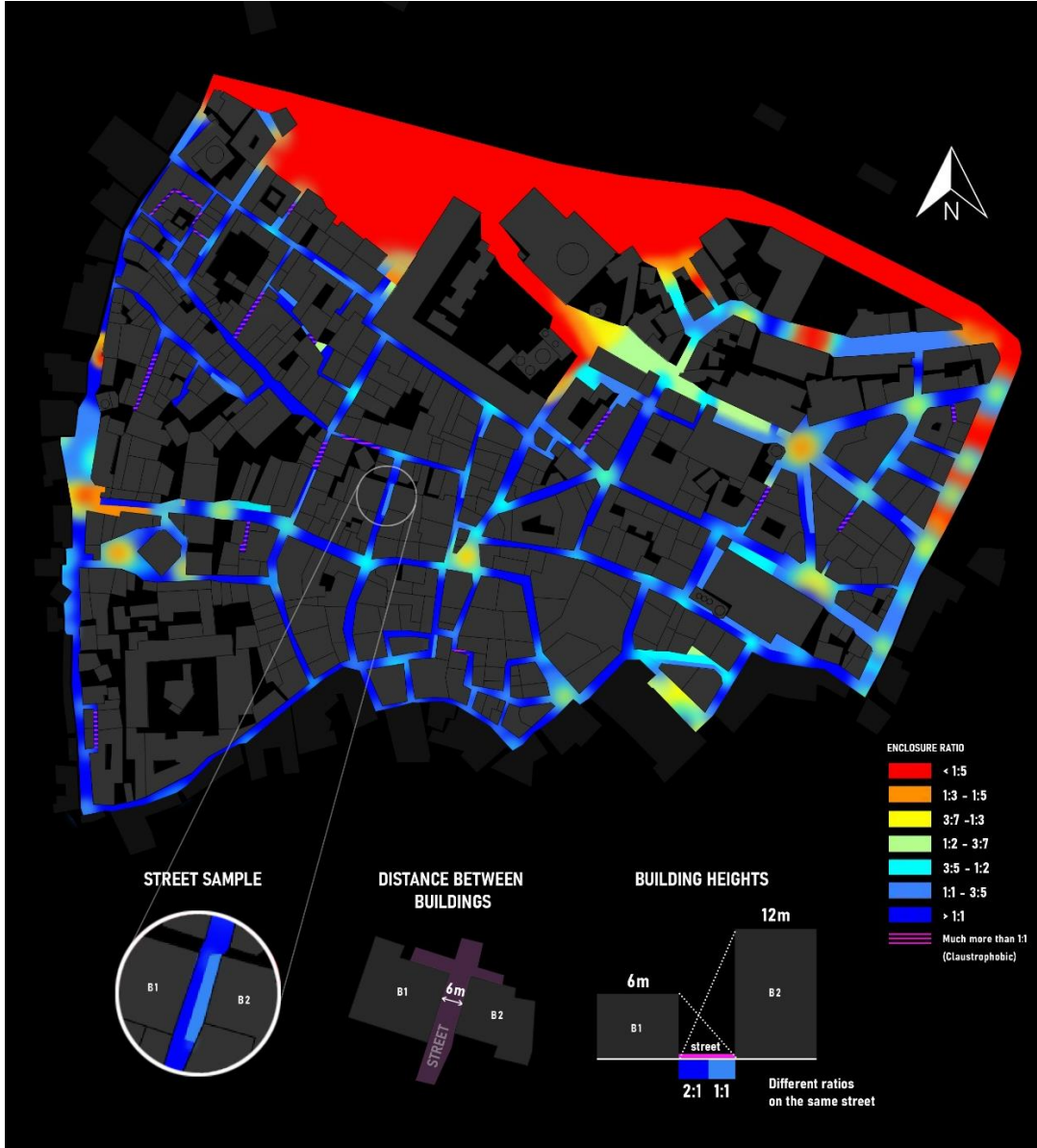


Figure 3.17 : Eminönü street enclosure analysis.

On the other hand, in Maslak study area, it is observed that the prevailing ratio in the entire area is 1:5 and lower (Figure 3.18). This means that there is a weak and low placemaking potential in the field. This ratio increases in some parts of the area, even over 1:1. Street enclosure is getting higher where the narrow streets are located in the study area. There are also some narrow areas (lower ratios) on Büyükdere Street, on the east side of the area, because of the buildings located on both sides of the road. On the north side of the area, there are some streets which have lower street enclosure ratio between 1:3-1:5.



Figure 3.18 : Maslak street enclosure analysis.

Comparison of Urban Attributes

In this section, analyses prepared for the Eminönü and Maslak study areas have been compared, similarities and differences between the study areas have been examined on analysis basis (Figure 3.19).

Land Use Analysis: Eminönü and Maslak both serve as significant commercial hubs in Istanbul, with 96.62% and 95.20% of their buildings dedicated to commercial purposes, respectively. While both areas host diverse functions, they differ in size and architectural characteristics. Maslak sprawls over 37.76 hectares with modern high-

risers and luxury plazas, while Eminönü boasts a rich variety of land uses including commercial, tourism, religious, public service, and technical functions, along with historical Ottoman-era structures. Eminönü's transportation leans towards traditional human-oriented modes like tram, whereas Maslak showcases a modern infrastructure. Eminönü has numerous religious facilities, contrasting with Maslak's singular mosque.

Figure-Ground Analysis: In terms of spatial layout, both areas feature open spaces but with different scales. Eminönü exhibits a denser structure with more attached buildings, while Maslak leans towards detached structures, resulting in a less defined urban fabric. Eminönü's open spaces are smaller and scattered, contrasting with Maslak's larger and evenly distributed ones. Eminönü's building density surpasses Maslak's, with a well-defined main road network compared to Maslak's less discernible routes.

Urban Elements, Landscape and Landmark Analysis: Both Maslak and Eminönü possess identifiable urban elements contributing to their navigability, yet they diverge in layout and boundary delineation. Eminönü's dense urban texture and complex pathways contrast with Maslak's more open and detached layout. Eminönü's boundaries are marked by main roads and commercial buildings, whereas Maslak's are primarily defined by Büyükdere Street. Eminönü exhibits a higher concentration of node points, reflecting its historic texture.

Street Width Analysis: Despite similarities in street width distribution patterns, Maslak and Eminönü differ in overall widths. Maslak tends to have wider streets accommodating more vehicular traffic, while Eminönü's streets are narrower, promoting pedestrian activity. Eminönü's streets can be as narrow as 2-3.9 meters, contrasting with Maslak's broader thoroughfares.

Building Height Analysis: While both areas exhibit a clustering of buildings with similar heights, their heights differ. Eminönü predominantly features mid-rise buildings, whereas Maslak stands out a mix of low-rise and high-rise buildings, with taller structures concentrated in certain zones.

Street Enclosure Analysis: Both areas acknowledge the significance of street enclosures in shaping urban spaces, but they exhibit varying ratios. Eminönü demonstrates higher street enclosure ratios, creating a sense of urban intensity, but

potentially inducing claustrophobia in some areas. In contrast, Maslak features lower street enclosure ratios, contributing to a more open environment overall.

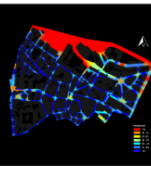
	Eminönü	Maslak	Analysis Comparisons of Two Study Areas
Land Use			Similarities: Both Eminönü and Maslak are significant commercial centers in Istanbul, with 96.62% and 95.20% of buildings serving commercial purposes. Both areas contain various functions. Differences: Maslak covers a larger area of 37.76 hectares, while Eminönü has a higher number of buildings and structures. Eminönü has a wider variety of land uses, including commercial, tourism, religious, public service, and technical functions. Eminönü has architectural character including historical buildings and Ottoman-era structures, while Maslak features modern high-rise buildings and luxury plazas. Maslak has designated green areas while Eminönü has a prominent park. Maslak's transportation infrastructure is modern, while Eminönü's is pedestrian-oriented and traditional, like tram and ferry. Eminönü boasts numerous religious facilities while Maslak has one mosque.
Figure-Ground			Similarities: Both areas have open spaces, both smaller and larger scale. Differences: Eminönü has more attached buildings, while Maslak has mostly detached buildings, resulting in a less defined structure. Eminönü's open spaces is smaller and scattered, while Maslak's is larger and more evenly distributed. The building density in the area is higher in Eminönü than in Maslak. The main road network in Eminönü is well-defined, while Maslak lacks it, making it difficult to identify major routes.
Urban Elements, Landscape and Landmark			Similarities: Maslak and Eminönü are both urban areas with identifiable elements, contributing to their readability and navigability. They also have distinct districts within their commercial textures, offering diverse experiences and functions to residents and visitors. Differences: Eminönü has a dense urban texture with attached buildings, and contains complex, and continuous pathways, while Maslak has a more open and detached layout. Eminönü's boundaries are defined by main roads and commercial buildings, while Maslak's boundaries are primarily defined by Büyükdere Street. Eminönü has a higher concentration of node points, reflecting its historic and densely populated nature, while Maslak's node points are more strategically located.
Street Width			Similarities: Both Maslak and Eminönü have similar street width distribution patterns, with common widths being 6-9.9 meters. Differences: Eminönü and Maslak have different street widths, with Maslak having wider streets, and Eminönü having narrower streets. Eminönü has narrower streets, with some as narrow as 2-3.9 meters. Vehicle traffic is more prominent in Maslak and pedestrian traffic is more active in Eminönü.
Building Height			Similarities: Both Eminönü and Maslak areas show a clustering of buildings with similar heights, indicating uniformity in the urban fabric. Differences: The building height analysis reveals that Eminönü has a higher density of mid-rise buildings, with 3 and 4-storey structures being the most common. In contrast, Maslak has a more varied skyline with high-rise buildings, particularly those with 7 or more storeys. Eminönü shows a gradual decrease in building heights from east to west, while Maslak has clusters of both low-rise and high-rise buildings dispersed throughout the area, with taller structures concentrated in certain zones.
Street Enclosure			Similarities: Maslak and Eminönü both acknowledge the crucial role of street enclosures in shaping urban environments and creating pedestrian spaces. However, they also note variations in street enclosure ratios, indicating diverse spatial experiences along different streets. Differences: Eminönü has higher street enclosure ratios, indicating a strong sense of enclosure and urban intensity. But in some streets enclosure ratios may create claustrophobia feeling. Maslak has lower street enclosure ratios, indicating a more open environment. While the street enclosure ratio is low in the north, and high in the general of the Eminönü area, the street enclosure ratio is low throughout the area, except for some side streets, in Maslak. The ratios vary within the areas, with some locations having higher ratios due to narrow streets or distance between buildings.

Figure 3.19 : Analysis comparisons of two study areas.

The street width analysis, building height analysis and street enclosure analysis, made in both study areas, are examined in more detail, and compared with each other. While doing detailed analyses, the street texture in both areas is divided it into pieces from each intersection points. While the number of links (road segments) is 177 in the Eminönü study area, this number is 63 in the Maslak study area (Figure 3.20). This means, while the street texture of the Eminönü study area is richer and contains many alternatives in terms of wayfinding, the Maslak study area is weaker in this perspective. 3 analyzes in the study areas are examined and average values is defined for each road segment. These values calculated by taking the average of the street widths of the link, the average of heights of the buildings on both side of the link and the average of street enclosure of the link.

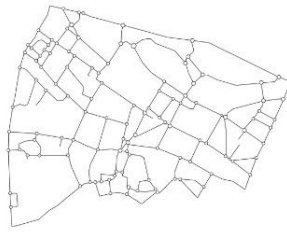
Street Widths of the Links: When the average street widths of the links at study areas are examined, in Eminönü study area; 29 (16%) of these are 2-3,9 meters, 9 (5%) of these are 4-5,9 meters, 114 (65%) of these are 6-7,9 meters, 8 (5%) of these are 8-9,9 meters, 2 (1%) of these are 10-11,9 meters, 6 (3%) of these are 12-13,9 meters and 9 (5%) of these are 14 and above meters. On the other hand, in Maslak study area; 1 (2%) of these are 2-3,9 meters, 1 (5%) of these are 4-5,9 meters, 13 (21%) of these are 6-7,9 meters, 28 (44%) of these are 8-9,9 meters, 2 (3%) of these are 10-11,9 meters, 2 (3%) of these are 12-13,9 meters and 14 (22%) of these are 14 and above meters.

Building Heights of the Links: When the average building heights of links at Eminönü study area is examined; 19 (11%) of these streets have no buildings on the one side (shown with; – (≈ 0 m)), 5 (3%) of these streets have 1-storey buildings, 32 (18%) of these streets have 2-storey buildings, 46 (26%) of these streets have 3-storey buildings, 55 (31%) of these streets have 4-storey buildings, 17 (10%) of these streets have 5-storey buildings, 2 (0.3%) of these streets have 6-storey buildings and 1 (0.7%) of these streets have 7 and more storey buildings. On the other hand, in Maslak study area; 29 (46%) of these streets have no buildings on the one side (shown with; – (≈ 0 m)), 1 (2%) of these streets have 2-storey buildings, 4 (6%) of these streets have 3-storey buildings, 6 (10%) of these streets have 4-storey buildings, 2 (3%) of these streets have 5-storey buildings, 11 (17%) of these streets have 6-storey buildings and 10 (16%) of these streets have 7 and more storey buildings.

Enclosure Ratio of the Links: When the average street enclosure ratio of links at Eminönü study area is examined; 23 of them (13%) are between 1:5 and below enclosure ratio, 2 of them (1%) are between 1:3-1:5 enclosure ratio, 3 of them (2%) are between 3:7-1:3 enclosure ratio, 4 of them (2%) are between 1:2-3:7 enclosure ratio, 9 of them (5%) are between 3:5-1:2 enclosure ratio, 49 of them (28%) are between 1:1-3:5 enclosure ratio and 87 of them (49%) is between 1:1 and above enclosure ratio. On the other hand, in Maslak study area; 37 of them (58%) are between 1:5 and below enclosure ratio, 12 of them (19%) are between 1:3-1:5 enclosure ratio, 5 of them (8%) are between 3:7-1:3 enclosure ratio, 3 of them (5%) are between 1:2-3:7 enclosure ratio, 3 of them (5%) are between 1:1-3:5 enclosure ratio and 3 of them (5%) is between 1:1 and above enclosure ratio.

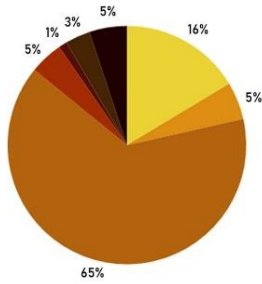
In conclusion, dominant features of the links of Eminönü is 6-7.9m street width, 4 storey building height and 1:1 and above enclosure ratio. On the other hand, dominant features of the links of Maslak is 8-9.9m street width, existence of buildings only one side of the link and 1:5 and below enclosure ratio.

EMİNÖNÜ



Number of Links
(Road Segments):
177

EMİNÖNÜ STREET WIDTHS



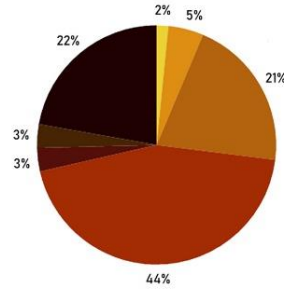
Street Widths	Number of Links
2 - 3,9 (m)	29
4 - 5,9 (m)	9
6 - 7,9 (m)	114
8 - 9,9 (m)	8
10 - 11,9 (m)	2
12 - 13,9 (m)	6
14 > (m)	9

MASLAK



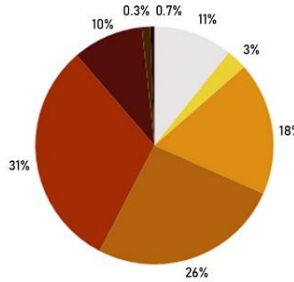
Number of Links
(Road Segments):
63

MASLAK STREET WIDTHS



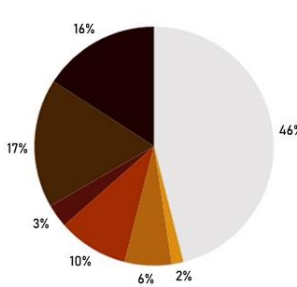
Street Widths	Number of Links
2 - 3,9 (m)	1
4 - 5,9 (m)	3
6 - 7,9 (m)	13
8 - 9,9 (m)	28
10 - 11,9 (m)	2
12 - 13,9 (m)	2
14 > (m)	14

EMİNÖNÜ BUILDING HEIGHTS



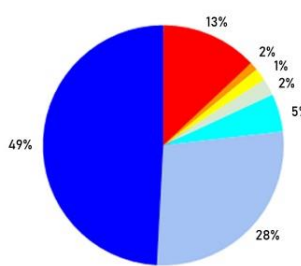
Building Heights	Number of Links
- (≈0m)	19
1 (≈3m)	5
2 (≈6m)	32
3 (≈9m)	46
4 (≈12m)	55
5 (≈15m)	17
6 (≈18m)	2
7 and more (≈21m and more)	1

MASLAK BUILDING HEIGHTS



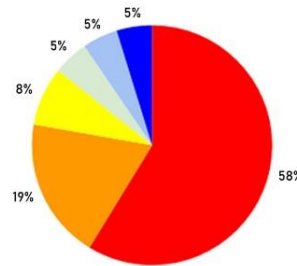
Building Heights	Number of Links
- (≈0m)	29
1 (≈3m)	0
2 (≈6m)	1
3 (≈9m)	4
4 (≈12m)	6
5 (≈15m)	2
6 (≈18m)	11
7 and more (≈21m and more)	10

EMİNÖNÜ STREET ENCLOSURE



Street Enclosure	Number of Links
< 1:5	23
1:3 - 1:5	2
3:7 - 1:3	3
1:2 - 3:7	4
3:5 - 1:2	9
1:1 - 3:5	49
> 1:1	87

MASLAK STREET ENCLOSURE



Street Enclosure	Number of Links
< 1:5	37
1:3 - 1:5	12
3:7 - 1:3	5
1:2 - 3:7	3
3:5 - 1:2	0
1:1 - 3:5	3
> 1:1	3

Figure 3.20 : Analysis of the road segments in the two study areas.

3.4 Subject Group Study

On weekday afternoons, a site study has been carried out on the relationship between wayfinding and human scale in urban commercial areas - 30 subjects (participants) in Eminönü study area and 30 subjects (participants) in Maslak study area - with a group of 60 subjects (participants) who had never experienced the study area or had visited once.

Determining Start-End Points of the Study and Subject Group Size

Before conducting the subject group study, start-end points (A, B) were determined. These points were chosen as the two possible farthest points of the study areas. In addition, attention was paid to ensuring that the road network between these two points could offer various route alternatives for the subjects. When points A and B in the Eminönü study area are examined; point A is located in the north-west corner of the area and is located on the side of the main road separating the golden horn and the bazaar area, with a small opening that invites pedestrians to the area, on the other hand, point B is located in the south of the area, where the topography level increases and is a specific point where several streets intersect. When points A and B in the Maslak study area are examined; point A is located at the exit of the M2 metro stop (İTÜ Ayazağa - Plazalar Exit) and is a point where daily pedestrian traffic is very intense, on the other hand, point B is a point at a higher elevation than point A, close to the other metro station (Atatürk Oto Sanayi – South Exit) and located where the defined area for pedestrians ends.

A pedestrian count was conducted, on the weekday midday, in the study areas to determine the size of the subject group. To find the hourly number of pedestrians in the area, the number of pedestrians at the starting and ending points (A, B) was measured by visiting the area and using the observation method. When the pedestrian density at points A and B in the Eminönü study area is examined; 2154 people pass from point A per hour, and 1122 people pass from point B per hour. When the pedestrian density at points A and B in the Maslak study area is examined; 3372 people pass from point A per hour, and 288 people pass from point B per hour. As a result, when the number of people passing through these points (A, B) is added up in both areas, the hourly pedestrian density in the Eminönü study area is 3276 people, while the hourly pedestrian density in the Maslak study area is 3660 people. The average density of the two areas corresponds to 3468 people. Pedestrian density in both areas is very close to each other. When determining the subject size in the study, approximately 1% (0.86%) of the pedestrian density in the area was taken. In other words, 30 people walked in the Eminönü study area and 30 people in the Maslak study area (Figure 3.21).

PEDESTRIAN DENSITIES

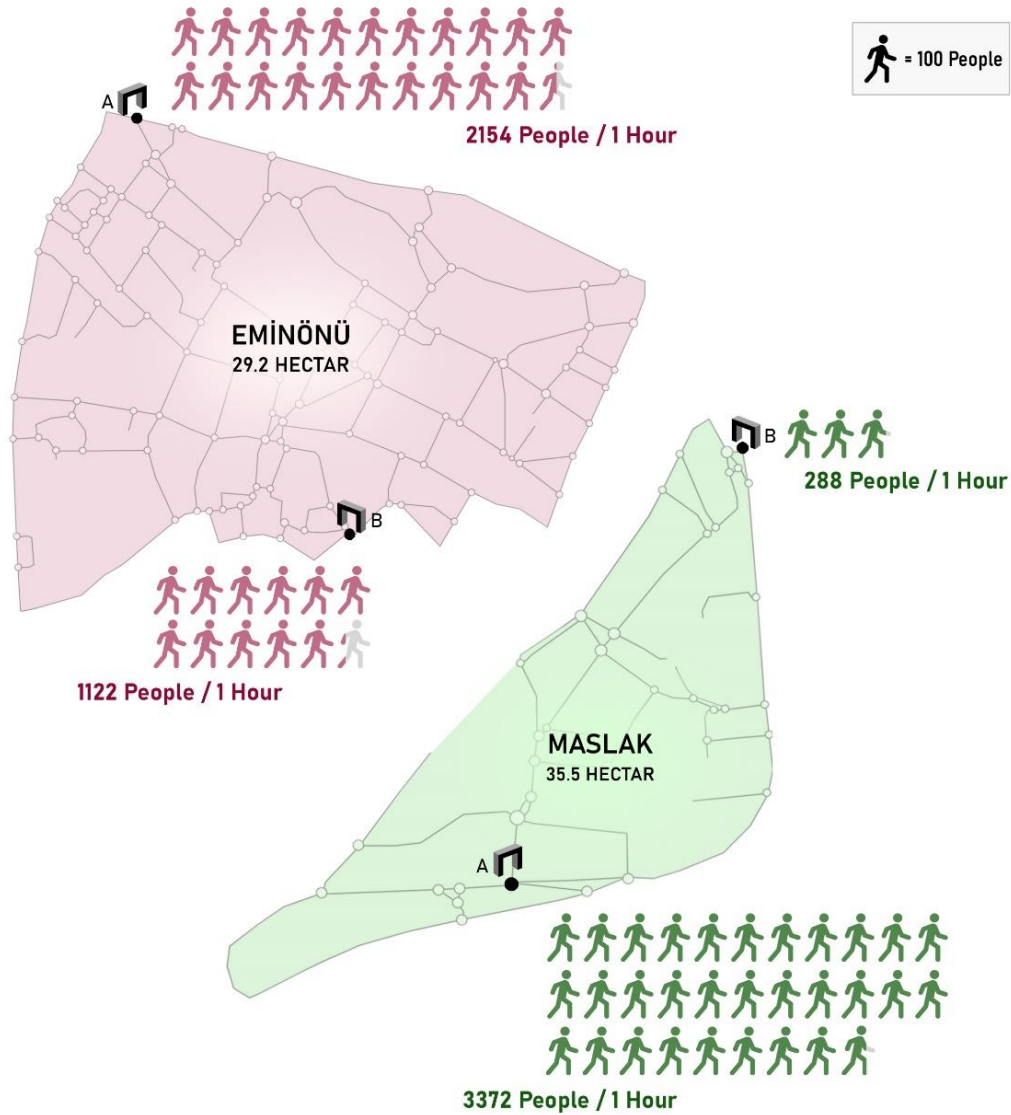


Figure 3.21 : Start-end points and pedestrian densities of the study areas.

In order to understand the demographic characteristics of the subject group in the Eminönü study area, a detailed examination was conducted on 30 subjects. In this group; 20 subjects are female (66.7%) and 10 subjects are male (33.3%). The age distribution of the subject group is 1 of the subjects is 24 years old and under (3.3%), 11 subjects are 25-29 years old (36.7%), 12 subjects are 30-34 years old (40%), 3 subjects are 35-40 years old (10%) and, 3 subjects are 40 years and over (10%). The education levels of the subjects are 1 subject has a secondary school degree (3.3%), 1 subject has a high school degree (3.3%), 11 subjects have a bachelor's degree (36.7%), 7 subjects are graduate student (23.3%), 7 subjects have master's degree (23.3%), 2

subjects are PhD student (6.7%) and 1 subject have PhD degree (3.3%). It is seen that the majority are female, subjects between the ages of 30-34, and subjects who have bachelor's degrees stand out in Eminönü study area. Subjects between the ages of 25-29, graduate students, and master's degree subjects also stand out in the group profile. Subjects who have associate degree doesn't exist in the group.

When the subject group in the Maslak study area (30 subjects) is examined; 16 subjects are female (53.3%) and 14 subjects are male (46.7%). The age distribution of the subject group is 4 subjects are 24 years old and under (13.3%), 23 subjects are 25-29 years old (76.7%) and, 3 subjects are 30-34 years old (10%). The education levels of the subjects are 1 subject has a high school degree (3.4%), 2 subjects have associate degree (6.9%), 18 subjects have a bachelor's degree (62.1%), 6 subjects are graduate student (20.7%) and 2 subjects have master's degree (6.9%). In Maslak study area, the majority are female, subjects between the ages of 25-29 and subjects who have bachelor's degrees stand out. Subjects between the ages of 35-40 and between ages of 40 and above, subjects who have secondary school degree, PhD degree and PhD student doesn't exist in the group.

In total (60 subjects), 36 subjects are female (60%) and 24 subjects are male (40%). The age distribution of the subject group is 5 subjects are 24 years old and under (3.3%), 44 subjects are 25-29 years old (36.7%), 15 subjects are 30-34 years old (40%), 3 subjects are 35-40 years old (10%) and, 3 subjects are 40 years and over (10%). The education levels of the subjects are; 1 subject has a secondary school degree (1.6%), 2 subjects have a high school degree (3.3%), 2 subjects have associate degree (3.3%), 29 subjects have a bachelor's degree (47.5%), 15 subjects are graduate student (24.6%), 9 subjects have master's degree (14.8%), 2 subjects are PhD student (3.3%) and, 1 subject have PhD degree (1.6%). It is seen that the majority are female, subjects between the ages of 25-29, and subjects who have bachelor's degrees stand out in the study (Figure 3.22).

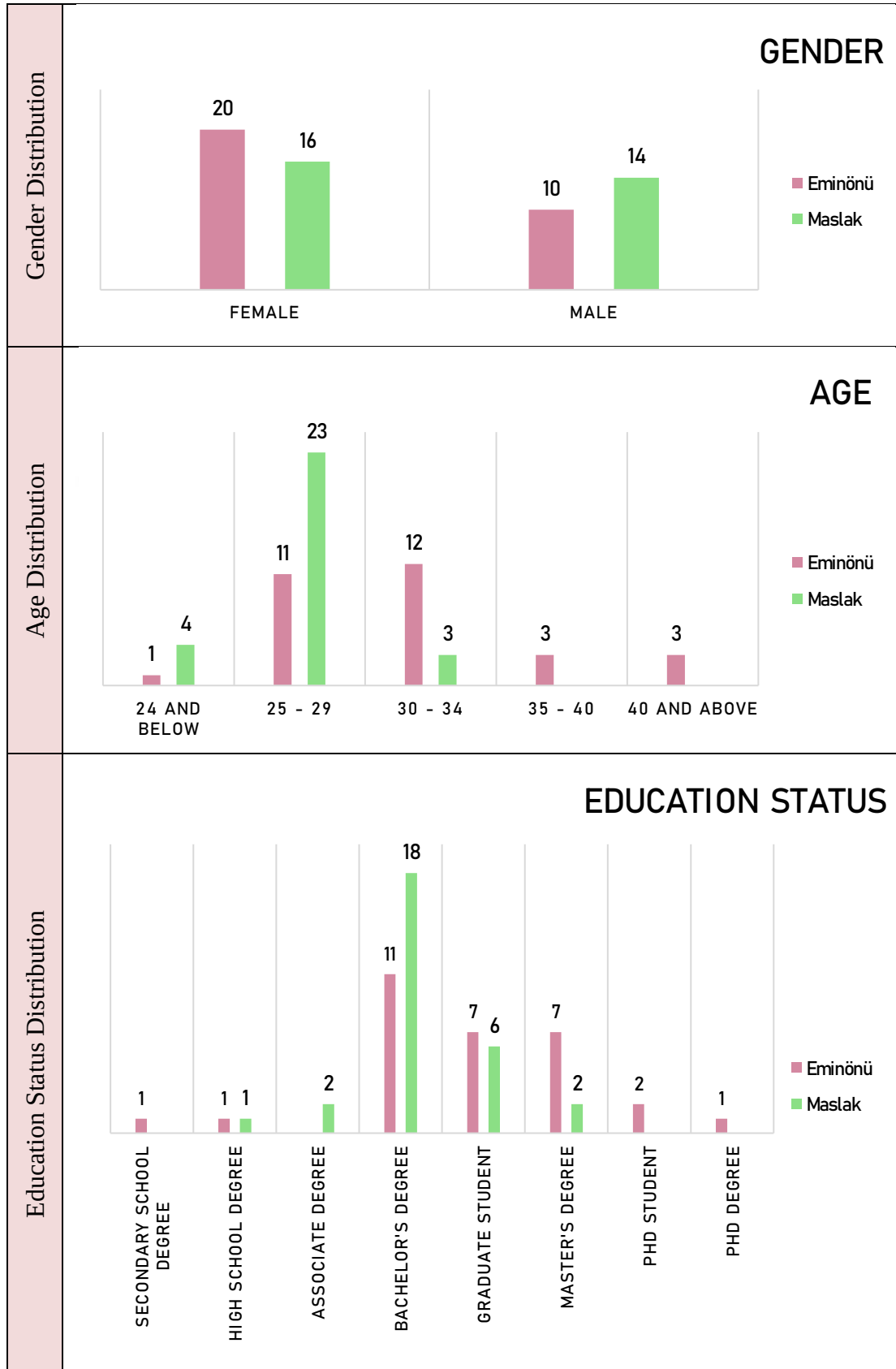


Figure 3.22 : Subject group general information distributions in the study areas.

Study Scenario

Within the scope of the study, main framework and six steps of subject group study explained in this section.

Main framework: The study observer (facilitator) walks the area with the subject. The observer shows the worksheet to the subject once at the beginning of the study. During the study, the worksheet is only in the hands of the observer, and she processes the outputs onto the worksheet during the study. Subjects are walked from point A to point B on the map or from point B to point A, depending on the observers' guidance. Throughout the experiment, the subject chose the streets by observing them directly and tried to find his/her way in line with the road alternatives offered to him/her by the observer. In addition, during the study, the subject can re-pass the roads he/she passed and can return from the road he/she passed. As a result of the study, when the desired endpoint is reached, the study ends.

Step 1: At the beginning of the study, the subjects were told the direction they should walk (such as north direction, south-east direction), the study work sheet and the point on the map where they would enter the area (point A or B) were shown only once to the subjects.

Step 2: Subjects entered the area and start walking with the observer (owner of the study) from point A or B. The start time was written on the map at the beginning of the study.

Step 3: The observer stopped the subject at every street intersection and gave the subject the street alternatives to which he or she could navigate and asked the subject which direction he or she wanted to go. The subject was asked to turn to the street where he or she felt most comfortable and most attractive to him/her. After the subject makes the choice, observer marks the route followed on the worksheet.

Step 4: When the subject walked into the middle of the streets where he or she was directed, he or she was asked to score the feeling of street closure on a scale from 1 to 5 (1: least, 5: most). This scoring was applied to each street the subject directed and was recorded on the map along with the route.

Step 5: In the empty spaces on the worksheet, the elements that affected the subject's sense of enclosure or sense of wayfinding were also noted as keywords by observer.

Step 6: When the subjects, who oriented themselves in the space in the direction they wanted throughout the study (directing according to any element that attracted their attention, passing through the street again, turning back, etc.) reached the destination point, the end time of the study was written on the worksheet and the study ended.

Study Worksheet

The base map on the study worksheet is a map where the road connection elements within the boundaries of the study area, on which the observer can mark the route of the subjects, are abstracted, and expressed as linear, and the intersection points of these connection elements are expressed as circular. The subject number is located in the upper left corner of the study worksheet (Figure 3.23).

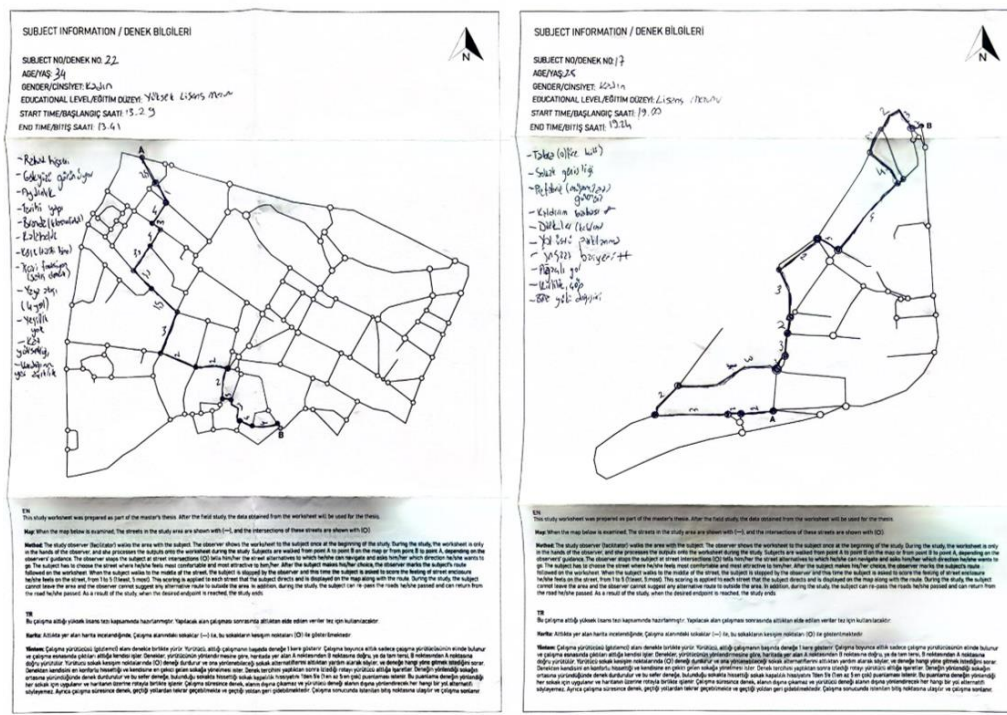


Figure 3.23 : Example study worksheets of the study areas.

In the study, name and surname information was not included, and the subjects were coded with a number system. In addition, in the upper left part, there is subject information such as age, gender and education level, and there is also a section where the start and end times of the study are filled in. There are two main explanations at

the bottom of the study worksheet: map and method. In the map section, there are explanations of the symbols to understand/read the base map, and in the method section, there is information explaining how the experiment will be carried out.

Subject Study Results

The subject group's choices of links/street and route patterns are examined in this section. The frequency and distribution of chosen links/streets are analyzed in both study areas separately. Then it identified the main routes between start-end points (Point A and Point B). And dominant side routes of the subject groups in the areas were given. Additionally, links/streets that were never chosen by the subject group are examined, to understand potential barriers to pedestrian movement within the framework of urban scale. Furthermore, the side effects associated with increasing or decreasing the feeling of enclosure are given in this section. Through these comprehensive analyses, it is aimed that provide valuable insights for understanding how environmental scale and street enclosure affect the preference of choosing a way (wayfinding).

Choices of Links/Streets

In the Eminönü study area, a total of 145 links/streets (81% of all links) were chosen by the subjects (30 subjects). Upon examining these choices, significant findings regarding the usage frequencies of links within the area were obtained. Except for the links that were not chosen at all, links in the area were selected by at least 1 person and at most by 24 subjects. When considering the choices for links in different parts of the study area, it is observed that the number of selections for the links in the east and west parts are low. It was determined that the links chosen by the subjects were located in the middle of the study area. This suggests that the subjects proceeded decisively toward the specified destination and the described walking direction at the beginning of the study, indicating a strong sense of wayfinding.

Among the three alternative links connected to point A, one of them (the middle link) was significantly chosen over the others. On the other hand, three alternative links connected to point B were chosen at a similar rate. This indicates that subjects tend to choose a specific direction to reach point A or proceed from point A. Only 2 out of the 7 dead-end streets within the area were chosen. Among the reasons for this are the

generally short length of dead-end links/streets and also the perception that they do not resemble streets due to the presence of a business center or a passage atmosphere within the area. This demonstrates the tendency of users to avoid dead-ends (Figure 3.24).

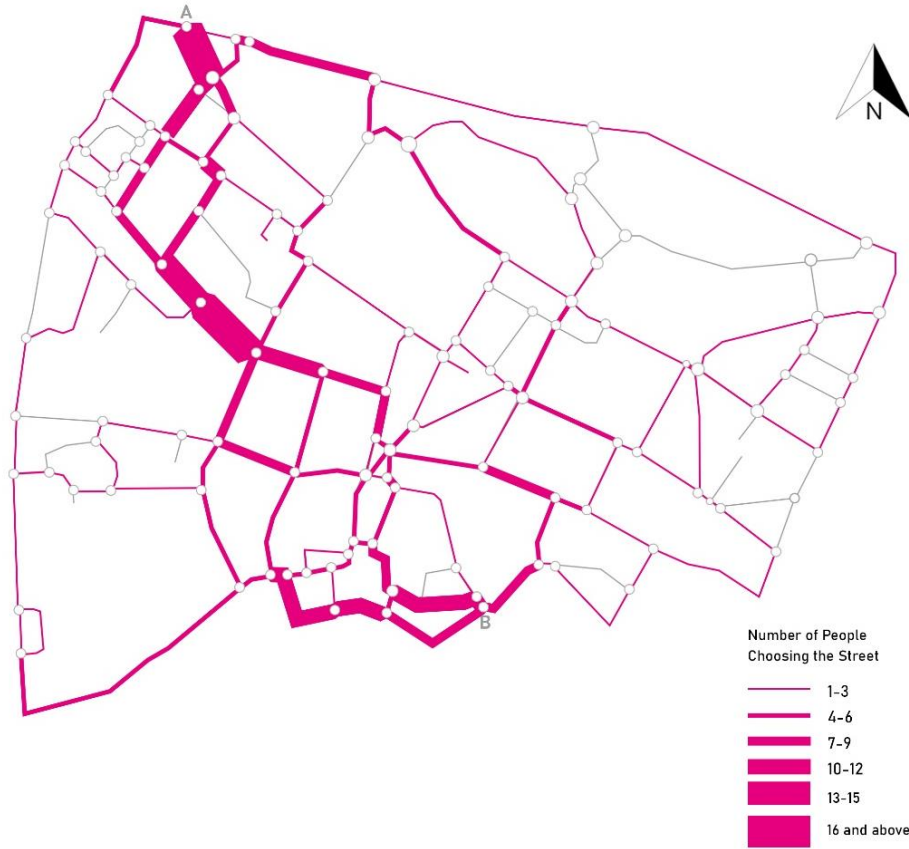


Figure 3.24 : Choices of streets in the Eminönü study area.

In the Maslak study area, a total of 50 links/streets (79% of all links) were chosen by the subjects (30 subjects). Upon examining these choices, significant findings regarding the usage frequencies of links within the area were obtained. Except for the links that were not chosen at all, links in the area were selected by at least 1 person and at most by 22 subjects. When considering the choices for links in different parts of the study area, it is observed that the number of selections for the links in the west and south-west parts are low. It was determined that the links chosen by the subjects were located in the middle and south-east of the study area. This suggests that, due to the triangular shape of the study area and the fact that points A-B are located diagonally to each other, the subjects proceeded decisively toward the specified destination and the described walking direction at the beginning of the study, and it suggests that subjects have a good sense of wayfinding.

Among the three alternative links connected to point A, one of them (the middle link) was significantly chosen over the others. On the other hand, three alternative links connected to point B were chosen at a similar rate. This indicates that subjects tend to choose a specific direction to reach point A or proceed from point A, on the other hand, subjects do not choose a unique preference to reach point B or proceed from point B. Because the links connecting to point B are very similar short streets/links and close to each other. Only 3 out of the 8 dead-end streets within the area were chosen. Among the reasons for this, the dead-end links/streets are generally long but have a low enclosure ratio. This demonstrates the tendency of users to avoid dead-ends (Figure 3.25).



Figure 3.25 : Choices of streets in the Maslak study area.

When the street choice distributions of the Eminönü and Maslak study areas are compared, it is seen that since there are more route alternatives in Eminönü, the preferences are concentrated in the middle of the area and distributed to other parts. And, since the road alternatives in Maslak are less (less than half) compared to Eminönü, the preference rate in certain links of the area is quite high.

Main Routes (Between Point A and Point B)

For both the Eminönü and Maslak study areas;

Half of the subject group, consisting of 15 subjects, walked from point A to point B, while the other half, also 15 subjects, walked from point B to point A. The main route was delineated by following the most preferred links from the starting point until reaching the endpoint. Two main routes were established: the 'Main Route from Point A to Point B' and the 'Main Route from Point B to Point A'. To facilitate the examination of these main routes, each intersection point was assigned a letter, and the links between each pair of letters were thoroughly examined based on the assigned labeling. The street widths of the links (average street width for each link), building heights (average height of buildings on each side of the link), and street enclosure rates (average closure rate for each link) of these links were examined for each route.

An examination of 'The Main Route from Point A to Point B' in the Eminönü study area reveals;

- The main route from Point A to Point B is 750 meters long.
- It's located in the middle of the area, formed as a result of cross-movements of 19 links.
- Analyzing the average street widths of the links; 16 of them (84.2%) are 6-7.9m and 3 of them (15.8%) are 8-9.9m wide.
- Reviewing the average building heights on the links; 5 of them (26.3%) have 2-storey (6m), 3 of them (15.8%) have 3-storey (9m) and 11 of them (57.9%) have 4-storey (12m) buildings.
- Assessing the average street enclosure ratios of the links; 1 of them (5.3%) is between 3:7-1:3, 1 of them (5.3%) is between 1:2-3:7, 1 of them (5.3%) is between 3:5-1:2, 7 of them (36.8%) are between 1:1-3:5, and 8 of them (42.1%) are between 1:1 and above enclosure ratio.
- In general, the dominant street width of the main route is 6-7.9m, the dominant building height is 4 stories, and the dominant enclosure ratio is 1:1 and above. The main route's dominant features exactly match the dominant street profile in the Eminönü study area (Figure 3.27).

If the movement from the starting point (point A) to the end point (point B) of the main route in the area is analyzed in detail, it can be observed that point A is located next to the highway, resulting in a very low enclosure ratio, indicating an open area. A significant majority of the subjects, starting from this open area, preferred the A-c link, which is the narrowest and has the highest enclosure among the three alternatives provided for the initial movement. At the end of the A-c link, among the three street alternatives, two lead to the Eminönü square, while one extends into a narrow street leading into the bazaar. The c-d link was followed by most subjects, directing them towards a more enclosed area. From point d to point g, links with a very high enclosure were followed. After point g, the end point was focused on, and the subjects naturally oriented themselves eastward rather than westward. The majority continued straight from point g to point l, following five interconnected links towards the east. The highly enclosed l-m and n-o links were followed to reach point n, which has a small plaza-like open area. From point n, the subjects advanced towards the target end point, choosing the highly enclosed p-q and q-r links, and reached point B (Figure 3.26).

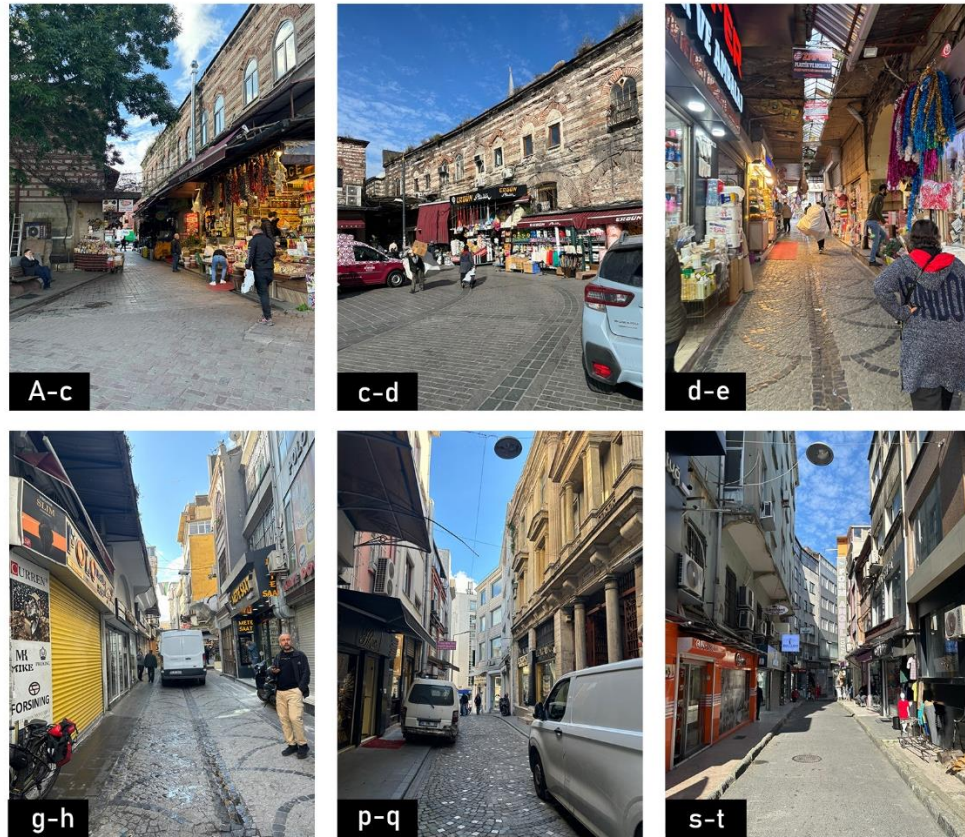
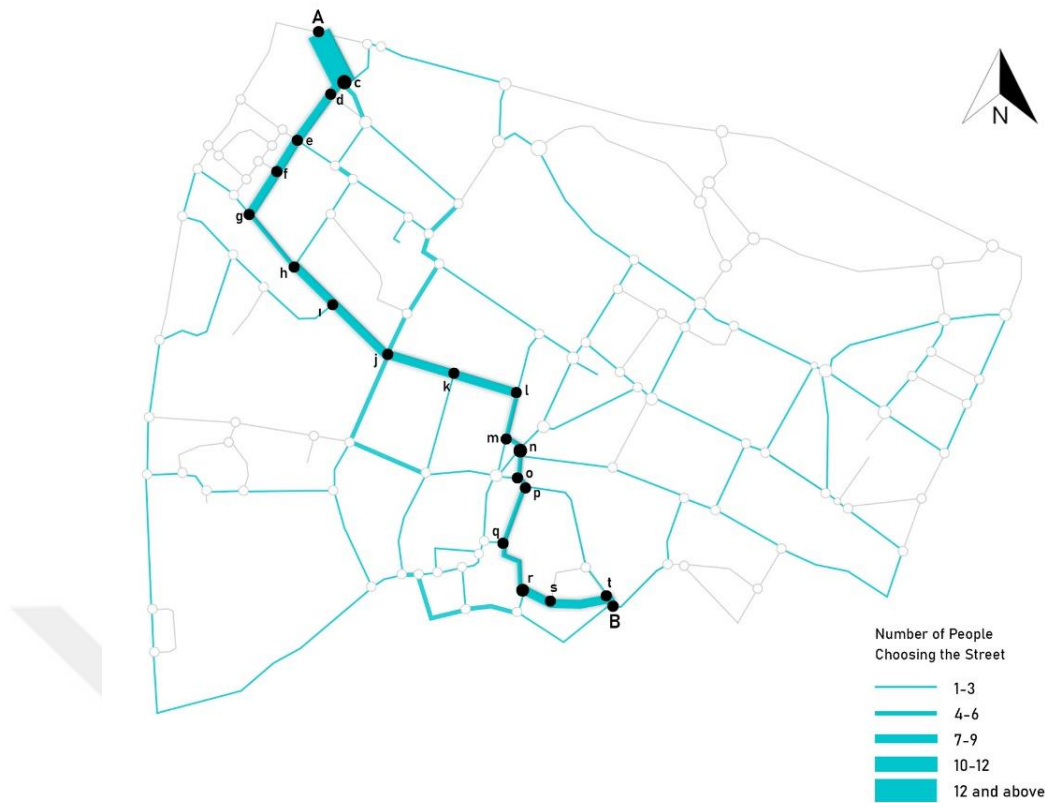


Figure 3.26 : Links that stand out on the main route (A-B) in the Eminönü study area.

If the main route movement of the subjects from point A to point B is generally interpreted, it is observed that the subjects started walking from an open area and predominantly chose the A-c link, which has the highest enclosure, for their initial movement. This link attracted the subjects' interest due to its well-defined character and the presence of attractive shops on both sides (spice and souvenir shops). The subjects directed themselves towards the streets with a high enclosure ratio and walked along the g-l axis without deviating, demonstrating a smooth walking action by following the flow of these links. After a while, subjects influenced by the similar commercial functions of the shops and the flow of the crowd, tried to walk in a way focused on finding their direction rather than perceiving the space. The majority of the subjects expressed that they could not perceive the scale of the streets very clearly and began to make diagonal movements by imagining themselves from a bird's-eye view. At this point, urban areas with a high enclosure ratio and a cohesive character encourage individuals to perceive the space on a larger scale and significantly contribute to enhancing their wayfinding skills, like a scout. In this context, the chaotic, similar, and confusing streets of the Eminönü bazaar area (Tahtakale) are a unique commercial region for improving individuals' wayfinding perception. Subsequently, the subjects continued their movements through the highly enclosed links in the area and reached the m-o opening. From there, they proceeded towards the street (p-q) located in the direction they would move (south), which also had a high enclosure ratio. Subjects who made choices in the less enclosed area directed themselves towards more defined, highly enclosed streets in the desired direction. At this point, it can be inferred that individuals searching for their direction in open areas can perceive the direction more easily compared to high-enclosure areas. Then, subjects who followed the t-B axis completed their walk at point B. In this area, subjects followed the flow of the rising slope and the street network, and easily reached to the target endpoint (Figure 3.27).



Eminönü	Main Route from Point A to Point B						
Street	Average Street Width	Average Building Height	Street Enclosure	Street	Average Street Width	Average Building Height	Street Enclosure
A-c	6 - 7,9 (m)	2 (≈6m)	1:1 - 3:5	l-m	6 - 7,9 (m)	4 (≈12m)	1:1 - 3:5
c-d	6 - 7,9 (m)	2 (≈6m)	< 1:5	m-n	6 - 7,9 (m)	2 (≈6m)	1:1 - 3:5
d-e	6 - 7,9 (m)	3 (≈9m)	1:1 - 3:5	n-o	6 - 7,9 (m)	3 (≈9m)	3:5 - 1:2
e-f	6 - 7,9 (m)	2 (≈6m)	> 1:1	o-p	8 - 9,9 (m)	4 (≈12m)	3:7 - 1:3
f-g	6 - 7,9 (m)	2 (≈6m)	1:1 - 3:5	p-q	6 - 7,9 (m)	4 (≈12m)	> 1:1
g-h	6 - 7,9 (m)	3 (≈9m)	> 1:1	q-r	6 - 7,9 (m)	4 (≈12m)	> 1:1
h-i	8 - 9,9 (m)	4 (≈9m)	> 1:1	r-s	6 - 7,9 (m)	4 (≈12m)	1:1 - 3:5
i-j	8 - 9,9 (m)	4 (≈12m)	> 1:1	s-t	6 - 7,9 (m)	4 (≈12m)	1:1 - 3:5
j-k	6 - 7,9 (m)	4 (≈12m)	> 1:1	t-B	6 - 7,9 (m)	4 (≈12m)	1:2 - 3:7
k-l	6 - 7,9 (m)	4 (≈12m)	> 1:1				

Figure 3.27 : The main route from point A to point B in the Eminönü study area.

At the enclosure scores given by the subjects for the dominant route from point A to point B, it is observed that out of the 19 links on the route, 8 have been perceived as significantly less enclosed than they actually is, 9 have been perceived as less enclosed, 1 has been perceived as having the same level of enclosure, and 1 has been perceived as more enclosed. Subjects entered from the A-c street, transitioning from an open area to an enclosed street. As a result of this movement, the subjects, who were just beginning to perceive the surrounding scale, have perceived this link as less enclosed than it actually was. Subsequently, the subjects reached the c-d opening and have

perceived this connection as more enclosed due to the influence of the previous street's scale. This indicates that when subjects transition from a link they have started to perceive to links with higher or lower enclosure, they cannot quickly grasp the street's scale and experience a sense of enclosure influenced by the previous streets.

Following the d-e link, the subjects have fully entered the inner parts of the area, followed the enclosed and similarly scaled links, and because they exhibited a smoother walking action, they have perceived these streets to be significantly less enclosed. At this point, there is a sense of scale adaptation among the subjects, due to the very similar characteristics of the links on this most preferred route. As a result of this adaptation, the subjects, focusing more on their direction than on the surrounding elements, have perceived the area as a whole to be less enclosed. Finally, the subjects have perceived each link extending to the end, except for the l-m link, to be less enclosed than it actually was (Table 3.1).

Table 3.1 : Enclosure scoring of the main route from point A to point B by the subject group in the Eminönü study area.

Links	Street Enclosure	Average Score	Equivalent Enclosure Ratio of the Score	Evaluation
A-c	1:1 - 3:5	3.5	3:5 - 1:2	The street has been perceived as less enclosed than it actually is.
c-d	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
d-e	1:1 - 3:5	3	1:2 - 3:7	The street has been perceived as less enclosed than it actually is.
e-f	> 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
f-g	1:1 - 3:5	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
g-h	> 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
h-i	> 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
i-j	> 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
j-k	> 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
k-l	> 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
l-m	1:1 - 3:5	4	1:1 - 3:5	The street has been perceived as the same as it actually is.
m-n	1:1 - 3:5	2.5	3:7 - 1:3	The street has been perceived as less enclosed than it actually is.
n-o	3:5 - 1:2	2.5	3:7 - 1:3	The street has been perceived as less enclosed than it actually is.
o-p	3:7 - 1:3	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.
p-q	> 1:1	3	1:2 - 3:7	The street has been perceived as less enclosed than it actually is.
q-r	> 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
r-s	1:1 - 3:5	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.
s-t	1:1 - 3:5	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.
t-B	1:2 - 3:7	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.

'The Main Route from Point B to Point A' is examined in the Eminönü study area;

- The main route from Point B to Point A 860 meters long.
- It's located in the middle of the area, formed as a result of cross-movements of 17 links.
- Reviewing the average street widths of the links; 1 of them (5.9%) is 2-3.9m, 5 of them (29.4%) are 4-5.9m, 9 of them (52.9%) are 6-7.9m and 2 of them (11.8%) are 8-9.9m wide.

- Assessing the average building heights on the links; 6 of them (35.3%) have 2-storey (6m), 3 of them (17.6%) have 3-storey (9m), 7 of them (41.2%) have 4-storey (12m) and 1 of them (5.9%) have 5-storey (15m) buildings.
- The average street enclosure ratios of the links; 1 of them (5.9%) is between 1:5 and below, 7 of them (41.2%) are between 1:1-3:5 and 9 of them (52.9%) are between 1:1 and above enclosure ratio.
- In general, the dominant street width of the main route is 6-7.9m, the dominant building height is 4 stories, and the dominant enclosure ratio is 1:1 and above. The main route's dominant features exactly match the dominant street profile in the Eminönü study area.

From the starting point (point B) to the end point (point A) of the main route in the area is analyzed in detail: point B is where many streets intersect and has the characteristic of a small open space. This point is located at a higher elevation compared to the rest of the area. Among the three alternatives, the subjects chose the a-b link first, preferring to stay on a flat level rather than walking downhill. After their first movement subjects made a mandatory downhill turn (northward) on the c-d link due to reaching the boundary of the area. Subjects walking from point A to point B also tried to avoid steep slopes as much as possible when approaching this point. Therefore, it can be concluded that flatter levels are preferred during the wayfinding process. Subsequently, the subjects made four diagonal turning movements from point f to point p and reached the boundary opening of the square at the p-q link. This indicates that the subjects have a strong sense of direction and are walking in a focused manner towards the target from a bird's-eye view. It should also be noted that the orientation movement from a higher elevation allows for a more holistic perception of the space. Finally, to reach the end point (A), the remaining subjects chose the street with the highest enclosure ratio among the three options (two in the direction of the end and one in the opposite direction) and reached the end point. This was observed in the same way for the subjects walking from point A to point B. Subjects making choices in open (less enclosed) areas perceived their direction more easily and preferred the more enclosed and defined street (Figure 3.29).

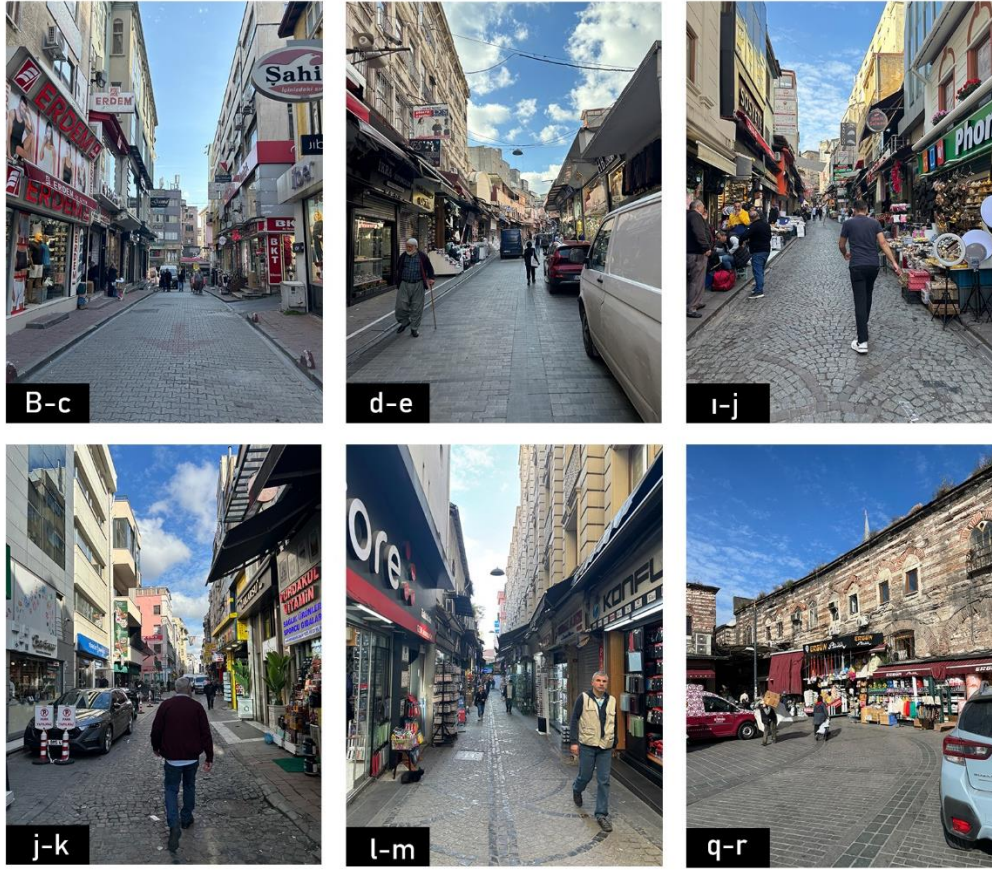


Figure 3.28 : Links that stand out on the main route (B-A) in the Eminönü study area.

In general, from point B to point A, subjects began their walk from the upper level and exhibited many diagonal orientation movements, perceiving the area from a broader/upper perspective. They preferred diagonal movements and links with almost equal high enclosure ratios. After a while, the subjects, influenced by the flow of shops with similar commercial functions and the crowd, started to walk more focused on wayfinding rather than perceiving the space. A similar conclusion can be drawn from this group of subjects, who walked very similarly to those walking from point A to point B. At this point, it can be easily inferred that high enclosure ratio urban areas help individuals perceive the space on a larger scale. Furthermore, the subjects were more influenced by the overarching sense of direction rather than commercial functions, landmarks, or other secondary elements. The subjects who made decisions in a less enclosed area near the end point (q-r) chose the link with the highest enclosure ratio directly towards the end point. This indicates that areas with a low enclosure ratio and open surroundings help individuals easily perceive the direction they need to go (Figure 3.28).

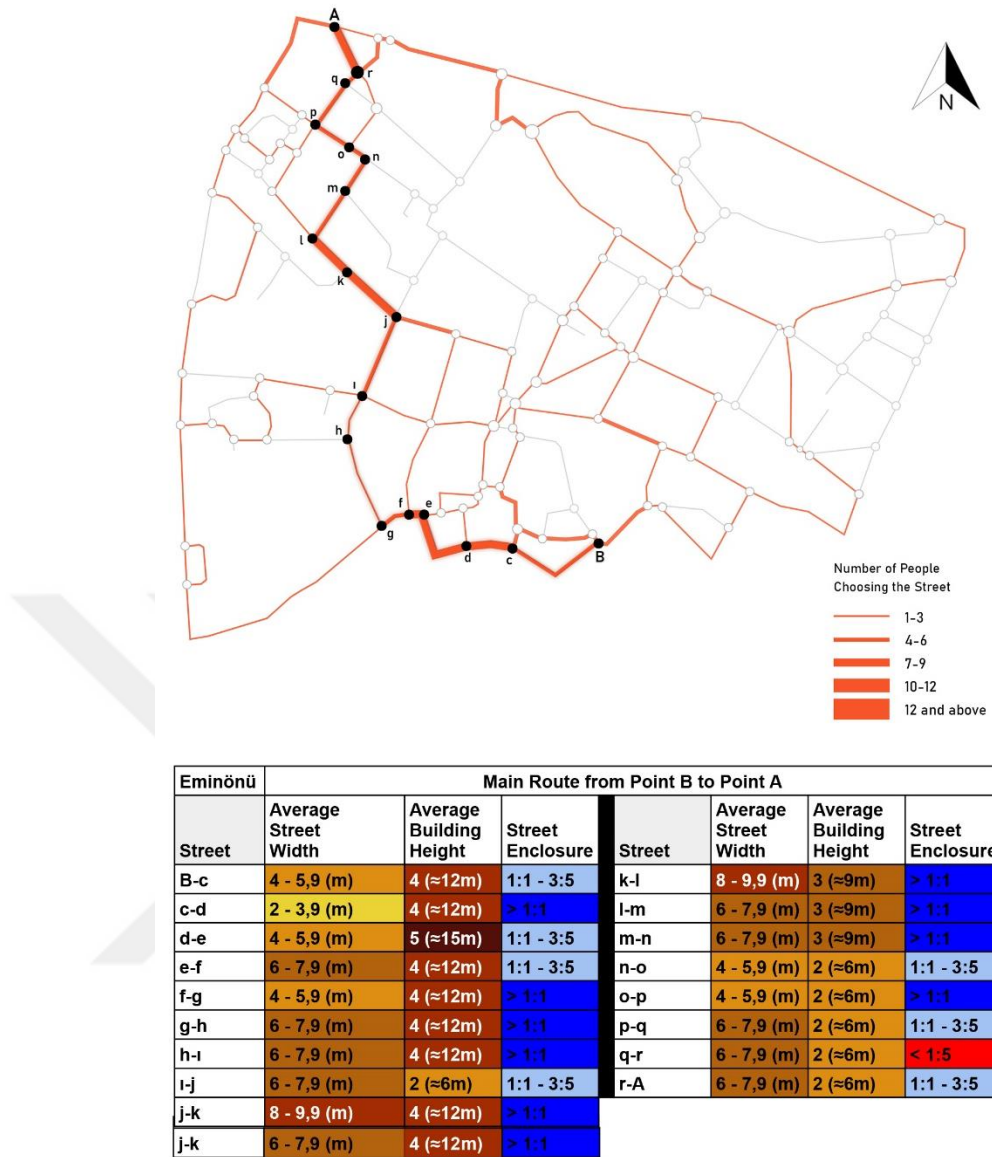


Figure 3.29 : The main route from point B to point A in the Eminönü study area.

At the enclosure scores given by the subjects to the dominant route from point B to point A are examined: of the 17 links on the route, 3 have been perceived as significantly less enclosed than they actually are, 12 have been perceived as less enclosed, 1 has been perceived as having the same enclosure ratio, and 1 has been perceived as more enclosed. Entering the area from the B-c link, which is an open area where many streets intersect, the subjects have perceived this link as less enclosed than it actually is. This demonstrates the perceptual effects of transitioning from an open area to a more enclosed area. It can be inferred that the sense of enclosure of a specific street continues in subsequent streets and then adjusts according to the enclosure ratio of the current street. At this point, the lack of prominent, distinct structures or elements in the walked area, subjects walked through has led them to perceive only the scale.

Afterwards, the subjects have reached point q from point c through diagonal movements and have perceived all the links between these points as more enclosed than they actually are. These links connect at different angles (not forming a straight axis) and create dynamic movements, causing the subjects to perceive them as less enclosed.

Then, the subjects who have reached the q-r link have perceived this connection as more enclosed due to the influence of the previous street. In other words, when the subjects have arrived at this link, they have perceived the high-enclosure link they had just passed and the next high-enclosure street as a whole, mentally bridging the gap between the two points. At this point, the subjects have gotten accustomed to the scale because all the links on this route, except one, have had very similar features (all having high enclosure), and thus the area has been perceived as less enclosed overall. The elements of continuity and similarity from Gestalt theory align with the orientation movements exhibited by the subjects and the similar sense of enclosure perceived in different links (Table 3.2).

Table 3.2 : Enclosure scoring of the main route from point B to point A by the subject group in the Eminönü study area.

Links	Street Enclosure	Average Score	Equivalent Enclosure Ratio of the Score	Evaluation
B-c	1:1 - 3:5	2.5	3:7 - 1:3	The street has been perceived as less enclosed than it actually is.
c-d	> 1:1	3.5	3:5 - 1:2	The street has been perceived as less enclosed than it actually is.
d-e	1:1 - 3:5	3	1:2 - 3:7	The street has been perceived as less enclosed than it actually is.
e-f	1:1 - 3:5	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.
f-g	< 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
g-h	< 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
h-i	< 1:1	3	1:2 - 3:7	The street has been perceived as less enclosed than it actually is.
i-j	1:1 - 3:5	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.
j-k	< 1:1	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
k-l	< 1:1	3	1:2 - 3:7	The street has been perceived as less enclosed than it actually is.
l-m	< 1:1	3	1:2 - 3:7	The street has been perceived as less enclosed than it actually is.
m-n	> 1:1	3.5	3:5 - 1:2	The street has been perceived as less enclosed than it actually is.
n-o	1:1 - 3:5	3.5	3:5 - 1:2	The street has been perceived as less enclosed than it actually is.
o-p	> 1:1	3.5	3:5 - 1:2	The street has been perceived as less enclosed than it actually is.
p-q	1:1 - 3:5	4	1:1 - 3:5	The street has been perceived as the same as it actually is.
q-r	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
r-A	1:1 - 3:5	3.5	3:5 - 1:2	The street has been perceived as less enclosed than it actually is.

‘Changing Parts Between the Main Routes (A-B and B-A)’ is examined detailed in the Eminönü study area;

When the main routes of subjects walking from point A to point B and from point B to point A are overlaid, it is observed that these routes change at four different points. The changing movements of both groups of subjects have been examined in detail below.

From point A to point B, it is seen that after starting from point A, subjects reached point a and then followed the a-c axis, unlike those starting from point B who used the a-f axis. At this point, the a-b and a-g links were compared, and it was found that the average building heights and enclosure ratios of these two links were the same. The only difference was that the a-b link had a street width of 6-7.9 meters, while the a-g link had a street width of 4-5.9 meters. Despite the fact that the a-f link was on the route and direction of those starting from point A, the subjects preferred the wider street (a-b). Another point is that the a-f link is part of an axis extending to the Spice Bazaar, making it one of the most touristy and crowded streets in the area due to its proximity to public transportation and the coast. Therefore, subjects starting from point A chose more comfortable routes, beginning their walk on the quieter a-b link due to the longer distance to their endpoint. Afterward, subjects followed the c-d link, continuing straight instead of using the d-f axis used by subjects starting from point B. The main reason is that the d-f axis is in the opposite direction of the subjects' endpoint (point B), i.e., not in the direction of their destination. When reaching point h, the subjects continued towards the h-y axis instead of following the h-i link used by those starting from point B. At this point, the h-i and h-z links were compared, and it was found that the average street widths of these two links were the same. When analysing the average building heights and enclosure ratios, the h-i link had 2-storey buildings with an enclosure ratio of 1:1-3:5, while the h-z link had 4-storey buildings with an enclosure ratio of 1:1 and above. Therefore, subjects continued their path along the link which has multi-storey buildings and a higher enclosure ratio. In this case, subjects who preferred streets with similar and high enclosure ratios walked more comfortably on streets which has multi-storey buildings. Another reason for this is that the short facades and low-rise buildings and shops positioned attached caused perceptual fatigue for the subjects. In such streets, the subjects' focus shifted to the stalls, relegating their primary purpose of wayfinding to a secondary concern (Figure 3.31).

At the movement of subjects walking from point B to point A, it is seen that in their initial movement, the subjects starting from point B preferred the p-o link instead of the q-r link. At this point, the q-r and p-o links were compared, and it was found that the average building heights and enclosure ratios of these two links were the same. The only difference was that the q-r link had a street width of 6-7.9 meters, while the p-o link had a street width of 4-5.9 meters. In this case, subjects preferred the narrower

street (p-o). Afterward, subjects moved diagonally, following the k-h link, and proceeded westwards instead of following the h-y axis (eastwards) used by those starting from point B. The main reason is that the h-y axis is in the opposite direction of the subjects' endpoint (point A), i.e., not in the direction of their destination. When reaching point d, the subjects continued towards the d-f axis instead of following the d-c link used by those starting from point A. At this point, the d-c and d-e links were compared, and it was found that these two links had entirely identical characteristics (Figure 3.30).

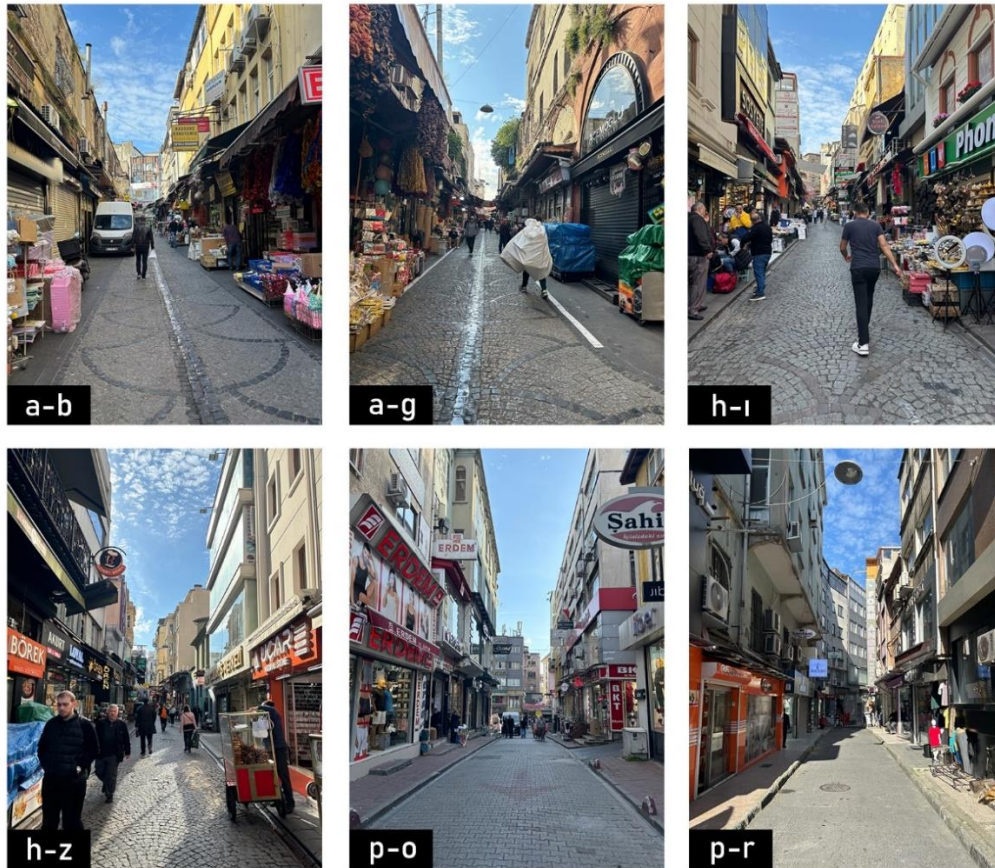


Figure 3.30 : Links that stand out on the changing parts between the main routes (A-B and B-A) in the Eminönü study area.

In conclusion, in the Eminönü study area, subjects, when their initial movements are considered separately, tend to navigate towards streets with wider pathways but higher enclosure ratios, where multi-storey buildings are located. This suggests that individuals walking in Eminönü may find it easier to navigate through the large labyrinthine streets (Figure 3.31).

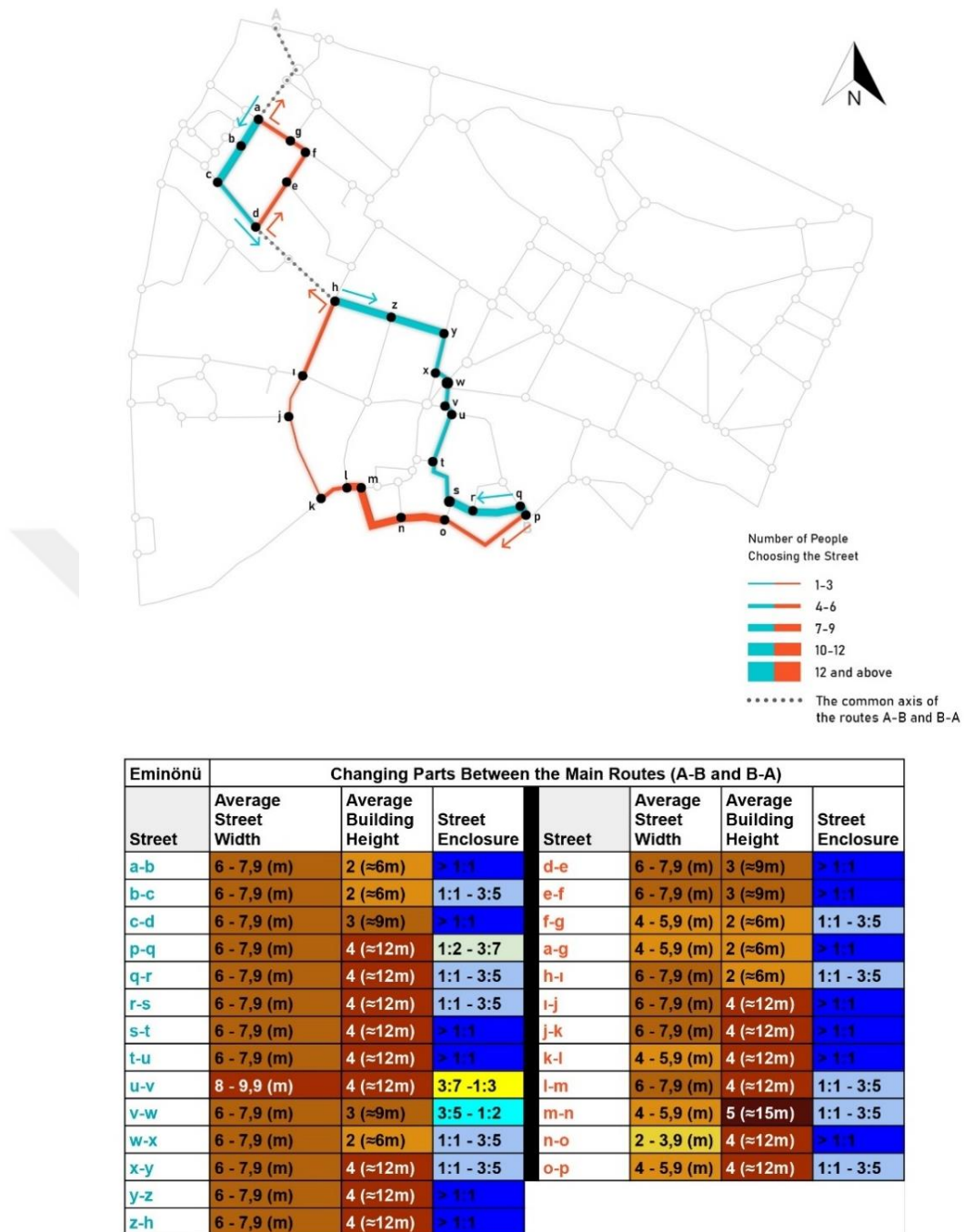


Figure 3.31 : Changing parts between the main routes (A-B and B-A) in Eminönü study area.

An examination of 'The Main Route from Point A to Point B' in the Maslak study area reveals;

- The main route from Point B to Point A 1630 meters (1.63km) long.
- It's located in the middle of the area, formed as a result of cross-movements of 17 links.

- Evaluating the average street widths of the links; 4 of them (23.5%) are 6-7.9m, 7 of them (41.2%) are 8-9.9m, 1 of them (5.9%) are 10-11.9m, 2 of them (11.8%) are 12-13.9m and 3 of them (17.6%) are 14m and above wide.
- Reviewing the average building heights on sides of the links; 10 of them (58.8%) have no building on one side (0m), 1 of them (5.9%) have 2-storey (6m), 1 of them (5.9%) have 3-storey (9m), 1 of them (5.9%) have 4-storey (12m) and 4 of them (23.5%) have 7 and more storey (21m and more) buildings.
- Analyzing the average street enclosure ratios of the links;
- In general, the dominant street width of the main route is 8-9.9m, the dominant building height is no building on one side, and the dominant enclosure ratio is 1:5 and below. The main route's dominant features exactly match the dominant street profile in the Maslak study area.

If the movement from the starting point (point A) to the endpoint (point B) of the main route in the area is analyzed in detail; point A is a location where several intersections of three different streets meet. Subjects entering the area via the A-c link have chosen the most enclosed street instead of the other two less enclosed alternatives. The fact that this link, which has roadside landscaping (towards the north), is the main option leading towards the endpoint is a significant factor in its preference. Additionally, the presence of one of the busiest plazas in the area (such as Orjin Plaza) along this link and its proximity to the metro station contribute to its vibrancy. Subsequently, subjects followed the c-d axis, which has a low enclosure ratio in the east-west direction and evolves into a more enclosed street upon turning southward. Although the enclosure ratio of this axis is low, the presence of trees in the middle of the street makes it feel more enclosed and intimate. Then, subjects were obliged to make a turn on this link (due to its shape) and exit from the part with a very high enclosure ratio to point d. Point d is located at the border of the highway and is a noisy area due to heavy traffic flow. Subjects reaching point d expressed feeling unsafe, and dissatisfied with their location, and mentioned that this point was unsuitable for pedestrians. However, instead of returning to point A direction, they exhibited a turning movement towards point d, in other words, towards the endpoint. Here, subjects who were relatively new to their route did not forego reaching the endpoint and, caught in the comfort-direction finding dilemma, opted for wayfinding. Another reason is that the length of the path

they walked was considerable, so subjects did not choose to turn back. Following the e-g axis with a very low enclosure ratio, subjects stated that they did not find the path suitable for pedestrians and walked along the edge of the highway and construction barriers feeling unsafe for a long time. Dismissing the first available road alternative (towards the west) due to the presence of a multi-storey parking lot, they directed themselves towards the g-h link, located in the next turn towards the west, which has a high enclosure ratio. This link is one of the most enclosed streets in the area and receives very little sunlight most hours of the day. Following the downhill connected links until point l, subjects made a directional decision towards the direction of the endpoint, focusing on the north diagonal. Then, following this axis (l-p), they reached the vicinity of the endpoint by making short diagonal movements (p-B) and finally reached to the endpoint (Figure 3.33).

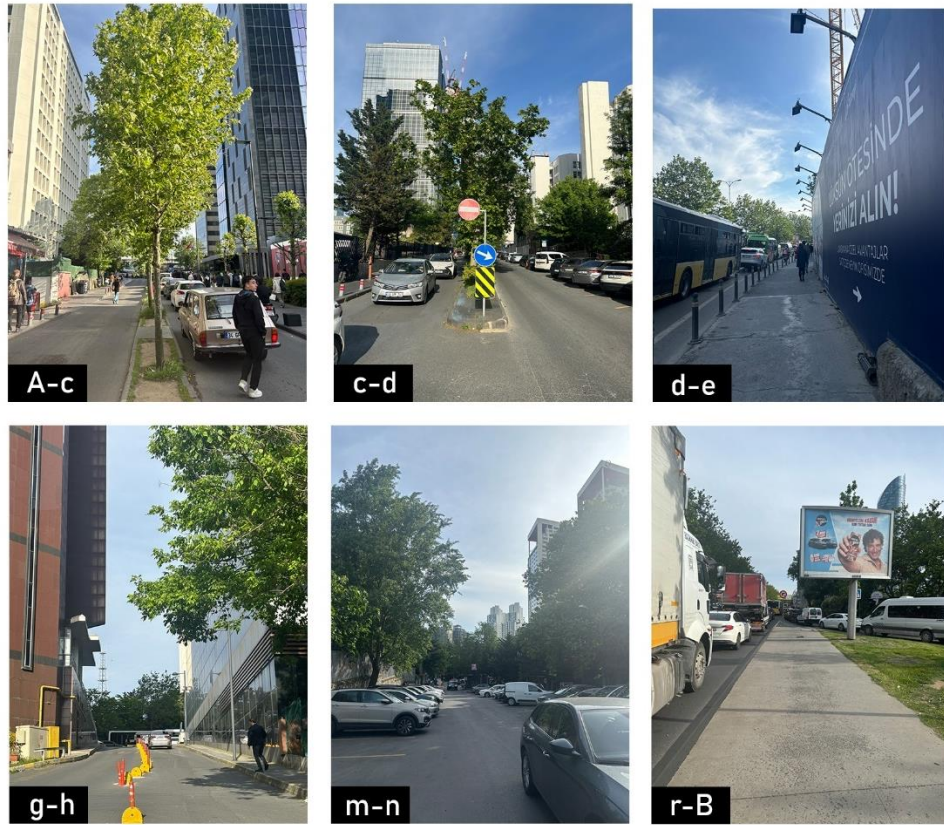


Figure 3.32 : Links that stand out on the main route (A-B) in the Maslak study area.

When interpreting the main route of the subjects walking from point A to point B, subjects initiated their walk from the highly enclosed link (A-c). After advancing a bit, subjects who reached the less enclosed point d followed this axis for a while, but later, they turned towards the west of the area, towards the inner parts, attracted by an

intermediate exit (g-h). At this point, subjects shifted their focus from less enclosed and undefined axes to a more defined and highly enclosed street, not based on directional guidance but on attractiveness. Subsequently, subjects heading towards the north diagonal ascended to the upper level with less enclosed streets and comfortably reached the endpoint (Figure 3.32).



Maslak	Main Route from Point A to Point B						
Street	Average Street Width	Average Building Height	Street Enclosure	Street	Average Street Width	Average Building Height	Street Enclosure
A-c	8 - 9,9 (m)	7 & more (≈21m & more)	1:2 - 3:7	k-l	6 - 7,9 (m)	7 & more (≈21m & more)	1:2 - 3:7
c-d	8 - 9,9 (m)	7 & more (≈21m & more)	3:7 -1:3	l-m	8 - 9,9 (m)	4 (≈12m)	< 1:5
d-e	10 - 11,9 (m)	- (≈0m)	< 1:5	m-n	8 - 9,9 (m)	3 (≈9m)	1:3 - 1:5
e-f	14 > (m)	- (≈0m)	1:3 - 1:5	n-o	8 - 9,9 (m)	- (≈0m)	< 1:5
f-g	14 > (m)	- (≈0m)	< 1:5	o-p	8 - 9,9 (m)	- (≈0m)	< 1:5
g-h	6 - 7,9 (m)	7 & more (≈21m & more)	< 1:1	p-q	8 - 9,9 (m)	- (≈0m)	< 1:5
h-i	6 - 7,9 (m)	2 (≈6m)	< 1:5	q-r	12 - 13,9 (m)	- (≈0m)	< 1:5
i-j	12 - 13,9 (m)	- (≈0m)	< 1:5	r-B	14 > (m)	- (≈0m)	< 1:5
j-k	6 - 7,9 (m)	- (≈0m)	< 1:5				

Figure 3.33 : The main route from point A to point B in the Maslak study area.

At the enclosure scores assigned by the subjects to the main route from point A to point B, it was observed that out of the 17 links along the route, 1 was perceived as significantly less enclosed, 1 as less enclosed, 3 at the same level of enclosure, 11 as more enclosed, and 1 as significantly more enclosed. Subjects entering the area from

the a-b link, one of the more enclosed streets in the area, perceived this street as less enclosed than it actually was. Subsequently, they followed more open links but still perceived these streets as more enclosed. At this point, secondary factors such as the wall effect created by skyscraper buildings at various points along the dominant route and especially the construction barriers located at the boundary of the d-e axis significantly influenced the subjects' perception of the links as more enclosed. Then, the perceived enclosure effects of the d-g axis, which has less enclosure and is a long axis, continued, and subjects who made a sharp turn onto the more enclosed g-h link actually perceived this link as significantly less enclosed. In other words, like in the Eminönü study area, subjects, upon encountering a link, remained under the influence of the previous enclosure and perceived the next street in conjunction with the street they had just passed. It can be inferred that there is an instantaneous memory development related to scale perception in individuals or, conversely, in individuals who have just acquired scale perception, this perception begins to change later. As they reached the endpoint, subjects perceived all other streets as more enclosed, giving similar scores indicating less enclosure to the q-r and r-B axes, which are equivalent and have no structures around them, thus completing their routes. Overall, there was considerable variation between the scores given by the subjects and the existing enclosure rates of the area. This is because subjects could not establish a fixed scale perception due to their varied turning movements and perceived the area as more enclosed than it actually was due to experiencing skyscrapers scattered throughout the area from different angles (Table 3.3).

Table 3.3 : Enclosure scoring of the main route from point A to point B by the subject group in the Maslak study area.

Links	Street Enclosure	Average Score	Equivalent Enclosure Ratio of the Score	Evaluation
A-c	1:2 - 3:7	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.
c-d	< 1:5	3.5	3:5 - 1:2	The street has been perceived as more enclosed than it actually is.
d-e	< 1:5	4	1:1 - 3:5	The street has been perceived as significantly more enclosed than it actually is.
e-f	1:3 - 1:5	2	1:3 - 1:5	The street has been perceived as the same as it actually is.
f-g	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
g-h	< 1:5	2	1:3 - 1:5	The street has been perceived as significantly less enclosed than it actually is.
h-i	< 1:5	3	1:2 - 3:7	The street has been perceived as more enclosed than it actually is.
i-j	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
j-k	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
k-l	1:2 - 3:7	3.5	3:5 - 1:2	The street has been perceived as more enclosed than it actually is.
l-m	< 1:5	2.5	3:7 - 1:3	The street has been perceived as more enclosed than it actually is.
m-n	1:3 - 1:5	3.5	3:5 - 1:2	The street has been perceived as more enclosed than it actually is.
n-o	< 1:5	3	3:7 - 1:3	The street has been perceived as more enclosed than it actually is.
o-p	< 1:5	2.5	3:7 - 1:3	The street has been perceived as more enclosed than it actually is.
p-q	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
q-r	< 1:5	1	< 1:5	The street has been perceived as the same as it actually is.
r-B	< 1:5	1	< 1:5	The street has been perceived as the same as it actually is.

An examination of 'The Main Route from Point B to Point A' in the Maslak study area reveals;

- The main route from Point B to Point A 940 meters long.
- It's located in the middle of the area, formed as a result of the straight movement of 13 links.
- Assessing the average street widths of the links; 11 of them (84.6%) are 8-9.9m, 1 of them (7.7%) is 12-13.9m and 1 of them (7.7%) is 14m and above wide.
- Observing the average building heights on the links; 7 of them (53.8%) have no building on one side (0m), 2 of them (15.4%) have 3-storey (9m), 3 of them (23.1%) have 4-storey (12m) and 1 of them (7.7%) have 7 and more storey (21m and more) buildings.
- Analyzing the average street enclosure ratios of the links; 9 of them (69.2%) are between 1:5 and below, 2 of them (15.4%) are between 1:3-1:5, 1 of them (7.7%) are between 3:7-1:3 and 1 of them (7.7%) is between 1:2-3:7 enclosure ratio.
- In general, the dominant street width of the main route is 8-9.9m, the dominant building height is no building on one side, and the dominant enclosure ratio is 1:5 and below. The main route's dominant features exactly match the dominant street profile in the Maslak study area (Figure 3.35).

A detailed interpretation of the movement from the starting point (point B) to the endpoint (point A) of the main route in the area reveals the following: Point B is a location at the intersection of highways, characterized by short and similar links, and has very low enclosure (with no structures around). Subjects swiftly passed through the area between points a and d, then entered the inner parts of the area, where the enclosure rate is high. Due to the low enclosure rate at the starting point and being situated at an elevated level, subjects naturally followed a straight going down path, inclining towards the southwest direction. They proceeded straight from point f to point k without deviating in other directions. The presence of restaurants along the g-h link particularly contributed to the subjects' more enjoyable walks and an increased sense of safety. Walking along this axis, subjects began to climb uphill from this point onwards and proceeded straight toward their destination. Eventually, they followed the

n-A axis, which had the highest level of enclosure along the route, to reach the endpoint (point A) (Figure 3.34).

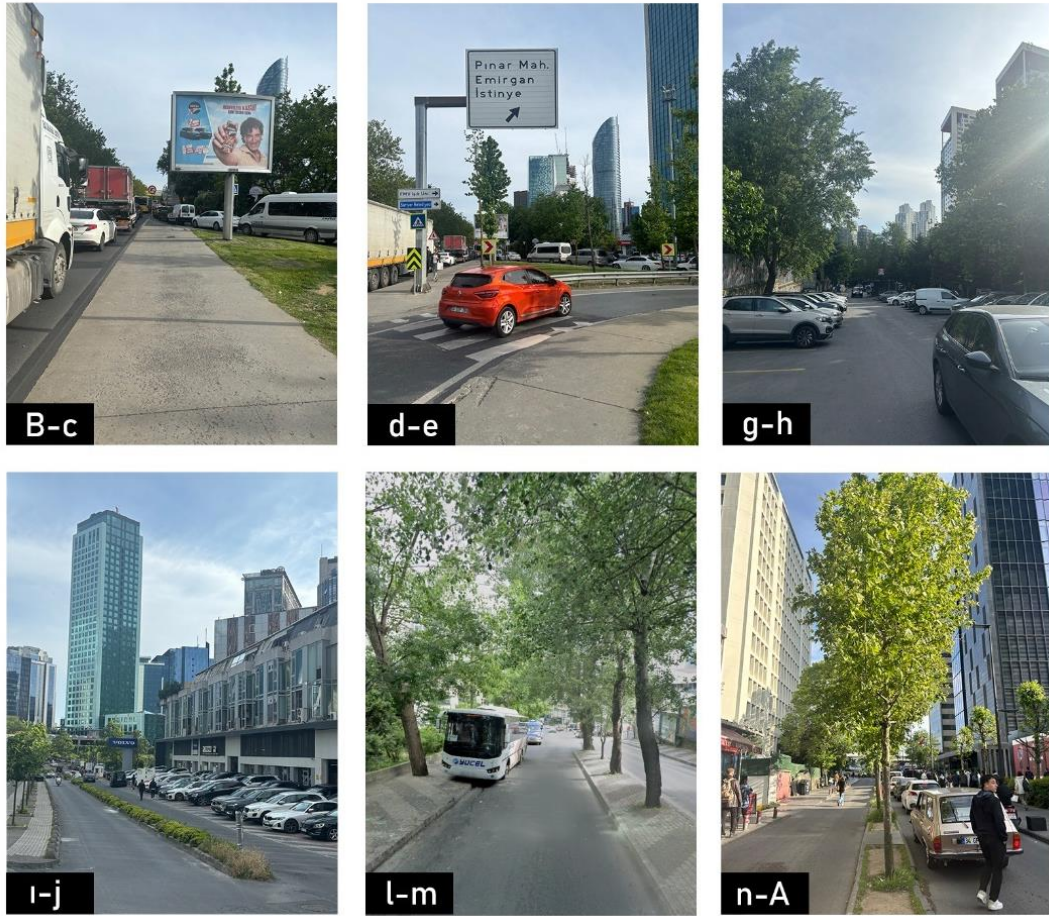


Figure 3.34 : Links that stand out on the main route (B-A) in the Maslak study area.

When the main route movement of the subjects from point B to point A is analyzed generally: subjects began their walk from an area with a low enclosure (from point a to point d). Perceiving the area easier from the elevated level they directed themselves towards streets with a higher enclosure rate and easily found their direction. In general, subjects walked in a straight movement through the cross-center of the area (Figure 3.35).



Maslak	Main Route from Point B to Point A						
Street	Average Street Width	Average Building Height	Street Enclosure	Street	Average Street Width	Average Building Height	Street Enclosure
B-c	14 > (m)	- (≈0m)	< 1:5	i-j	8 - 9,9 (m)	4 (≈12m)	3:7 - 1:3
c-d	12 - 13,9 (m)	- (≈0m)	< 1:5	j-k	8 - 9,9 (m)	- (≈0m)	< 1:5
d-e	8 - 9,9 (m)	- (≈0m)	< 1:5	k-l	8 - 9,9 (m)	4 (≈12m)	< 1:5
e-f	8 - 9,9 (m)	- (≈0m)	< 1:5	l-m	8 - 9,9 (m)	3 (≈9m)	1:3 - 1:5
f-g	8 - 9,9 (m)	- (≈0m)	< 1:5	m-n	8 - 9,9 (m)	- (≈0m)	< 1:5
g-h	8 - 9,9 (m)	3 (≈9m)	1:3 - 1:5	n-A	8 - 9,9 (m)	7 & more (≈21m & more)	1:2 - 3:7
h-i	8 - 9,9 (m)	4 (≈12m)	< 1:5				

Figure 3.35 : The main route from point B to point A in the Maslak study area.

Analyzing the enclosure scores given by the subjects for the main route from point B to point A, it is observed that out of the 13 links along the route, 1 has been perceived as less enclosed, 4 have been perceived at the same enclosure level with existing level, and 8 have been perceived as more enclosed. Subjects entering from the B-c link, near the highway, have perceived this area as open as it is. Subsequently, as subjects entered the area through the d-e axis, they perceived the area as more enclosed due to the presence of multi-storey buildings they began to notice while walking. In this regard, perceiving the irregularly placed multi-storey buildings within the open area has given them a feeling of being trapped. Upon reaching the g-h axis, subjects rated this axis as less enclosed due to the presence of low-rise buildings and sidewalks where they could

comfortably walk. Similarly, they have rated the i-j axis as it is. Starting from point j, subjects have perceived the area as significantly less enclosed, although still slightly more enclosed than the normal enclosure level. Finally, upon reaching the n-A link with a moderate level of enclosure, subjects have rated this link similarly to the others, but in the current situation, they have perceived it as less enclosed than it actually is. Overall, while the scores given by the subjects show a slight variation of 1-2 rates from the actual enclosure levels of the area, they have generally perceived the area as more enclosed than it actually is (Table 3.4).

Table 3.4 : Enclosure Scoring of the Main Route from Point B to Point A by the Subject Group in the Maslak Study Area.

Links	Street Enclosure	Average Score	Equivalent Enclosure Ratio of the Score	Evaluation
B-c	< 1:5	1	< 1:5	The street has been perceived as the same as it actually is.
c-d	< 1:5	1	< 1:5	The street has been perceived as the same as it actually is.
d-e	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
e-f	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
f-g	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
g-h	1:3 - 1:5	2	1:3 - 1:5	The street has been perceived as the same as it actually is.
h-i	< 1:5	2	1:3 - 1:5	The street has been perceived as more enclosed than it actually is.
i-j	3:7 - 1:3	2.5	3:7 - 1:3	The street has been perceived as the same as it actually is.
j-k	< 1:5	2.5	3:7 - 1:3	The street has been perceived as more enclosed than it actually is.
k-l	< 1:5	2.5	3:7 - 1:3	The street has been perceived as more enclosed than it actually is.
l-m	1:3 - 1:5	2.5	3:7 - 1:3	The street has been perceived as more enclosed than it actually is.
m-n	< 1:5	2.5	3:7 - 1:3	The street has been perceived as more enclosed than it actually is.
n-A	1:2 - 3:7	2	1:3 - 1:5	The street has been perceived as less enclosed than it actually is.

‘Changing Parts Between the Main Routes (A-B and B-A)’ is examined in the Maslak study area;

When the main routes of subjects walking from point A to point B and from point B to point A are overlaid, it is observed that these routes change at two different points. The changing movements of both groups of subjects have been examined in detail below.

Evaluating the movement of subjects walking from point A to point B, it is found that after starting from point A and walking a bit, they reached point f and, instead of following the a-f axis used by those walking from point B to point A, they followed the f-g link. When comparing the f-e and f-g links, it is seen that the average street widths of these two links are the same. However, when the average building heights and enclosure ratios are examined, the f-e link has 3-storey buildings and an enclosure ratio of 1:5 and below, while the f-g link has 7-storey and taller buildings with an enclosure ratio of 3:7 to 1:3. Therefore, in this case, the subjects continued on the link

with taller buildings and a higher enclosure ratio. Subsequently, the subjects followed the g-j link and walked westward to reach point A. At this point, the subjects headed northeast, unlike the subjects walking from point B who used the a-f axis. The main reason for this is that the a-f axis is in the opposite direction of the subjects' endpoint (point B), meaning it is not in the direction of their destination.

From point B to point A, it is found that after starting from point B and progressing through the area, they reached point A and, instead of following the a-n link used by those walking from point A, they followed the a-b link. When comparing the a-n and a-b links, it is found that these two links have completely different characteristics. The a-b link has a street width of 8-9.9 meters, 4-storey buildings, and an enclosure ratio of 3:7 to 1:3, while the a-n link has a street width of 6-7.9 meters, 7-storey and taller buildings, and an enclosure ratio of 1:2 to 3:7. Therefore, in this case, the subjects chose the street that was wider, has low-rise buildings, and had a lower enclosure ratio. However, it should be particularly noted that, since the subjects were walking downhill from an upper level and were strongly focused on their target point with a strong sense of direction, it is likely that they did not deviate in the opposite direction. Subsequently, the subjects reached point f and, at this point, unlike the subjects walking from point A who used the f-g axis, they headed south. The main reason for this is that the f-g axis is in the opposite direction of the subjects' endpoint (point A), meaning it is not in the direction of their destination. It can be said that the subjects' sense of direction increased as they approached the endpoint (Figure 3.36) (Figure 3.37).



Figure 3.36 : Links that stand out on the changing parts between the main routes (A-B and B-A) in the Maslak study area.

In conclusion, in the Maslak study area, subjects tend to navigate towards links with wider streets while finding their way within the area. The average building height (7 storey and above) and enclosure ratio vary based on the subjects' priorities for wayfinding, comfort, and attraction. Subjects starting from point B exhibit a stronger focus on the destination, while those starting from point A exhibit a stronger focus on attraction and comfort due to beginning their walk from a point with appealing urban elements and liveliness (Figure 3.37).

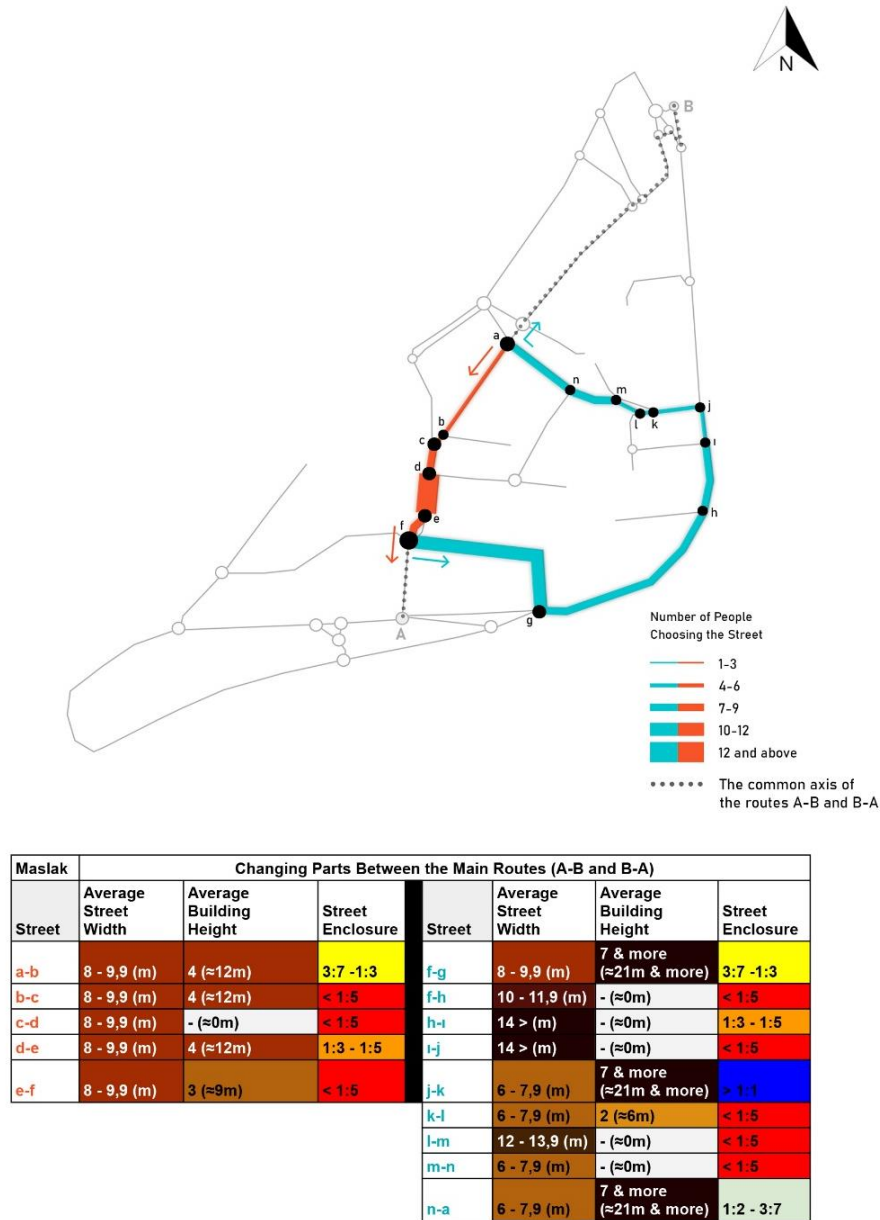


Figure 3.37 : Changing parts between the main routes (A-B and B-A) in Maslak study area.

Reviewing the walking distributions of the subjects in the study areas;

Walking Time Distributions: In the Eminönü study area, 7 subjects (5 from point A to point B, 2 from point B to point A) reached their destination within 14 minutes and less, 10 subjects (6 from point A to point B, 4 from point B to point A) within 15-19 minutes, 8 subjects (4 from point A to point B, 4 from point B to point A) within 20-24 minutes, 2 subjects (from point A to point B) within 25-29 minutes, 1 subject (from point B to point A) within 30-34 minutes, and 2 subjects (from point B to point A) in 35 minutes and above. In the Maslak study area, 7 subjects (2 from point A to point B,

5 from point B to point A) reached their destination within 14 minutes and less, 10 subjects (3 from point A to point B, 7 from point B to point A) within 15-19 minutes, 9 subjects (7 from point A to point B, 2 from point B to point A) within 20-24 minutes, 2 subjects (1 from point A to point B, 1 from point B to point A) within 25-29 minutes, 1 subject (from point A to point B) within 30-34 minutes, and 1 subject (from point A to point B) in 35 minutes and above.

Walking Distance Distributions: In the Eminönü study area, 13 subjects (5 from point A to point B, 8 from point B to point A) walked 799 meters and less, 5 subjects (3 from point A to point B, 2 from point B to point A) walked between 800-999 meters, 1 subject (from point B to point A) walked between 1000-1199 meters, 3 subjects (2 from point A to point B, 1 from point B to point A) walked between 1200-1399 meters, 2 subjects (1 from point A to point B, 1 from point B to point A) walked between 1400-1599 meters, and 6 subjects (4 from point A to point B, 2 from point B to point A) walked 1600 meters and above. In the Maslak study area, 7 subjects (2 from point A to point B, 5 from point B to point A) walked between 800-999 meters, 5 subjects (1 from point A to point B, 4 from point B to point A) walked between 1000-1199 meters, 5 subjects (2 from point A to point B, 3 from point B to point A) walked between 1200-1399 meters, 2 subjects (1 from point A to point B, 1 from point B to point A) walked between 1400-1599 meters, and 11 subjects (9 from point A to point B, 2 from point B to point A) walked 1600 meters and above.

Walking Speed Distributions: In the Eminönü study area, 3 subjects (2 from point A to point B, 1 from point B to point A) walked at a speed of 39 m/min and less, 4 subjects (2 from point A to point B, 2 from point B to point A) walked between 40-49 m/min, 12 subjects (7 from point A to point B, 5 from point B to point A) walked between 50-59 m/min, 7 subjects (2 from point A to point B, 5 from point B to point A) walked between 60-69 m/min, 3 subjects (1 from point A to point B, 2 from point B to point A) walked between 70-79 m/min, and 1 subject (from point A to point B) walked at a speed of 80 m/min or above. In the Maslak study area, 5 subjects (1 from point A to point B, 4 from point B to point A) walked between 50-59 m/min, 5 subjects (2 from point A to point B, 3 from point B to point A) walked between 60-69 m/min, 4 subjects (3 from point A to point B, 1 from point B to point A) walked between 70-

79 m/min, and 16 subjects (9 from point A to point B, 7 from point B to point A) walked at a speed of 80 m/min or above.

a general conclusion is drawn from the graphs, it is observed that subjects in the Eminönü study area predominantly walked within the range of 15-19 minutes, covering a distance of 799 meters or less, and at a speed of 50-59 meters per minute. In the Maslak study area, subjects predominantly walked within the range of 15-19 minutes, covering a distance of 1600 meters or more, and at a speed of 80 meters per minute or more. Due to the high street enclosure ratio in the Eminönü study area, subjects walked more slowly. However, because they covered a shorter distance at a lower speed on average, they completed their walks in a shorter amount of time. In the Maslak study area, where the street enclosure ratio is low, subjects walked comfortably and much faster. Yet, because they covered a greater distance on average, they balanced the situation by completing their walks in a similar time frame as observed in the Eminönü study area (Figure 3.40).

Another reason for subjects walking more slowly in the Eminönü study area compared to the Maslak study area is that Eminönü has many more attractions such as crowds, pedestrian flow, shops, and noise. In the Maslak study area, subjects walked faster and more purposefully because it is a commercial hub with business centers rather than a shopping or dining destination, and it lacks a specific commercial axis or density.

When comparing a slow walker (Eminönü) and a fast walker (Maslak) in general, it can be noted that fast walkers were decisive and goal-oriented. These subjects moved with a specific purpose (finding direction). Slow walkers, on the other hand, walked with more perception and awareness. These subjects had the opportunity to observe their surroundings more carefully and to experience the moment more deeply. The different scales and dynamics of the study areas are the main reasons for this differentiation.

When calculating the average walking data in the Eminönü study area, subjects completed their routes in an average of 20 minutes, walked an average of 1169 meters, and walked at an average speed of 58 meters per minute. In the Maslak study area, subjects completed their routes in an average of 19 minutes, walked an average of 1390 meters, and walked at an average speed of 72 meters per minute. Therefore, if two

subjects walked the same distance in both the Eminönü and Maslak study areas, the subject in the Maslak area would complete the walk in a shorter amount of time. Consequently, from the walking data, it can be inferred that there is an inverse relationship between street enclosure ratio and walking speed (Figure 3.38).

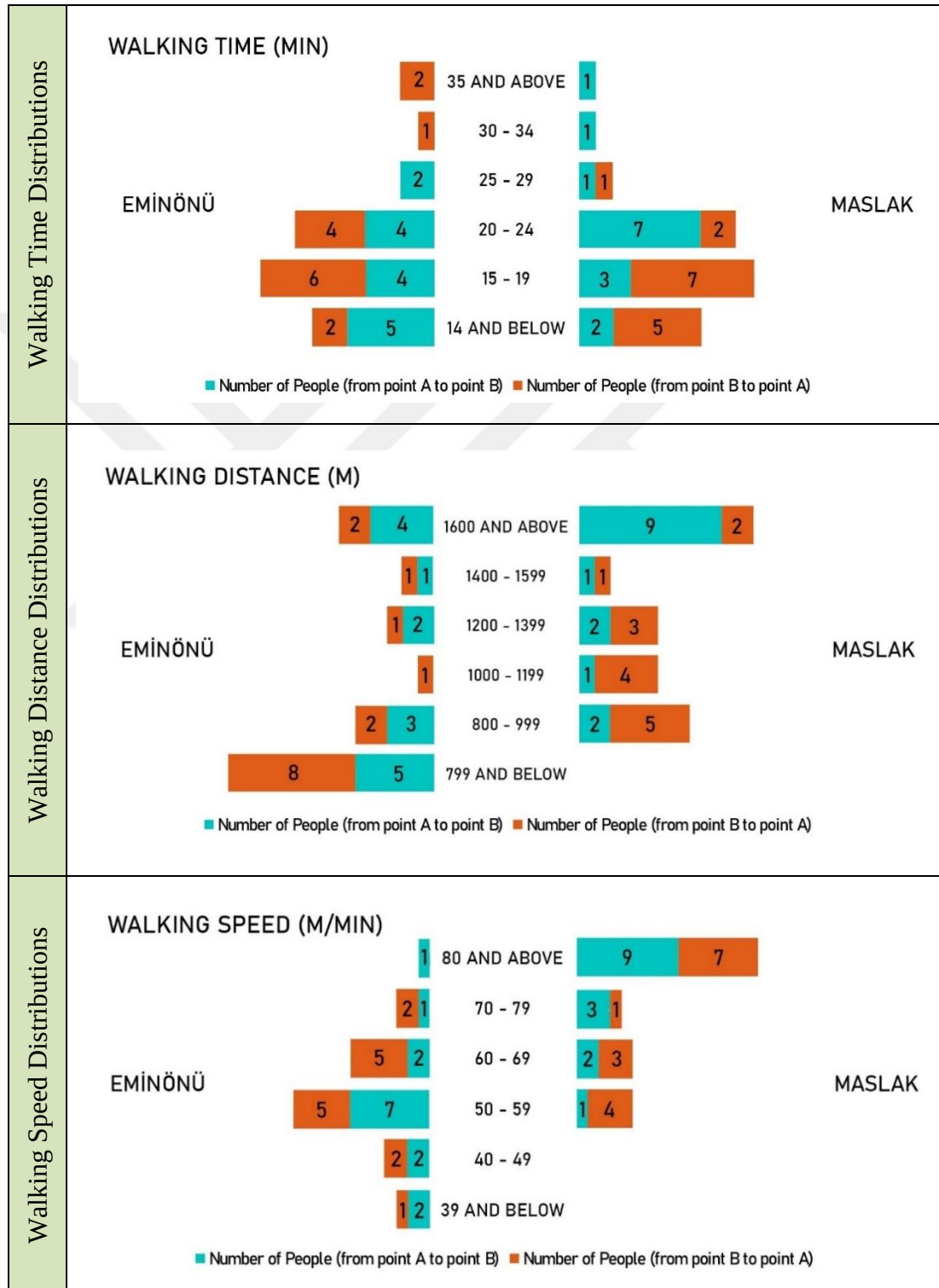


Figure 3.38 : Subject group walking distributions in the study areas.

Dominant Side Routes

For both the Eminönü and Maslak study areas;

By the choices of 30 subjects (total), the most chosen side/secondary routes -other than the main routes- were determined. To facilitate the examination of these dominant side routes, each intersection point was assigned a letter, and the links between each pair of letters were thoroughly examined based on the assigned labeling. The street widths of the links (average street width for each link), building heights (average height of buildings on each side of the link), and street enclosure rates (average closure rate for each link) of these links were examined for side routes.

'Dominant Side Routes' are examined in the Eminönü study area reveals;

- Dominant side routes consist of 17 links in total.
- They are located in the middle of the area and some of them are located close to the edges of the area.
- Considering the average street widths of the links; 5 of them (29.4%) are 2-3.9m, 2 of them (11.8%) are 4-5.9m, 6 of them (35.3%) are 6-7.9m, 1 of them (5.9%) is 8-9.9m, 1 of them (5.9%) is 10-11.9m and 2 of them (5.9%) are 14m and above wide.
- Evaluating the average building heights on the links; 5 of them (29.4%) have no building on one side (0m), 1 of them (5.9%) have 2-storey (6m), 1 of them (5.9%) have 3-storey (9m), 7 of them (41.2%) have 4-storey (12m) and 3 of them (17.6%) have 5-storey (15m) buildings.
- Assessing the average street enclosure ratios of the links; 6 of them (35.3%) are between 1:5 and below, 1 of them (5.9%) is between 3:5-1:2, 3 of them (17.6%) is between 1:1-3:5 and 7 of them (41.2%) are between 1:1 and above enclosure ratio.
- In general, the dominant street width of the dominant side routes is 6-7.9m, the dominant building height is 4 storey, and the dominant enclosure ratio is 1:1 and above. Dominant side routes' dominant features exactly match the dominant street profile in the Eminönü study area (Figure 3.39).



Eminönü	Dominant Side Routes						
Street	Average Street Width	Average Building Height	Street Enclosure	Street	Average Street Width	Average Building Height	Street Enclosure
a-b	2 - 3,9 (m)	2 (≈6m)	< 1:5	l-m	6 - 7,9 (m)	4 (≈12m)	1:1 - 3:5
b-c	6 - 7,9 (m)	- (≈0m)	< 1:5	m-n	6 - 7,9 (m)	4 (≈12m)	> 1:1
a-d	14 > (m)	- (≈0m)	< 1:5	m-o	10 - 11,9 (m)	4 (≈12m)	> 1:1
d-e	14 > (m)	- (≈0m)	< 1:5	m-p	8 - 9,9 (m)	4 (≈12m)	> 1:1
e-f	2 - 3,9 (m)	- (≈0m)	< 1:5	q-r	6 - 7,9 (m)	5 (≈15m)	> 1:1
f-g	2 - 3,9 (m)	- (≈0m)	< 1:5	r-s	4 - 5,9 (m)	4 (≈12m)	3:5 - 1:2
h-i	2 - 3,9 (m)	5 (≈15m)	1:1 - 3:5	r-t	2 - 3,9 (m)	5 (≈15m)	> 1:1
i-j	6 - 7,9 (m)	3 (≈9m)	> 1:1	t-u	6 - 7,9 (m)	4 (≈12m)	> 1:1
j-k	4 - 5,9 (m)	4 (≈12m)	1:1 - 3:5				

Figure 3.39 : Dominant side routes in the Eminönü study area.

The dominant side routes in the Eminönü study area are interpreted in detail; it is observed that the enclosure ratios of the links between a-g are low, with no structures around them, and they are links located around the Eminönü Square. Among these links, the b-c link is mostly used by subjects starting from point A and reaching point B, while the a-b, a-d, d-e, e-f, and f-g links are the most used by subjects walking from point B to point A. Apart from these links, the side routes preferred by subjects mostly have a high enclosure ratio. Among these links, the m-o and m-p routes stand out with their wide street width and connection in a straight axis. Additionally, the r-t link forms a defined path due to its narrow road width and the presence of stairs descending from the upper level, and especially because of a large landmark sculpture at point r, it has

aroused curiosity and interest among subjects while mostly preferred when going from point B to point A, thus standing out among the dominant side routes (Figure 3.39) (Figure 3.40).

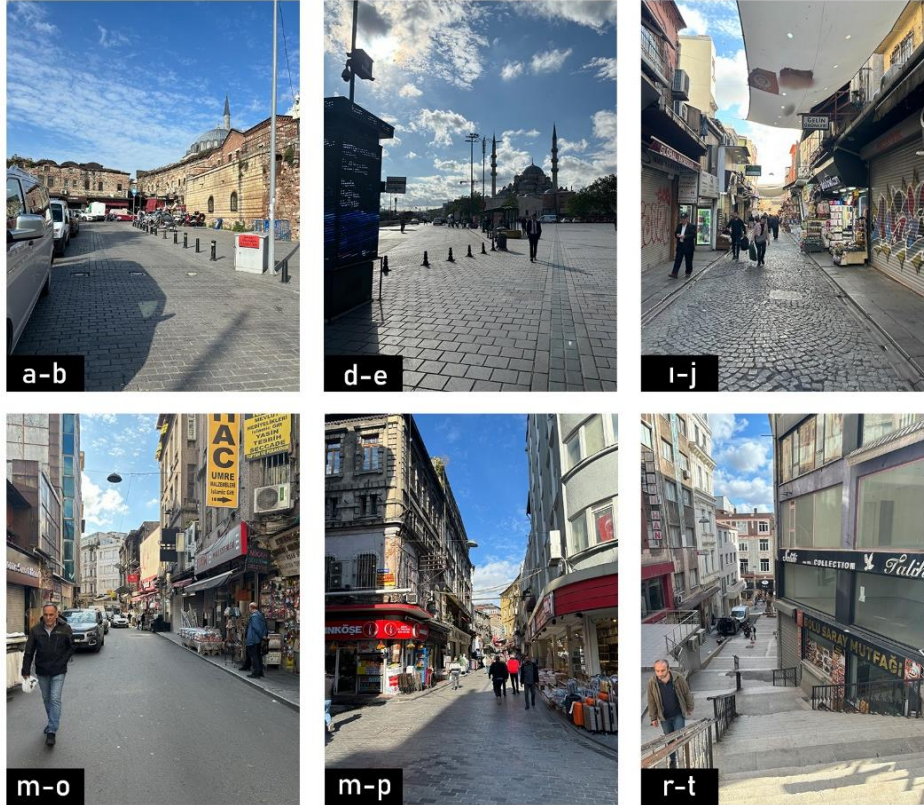


Figure 3.40 : Links that stand out on the dominant side routes in the Eminönü study area.

'Dominant Side Routes' are examined in the Maslak study area reveals;

- The dominant side route consists of 3 links in total.
- There is one side route located in the north edge part of the area.
- Evaluating the average street widths of the links; 2 of them (66.7%) are 8-9.9m and 1 of them (33.3%) is 10-11.9m wide.
- Assessing the average building heights on the links; 1 of them (33.3%) has no building on one side (0m), 1 of them (33.3%) have 3-storey (9m), and 1 of them (33.3%) have 4-storey buildings.
- Evaluating the average street enclosure ratios of the links; all 3 of them (100%) are between 1:5 and below the enclosure ratio.
- In general, the dominant street width of the dominant side routes is 8-9.9m and the dominant enclosure ratio is 1:5 and below. There is no dominant building

height. Dominant side routes' dominant street width and enclosure features exactly match the dominant street profile in the Maslak study area (Figure 3.41).



Maslak	Dominant Side Routes		
Street	Average Street Width	Average Building Height	Street Enclosure
a-b	8 - 9,9 (m)	4 ($\approx 12m$)	< 1.5
b-c	8 - 9,9 (m)	3 ($\approx 9m$)	< 1.5
c-d	10 - 11,9 (m)	- ($\approx 0m$)	< 1.5

Figure 3.41 : Dominant side routes in the Maslak study area.

When the dominant side route in the Maslak study area is examined in detail, it is observed that there is one prominent side route (a-d) in the area. This route is preferred by subjects walking from point A to point B as they reach the boundary of the area and are obliged to head towards the endpoint, making it a favored route for them. Despite having a significantly low enclosure ratio, this route is highly preferred due to the inviting atmosphere created by the restaurants located along it (Figure 3.41) (Figure 3.42).

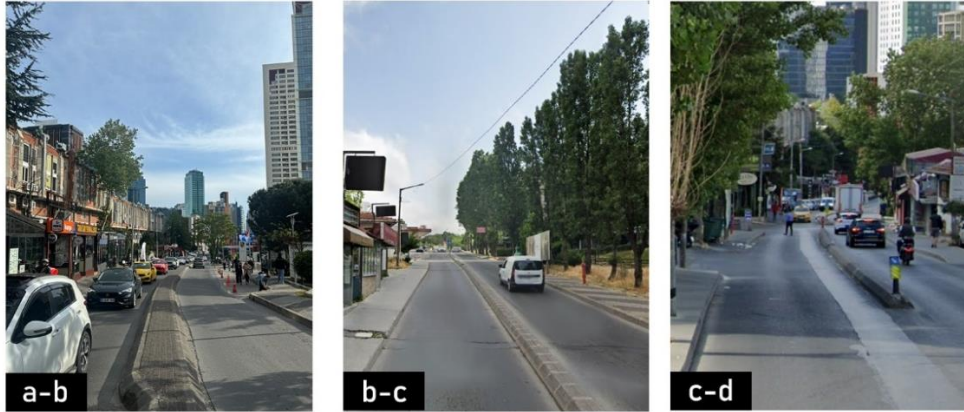


Figure 3.42 : Links of the dominant side route in the Maslak study area.

Never Chosen Links/Streets

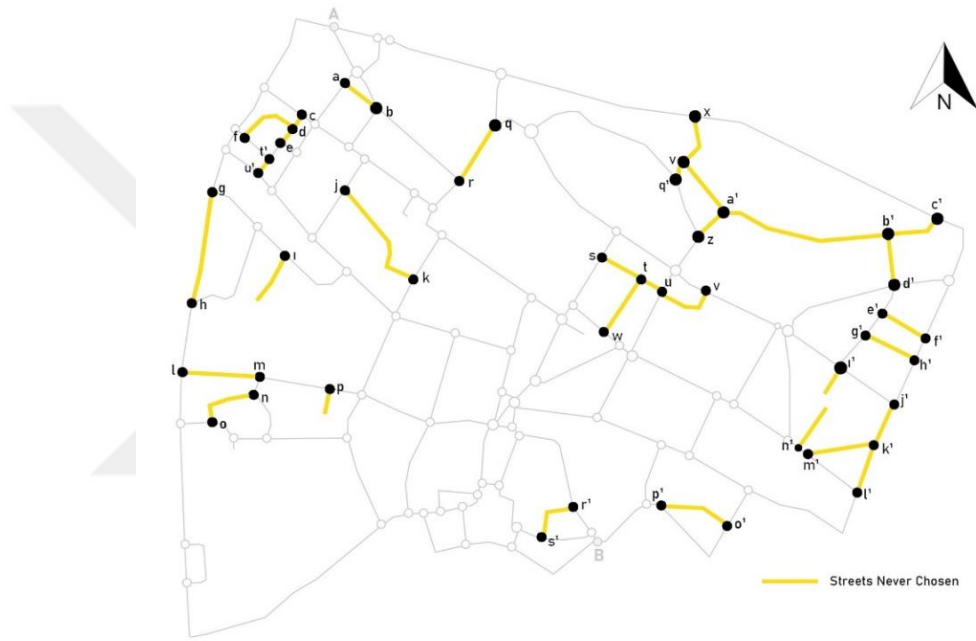
For both the Eminönü and Maslak study areas;

By the choices of 30 subjects (total), never chosen streets/links were determined. To facilitate the examination of these never chosen streets/links, each intersection point was assigned a letter, and the links between each pair of letters were thoroughly examined based on the assigned labeling. The street widths of the links (average street width for each link), building heights (average height of buildings on each side of the link), and street enclosure rates (average closure rate for each link) of these links were examined for side routes.

'Never Chosen Links/Streets' are examined in the Eminönü study area REVEALS;

- Never-chosen streets consist of 32 links (19% of all links) in total.
- They are located in the east and west parts of the area. Most of them are separate links and dead ends, rather than continuous links.
- Assessing the average street widths of the links; 8 of them (25%) are 2-3.9m, 1 of them (3.1%) is 4-5.9m, 21 of them (65.6%) are 6-7.9m and 2 of them (6.3%) are 14m and above wide.
- Observing the average building heights on the links; 4 of them (12.5%) have no building on one side (0m), 3 of them (9.4%) have 2-storey (6m), 9 of them (28.1%) have 3-storey (9m), 11 of them (34.4%) have 4-storey (12m) and 5 of them (15.6%) have 5-storey (15m) buildings.

- Analyzing the average street enclosure ratios of the links; 4 of them (12.5%) are between 1:5 and below, 1 of them (3.1%) is between 1:3-1:5, 5 of them (15.6%) are between 3:5-1:2, 5 of them (15.6%) is between 1:1-3:5 and 16 of them (50%) are between 1:1 and above enclosure ratio.
- In general, the dominant street width of the never-chosen streets is 6-7.9m, the dominant building height is 4 stories, and the dominant enclosure ratio is 1:1 and above. Never chosen streets' dominant features exactly match the dominant street profile in the Eminönü study area (Figure 3.43).



Eminönü	Never Chosen Streets						
Street	Average Street Width	Average Building Height	Street Enclosure	Street	Average Street Width	Average Building Height	Street Enclosure
a-b	6 - 7,9 (m)	- (≈0m)	< 1:5	v-a'	6 - 7,9 (m)	3 (≈9m)	1:3 - 1:5
c-d	6 - 7,9 (m)	2 (≈6m)	> 1:1	a'-z	6 - 7,9 (m)	4 (≈12m)	1:1 - 3:5
d-e	6 - 7,9 (m)	3 (≈9m)	> 1:1	a'-b'	6 - 7,9 (m)	5 (≈15m)	1:1 - 3:5
d-f	6 - 7,9 (m)	3 (≈9m)	> 1:1	b'-c'	6 - 7,9 (m)	5 (≈15m)	1:2 - 3:7
g-h	6 - 7,9 (m)	3 (≈9m)	3:5 - 1:2	b'-d'	2 - 3,9 (m)	5 (≈15m)	> 1:1
i	6 - 7,9 (m)	4 (≈12m)	> 1:1	e'-f'	2 - 3,9 (m)	5 (≈15m)	> 1:1
j-k	6 - 7,9 (m)	3 (≈9m)	> 1:1	g'-h'	2 - 3,9 (m)	5 (≈15m)	> 1:1
l-m	6 - 7,9 (m)	2 (≈6m)	3:5 - 1:2	i'	2 - 3,9 (m)	4 (≈12m)	> 1:1
n-o	2 - 3,9 (m)	3 (≈9m)	3:5 - 1:2	j'-k'	14 > (m)	4 (≈12m)	1:1 - 3:5
p	2 - 3,9 (m)	4 (≈12m)	> 1:1	k'-l'	14 > (m)	4 (≈12m)	1:1 - 3:5
q-r	2 - 3,9 (m)	- (≈0m)	< 1:5	k'-m'	2 - 3,9 (m)	4 (≈12m)	> 1:1
s-t	6 - 7,9 (m)	3 (≈9m)	3:5 - 1:2	n'	6 - 7,9 (m)	4 (≈12m)	> 1:1
t-u	6 - 7,9 (m)	3 (≈9m)	1:1 - 3:5	o'-p'	6 - 7,9 (m)	3 (≈9m)	3:5 - 1:2
u-v	4 - 5,9 (m)	4 (≈12m)	> 1:1	r'-s'	6 - 7,9 (m)	4 (≈12m)	> 1:1
t-w	6 - 7,9 (m)	4 (≈12m)	> 1:1	q'-v	7 - 7,9 (m)	- (≈0m)	< 1:5
x-v	6 - 7,9 (m)	- (≈0m)	< 1:5	t'-u'	8 - 7,9 (m)	2 (≈6m)	> 1:1

Figure 3.43 :. Never chosen streets in the Eminönü study area.

Never chosen links in the Eminönü study area are analyzed in detail, it is observed that most of these links connect to continuous axes at different angles and many of them are dead-end streets. Therefore, subjects who follow defined axes within the area have never chosen these links. The fact that these links are mostly located in the eastern and western parts of the area and are distant from points A and B also suggests that they are not preferred. Additionally, due to their widely varying enclosure ratios, these links may disrupt the existing street profile in the area and therefore may not have been chosen (Figure 3.43) (Figure 3.44).



Figure 3.44 : Links that stand out on never chosen streets in the Eminönü study area.

'Never Chosen Links/Streets' are examined in the Maslak study area reveals;

- Never-chosen streets consist of 13 links (21% of all links) in total.
- They are located in the middle and southwest parts of the area. Most of them are dead ends.
- Evaluating the average street widths of the links; 1 of them (7.7%) is 4-5.9m, 4 of them (30.8%) are 6-7.9m, 4 of them (30.8%) are 8-8.9m and 4 of them (30.8%) are 14m and above wide.
- Reviewing the average building heights on the links; 8 of them (61.5%) have no building on one side (0m), 1 of them (7.7%) have 3-storey (9m), 2 of them

(15.4%) have 4-storey (12m) and 2 of them (15.4%) have 5-storey (15m) buildings.

- Considering the average street enclosure ratios of the links; 9 of them (69.2%) are between 1:5 and below, 1 of them (7.7%) are between 1:3-1:5, 1 of them (7.7%) are between 1:1-3:5 and 2 of them (15.4%) are between 1:1 and above enclosure ratio.
- In general, the dominant building height is no building on one side and the dominant enclosure ratio is 1:5 and below. There is no dominant street width. Dominant side routes' dominant street width and enclosure features exactly match the dominant street profile in the Maslak study area (Figure 3.45).



Maslak	Never Chosen Streets						
Street	Average Street Width	Average Building Height	Street Enclosure	Street	Average Street Width	Average Building Height	Street Enclosure
a-b	14 > (m)	- (≈0m)	< 1:5	i	4 - 5,9 (m)	5 (≈15m)	> 1:1
b-c	8 - 9,9 (m)	- (≈0m)	< 1:5	j	6 - 7,9 (m)	3 (≈9m)	> 1:1
c-e	8 - 9,9 (m)	- (≈0m)	< 1:5	k	6 - 7,9 (m)	- (≈0m)	1:1 - 3:5
c-d	8 - 9,9 (m)	- (≈0m)	< 1:5	l	6 - 7,9 (m)	4 (≈12m)	< 1:5
b-g	14 > (m)	- (≈0m)	< 1:5	m-n	8 - 9,9 (m)	4 (≈12m)	1:3 - 1:5
g-f	14 > (m)	- (≈0m)	< 1:5	o	6 - 7,9 (m)	5 (≈15m)	< 1:5
g-h	14 > (m)	- (≈0m)	< 1:5				

Figure 3.45 : Never chosen streets in the Maslak study area.

When the never chosen links in the Maslak study area are analyzed in detail, it is observed that some of these links are located in the southwest region. This indicates that subjects prefer the area between points A and B and suggests a strong sense of direction. Another portion of these links consists mainly of dead-end streets. Subjects who follow defined axes within the area (cross axes) have not chosen these links (Figure 3.45) (Figure 3.46).

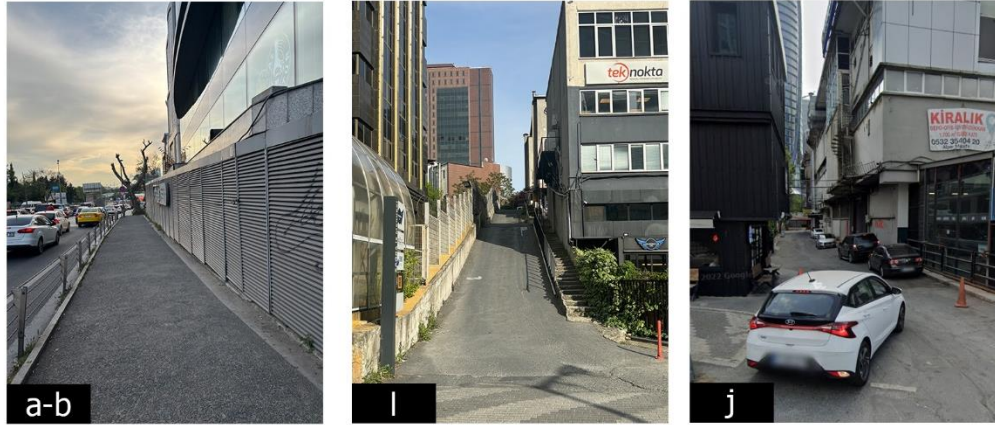


Figure 3.46 : Links that stand out on never chosen streets in the Maslak study area.

Side Effects that Increasing/Decreasing the Feeling of Enclosure

Subjects mentioned several side effects that increasing and decreasing the sense of enclosure while walking in the study areas. In the wordclouds at the below; Eminönü study area effects are shown in pink color and tones, and Maslak study area effects are shown in green color and tones. Additionally, these effects have been shown with a larger font size when more subjects mentioned a specific effect.

The side effects that increasing the feeling of enclosure;

- The presence of benches, awnings, or street occupation (mentioned by 6 subjects) and multi-storey buildings (mentioned by 4 subjects) were mentioned the most as the side effect in the Eminönü study area. On the other hand, construction barriers (mentioned by 5 subjects) were mentioned the most as the side effect in the Maslak study area.
- Additionally, corner buildings on building blocks (mentioned by 3 subjects), the absence of sidewalks (mentioned by 3 subjects) and flags hanging on the

street (mentioned by 2 subjects) mentioned as the side effect in the Eminönü study area and billboards (mentioned by 3 subjects), on-road parking (mentioned by 3 subjects) and flags hanging on the street (mentioned by 2 subjects) mentioned as the side effect in the Maslak study area.

- Less mentioned side effects are dark-colored buildings (mentioned by 1 subject), street signs (mentioned by 1 subject) and street pollution (mentioned by 1 subject) in the Eminönü study area. And, narrow sidewalks (mentioned by 2 subjects), multi-storey buildings seen at the end of the street (mentioned by 2 subjects), electric poles (mentioned by 1 subject), street pollution (mentioned by 1 subject), pavement bollards (mentioned by 1 subject), irregular building heights (mentioned by 1 subject), tree planting in the middle of the sidewalk (mentioned by 1 subject) less mentioned side effects in the Maslak study area (Figure 3.47).

In general; The side effects in the Eminönü study area come to the forefront with multiple subjects mentioning them, whereas the side effects in the Maslak study area stand out with subjects mentioning specific things individually. This situation can be the cause that subjects in the Eminönü study area prefer very similar streets, whereas, in the Maslak study area, subjects tend to prefer streets with more diverse characteristics.

In the Eminönü study area, subjects mentioned that their feeling of enclosure increased due to the continuous benches and chairs placed in front of shops/restaurants, which restricts the streets. This situation makes these streets, which are already highly enclosed, even more challenging to walk. In addition, since the study was conducted during the local election period, many party flags were hanging on the streets causing these streets to feel more enclosed by subjects. Also, the irregularity of various shop signs and the overflow onto the street in Eminönü bazaar is another important factor that increases the feeling of enclosure in the Eminönü study area.

On the other hand, in the Maslak study area, subjects mentioned that their feeling of enclosure increased due to the presence of barriers around construction sites in some main parts of the study area. This situation creates the feeling of a wall for those walking on these streets. In addition, on-road parking makes the streets feel more enclosed by subjects in the area. Maslak study area is a vehicle-oriented area and

pedestrians can mostly walk on sidewalks. At this point, parked vehicles along the sidewalk reduce the feeling of street width feeling and it cause an increasing feeling of enclosure. Also, multi-storey buildings seen at the end of the street is another important factor that increases the feeling of enclosure in the area. These buildings were described by many subjects as ‘walls’ at the end of the street.



Figure 3.47 :. Effects that increasing the feeling of street enclosure in the study areas.

The side effects that decreasing the feeling of enclosure;

- Seeing the end of the street/short street (mentioned by 5 subjects) were mentioned the most as the side effect in the Eminönü study area. On the other hand, presence of wide sidewalk (mentioned by 5 subjects) were mentioned the most as the side effect in the Maslak study area.
- Additionally, light-colored buildings (mentioned by 3 subjects) and daylight on the street (mentioned by 2 subjects) are mentioned as the side effect in the Eminönü study area. Daylight on the street (mentioned by 3 subjects) also mentioned as the side effect in the Maslak study area too.
- Less mentioned side effects are all in the Maslak study area, these are; buildings with transparent facades (mentioned by 1 subject), low-rise buildings (mentioned by 1 subject) and seeing the end of the street/short street (mentioned by 1 subject) (Figure 3.48).

In general; The side effects in the Eminönü study area and balanced with the Maslak study area effects. Both areas have prominent effects mentioned by multiple subjects, there are also effects mentioned by subjects specifically.

In the Eminönü study area, subjects have mentioned that in the shorter streets, they see the end of streets easier and therefore they navigate themselves more easily. From this, it can be inferred that if two streets have the same enclosure ratio, a shorter length gives a low sense of enclosure. Additionally, subjects specifically mentioned that buildings with lighter colors on the streets decrease the sense of enclosure, and when the street receives sunlight -when the building height is lower compared to the street section- it also decreases the sense of enclosure.

On the other hand, in the Maslak study area, subjects mentioned that their feeling of enclosure decreased due to the presence of wide sidewalk. In this case, it can be inferred that pedestrians perceive sidewalks as a comfortable dedicated path and their own street width. Also, daylight on the street is another important factor that decreases the feeling of enclosure in the area. This situation is very important for this area because in general, so many high-rise buildings and skyscrapers are located in the area and they are blocking most of the streets from daylight/sunlight. They also create wind corridors on the streets. Therefore, it is seen that most of the subjects tend to avoid streets that do not receive daylight/sunlight.



Figure 3.48 : Effects that decreasing the feeling of street enclosure in the study areas.

3.5 Chapter Evaluation

Considering the dynamic evolution of Istanbul's commercial landscape, two study areas selected as the starting and ending points of Istanbul's CBD axis are Eminönü (Fatih) and Maslak (Sarıyer). Eminönü is one of Istanbul's oldest commercial centers, known for preserving its historical texture and standing out with its intense touristic character. In contrast, Maslak rapidly developed from a small village in the 1990s into a modern business district with high-rise buildings and business centers. Eminönü's central location offers strong transportation connections with metro, ferry, tram, and bus lines. Maslak is notable for significant structures like the main campus of Istanbul Technical University and major transportation routes along Büyükdere Avenue. The transformation of Istanbul's commercial axis over time reflects the shift from Eminönü's role as a historical commercial center to Maslak's identity as a modern business hub.

Eminönü and Maslak study areas exhibit different urban characteristics through analyses of land use, figure-ground relationships, urban elements, street widths, building heights, and street enclosure ratios. Eminönü, with its historical and commercial significance, is characterized by narrow streets and densely attached buildings. This area has a vibrant yet complex urban fabric, greatly influenced by historical and religious landmark structures. In contrast, Maslak, a modern business district, is defined by detached high-rise buildings and wide streets, fulfilling its role as a financial center. In the conducted analyses, the street width analysis highlights Maslak's wide streets suitable for vehicular traffic, in contrast to Eminönü's narrower streets that promote pedestrian activities. The building height analysis shows that Eminönü predominantly has medium-height buildings, whereas Maslak features high-rise buildings. The focal point of the study, the street enclosure analysis, clearly demonstrates the different street enclosure characteristics of the two areas. Eminönü has a significantly high street enclosure ratio, aligning closely with the human scale, while Maslak, on the other hand, has a very low street enclosure ratio in general.

The structure of the field study has been determined according to the characteristics of the study areas. The scenario of the subject study is planned in such a way that subjects start from a specific point and navigate through the area by instinctively following the streets they find attractive, ultimately reaching the endpoint. The size of the subject

group for the field study has been calculated with pedestrian density. The hourly pedestrian density is quite similar in both areas, and approximately 1% of this rate has been taken to determine the group size. In total, 60 subjects participated the study and walked in the study areas on sunny weekday afternoons.

The subject group study was conducted in the Eminönü and Maslak study areas, with a total of 30 participants in each area: 15 subjects walked from point A to point B, and 15 subjects walked from point B to point A. Significant findings were obtained from the subjects' routes and the enclosure scores they assigned to their preferred links. In both areas, it was concluded that certain street characteristics (width, building height, enclosure ratio) influenced route choices and were important factors in determining their preferences. Additionally, analyses of the routes preferred by the subjects given how these street characteristics impacted their choices.

The results of the study are generally as follows: In the Eminönü area, when examining the subjects' preferences, it was observed that most of the selected streets were located in the central part of the area, with choices concentrated in a specific direction. Additionally, it was noted that main routes were predominantly chosen, and subjects made their choices based on certain factors such as street width, building height, and enclosure ratio. Similarly, in the Maslak area, subjects' choices were analyzed, and various factors were considered to identify the main routes. The analysis revealed that subjects' choices were concentrated in the central part of the area, and certain street characteristics were favored. In Eminönü, the subjects generally started from open areas and initially preferred streets with high enclosures. In Maslak, subjects began to walk in areas with low enclosures and moved towards the inner parts of the area. In both areas, subjects generally chose streets with higher enclosure ratios rather than the diverse ratio path. It was found that streets with high enclosure ratios encourage people to enhance their wayfinding skills and perceive the space on a larger scale. The chaotic and similar-looking streets of Eminönü provide opportunities for individuals to improve their wayfinding perception. In both areas, subjects convey the sense of enclosure from one street to the next during their walk. This suggests that the sense of enclosure from a particular street continues onto the subsequent streets and is shaped by the enclosure ratio of the following street. While we encounter open links among the dominant side routes in Eminönü, in Maslak, the dominant side route, identified as

a single route reaching the boundary of the area and obligatorily directing towards the endpoint, is observed. Never chosen links in both areas are mostly dead-end streets or streets outside the dominant street profile of the area. Comparing the walking speed of subjects in Eminönü and Maslak study areas, the walking speed is slower in the Eminönü study area due to the high street enclosure ratio. Conversely, in the Maslak study area, subjects walk faster and find their way more easily. Features such as benches and chairs, flags, and shop signs in Eminönü, and obstacles and parked vehicles around construction sites in Maslak, contribute to the sense of enclosure. Short streets and light-colored buildings in Eminönü, and wide sidewalks and daylight in Maslak, decrease the sense of enclosure.



4. CONCLUSION

Rapid urbanization and population density growth in today's world necessitate urban areas to become more functional, accessible, and livable. This research aims to examine the factors influencing pedestrians' wayfinding and spatial perceptions in different scales of urban areas. By comparing the historical commercial center of Istanbul, Eminönü, with the modern business district of Maslak, the study aimed to reveal how urban scale impacts pedestrians' movement and perception processes. Conducted particularly in two distinct urban study areas like Eminönü and Maslak, this research aims to uncover individuals' wayfinding behaviors and spatial features influencing these processes. The primary motivation of the study is to understand how urban design shapes pedestrians' wayfinding and spatial perception.

The study was conducted with a subject group of 60 participants on sunny weekday afternoons in two different study areas. Significant findings were obtained from the routes collected during walking studies. Based on the collected route data, various implications were drawn regarding individuals' wayfinding behavior and the concept of human scale:

- **In urban environments above human scale, particularly in urban openings, directional cues are perceived more easily:**

Data obtained from fieldwork indicates that individuals searching for directions in open areas above human scale move more comfortably compared to searching in enclosed spaces, perceiving their desired direction more easily. Individuals starting their walks from open starting points in both areas tend to perceive their direction more easily due to the potential of perceiving their surroundings offered by this openness. Moreover, individuals walking in areas with high enclosure rates within the human scale, particularly in Eminönü, shape their routes towards the destination based on the urban openings/spaces they encounter. These findings highlight the significant role of urban scale levels in individuals' wayfinding and reaching processes.

- **Performing wayfinding actions in human-scale urban areas strengthens directional perception:**

Data obtained from fieldwork reveals that subjects in Eminönü, a human-scale area, perceive their environment from a bird's eye perspective due to the enclosure of surrounding structures rather than perceiving it directly. These human-scale areas significantly contribute to individuals' wayfinding skills and directional perception. Moreover, individuals in such densely enclosed urban areas are less influenced by commercial functions, symbolic structures, or other secondary factors and are guided by the motivation to find their direction within the area. These findings indicate that areas with high enclosure ratios positively shape individuals' wayfinding and spatial awareness processes.

- **The scale of urban areas is inversely proportional to individual' wayfinding/walking speed:**

A noticeable inverse correlation is observed between the scale of urban areas and individual' wayfinding and walking speed. The main reason for subject' slower walking pace in Eminönü is the area being within human scale and having high enclosure rates. Therefore, individuals perceive their desired direction more difficultly and walk slower. Additionally, factors like pedestrian flow, shops, various stands, create distracting effects and decrease walking speed. However, the Maslak study area, being a larger scale area, enables individuals to perceive their environment from a broader perspective, allowing pedestrians to walk faster and focus on reaching their destination. Fast-walking individuals usually move towards a specific goal, displaying a determined progress in wayfinding. These individuals exhibit a more distinct focus on route determination and reaching the destination. On the other hand, slow-walking individuals engage more in perceptual and awareness activities. The differences in scale and dynamics of the study areas are the fundamental reasons for this discrepancy and affect pedestrians' movement and perception processes. These findings demonstrate the impact of the scale and dynamics of urban areas on individual' wayfinding and walking speed.

- **Starting walking from an upper level helps individuals perceive their directions more clearly:**

Data obtained from fieldwork indicates that starting walking from an upper level helps individuals perceive their directions more effectively. Observing the area to be walked from a high point provides individuals with a broader perspective, allowing them to perceive details of the environment more clearly and determine their direction more easily. This situation, namely observing from a high point, enables individuals to see streets, buildings, and other important points more clearly. This helps users better understand their positions and environments, allowing them to determine their directions more accurately. These findings demonstrate how walking from an upper level helps individuals perceive their directions more effectively.

- **Urban elements restricting pedestrians' walking area increase the sense of enclosure in space, affecting individuals' scale perception:**

Urban elements that restrict pedestrians' walking area increase the sense of enclosure in space, reducing scale perception. Especially observed in the Eminönü study area, stands in front of shops narrow the streets, making these areas even more enclosed. This makes walking on already enclosed streets. Moreover, the irregularity of various shop signs and overflowing crowds onto the streets are significant factors that increase the sense of enclosure in this area. On the other hand, in the Maslak study area, the presence of construction barriers increases the feeling of enclosure, thus playing with the perception of scale of individual. This situation creates a sense of a barrier among individuals. These findings demonstrate that the sense of enclosure perceived by pedestrians in urban spaces increases with the presence of restrictive elements in the surroundings, thereby reducing the perception of scale.

In general, this research offers a comprehensive analysis of how urban design influences pedestrian wayfinding and spatial perception, comparing the historical commercial center of Istanbul, Eminönü, with the modern business district of Maslak. The study reveals that both areas have their unique advantages and challenges, each with its own set of strategies that can be employed to enhance the urban experience. Eminönü, with its dense, human-scale environment, presents a rich, complex landscape that, while challenging for navigation, offers a strong sense of place and

spatial awareness. The area's enclosed spaces and historical significance contribute to a unique character that is both engaging and immersive. On the other hand, Maslak, with its open, expansive layout provides clear directional cues, making wayfinding more straightforward. However, this openness may sometimes lack the intimacy and richness of experience found in more enclosed spaces.

When the results and research questions are compared; the question "How can pedestrians' wayfinding skills in urban areas be correlated with the scale of the environment?" corresponds with the findings that "In urban environments above human scale, particularly in urban openings, directional cues are perceived more easily" and "Performing wayfinding actions in human-scale urban areas strengthens directional perception". This finding emphasizes how expansive and open spaces influence individuals' wayfinding abilities.

The question "How do urban elements affect pedestrians' wayfinding behavior and perception of scale?" corresponds with the finding that "Urban elements restricting pedestrians' walking area increase the sense of enclosure in space, affecting individuals' scale perception" This finding demonstrates how environmental factors affect individuals' scale perception and navigation behaviors.

The questions "How does pedestrians' wayfinding behavior in urban areas at a human scale differ from behavior in areas beyond this scale?" correspond with the findings that "The scale of urban areas is inversely proportional to individual' wayfinding/walking speed". This finding highlights how individuals experience the scale perception of the environment during navigation behaviors in urban areas.

Overall, findings strongly address research questions.

Recommendations for Urban Design Field

Urban planning and design have increasingly become important in enhancing people's quality of life and making cities more sustainable. Researchs in this field provides in-depth insights into how urban spaces are used and perceived. Particularly, the movement and guidance of people in urban areas are fundamental factors in the functional and aesthetic design of cities.

In this context, this thesis study focuses on the perception of scale in urban spaces and the guidance of individuals. Specifically, it examines the effects of the scale of space and various urban elements on people's ability to find directions and move in urban areas. The results aim to provide valuable information to the field of urban planning and design, contributing to making urban spaces more defined, guiding, and comfortable. Various design strategies can be employed to improve people's wayfinding skills in urban spaces. Some recommendations that could contribute to urban design are as follows:

- Creating open and spacious areas at specific distances in urban spaces with a high sense of enclosure can facilitate people's navigation and reaching their destinations. Open areas like squares and parks allow people to plan their routes more easily and perceive the space more comfortably.
- Providing a perspective from high points is an effective method to strengthen the perception of scale in space and facilitate the guidance process for users.
- It is important to reduce distracting elements such as shopfront displays and signage clutter that affect walking speed and the guidance process. This enables people to perceive the space more clearly and focused.



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APPENDICES

APPENDIX A: Study Area Worksheets



SUBJECT INFORMATION / DENEK BİLGİLERİ

SUBJECT NO/DENEK NO:

AGE/YAŞ:

GENDER/CİNSİYET:

EDUCATIONAL LEVEL/EĞİTİM DÜZEYİ:

START TIME/BAŞLANGIÇ SAATİ:

END TIME/BİTİŞ SAATİ:



EN

This study worksheet was prepared as part of the master's thesis. After the field study, the data obtained from the worksheet will be used for the thesis.

Map: When the map below is examined; The streets in the study area are shown with (—), and the intersections of these streets are shown with (O).

Method: The study observer (facilitator) walks the area with the subject. The observer shows the worksheet to the subject once at the beginning of the study. During the study, the worksheet is only in the hands of the observer, and she processes the outputs onto the worksheet during the study. Subjects are walked from point A to point B on the map or from point B to point A, depending on the observers' guidance. The observer stops the subject at street intersections (O) tells him/her the street alternatives to which he/she can navigate and asks him/her which direction he/she wants to go. The subject has to choose the street where he/she feels most comfortable and most attractive to him/her. After the subject makes his/her choice, the observer marks the subject's route followed on the worksheet. When the subject walks to the middle of the street, the subject is stopped by the observer and this time the subject is asked to score the feeling of street enclosure he/she feels on the street, from 1 to 5 (1 least, 5 most). This scoring is applied to each street that the subject directs and is displayed on the map along with the route. During the study, the subject cannot leave the area and the observer cannot suggest any alternative route to outside the area. In addition, during the study, the subject can re-pass the roads he/she passed and can return from the road he/she passed. As a result of the study, when the desired endpoint is reached, the study ends.

TR

Bu çalışma altıncı yüksek lisans tezi kapsamında hazırlanmıştır. Yapılacak alan çalışması sonrasında altıttan elde edilen veriler tez için kullanılacaktır.

Harita: Altıttaki yer alan harita incelendiğinde; Çalışma alanındaki sokaklar (—) ile, bu sokakların kesişim noktaları (O) ile gösterilmektedir.

Yöntem: Çalışma yürütücüsü (gözetimci) alanı denekle birlikte yürür. Yürütücü, altıttı çalışmanın başında deneye 1 kere gösterir. Çalışma boyunca altıttı sadece çalışma yürütücüsünün elinde bulunur ve çalışma esnasında çıktıkları altıttı kendisi işler. Denekler, yürütücünün yönlendirmesine göre, haritada yer alan A noktasından B noktasına doğru, ya da tam tersi, B noktasından A noktasına doğru yürütülür. Yürütücü sokak kesişim noktalarında (O) deneyi durdurur ve ona yönlenebileceği sokak alternatiflerini altıttıktan yardım alarak söyler, ve deneye hangi yöne gitmek istediğini sorar. Denekten kendisini en konforlu hissettiği ve kendisine en çekici gelen sokağa yönelmesi ister. Denek tercihinin yaptıktan sonra izlediği rotayı yürütücü altıttı işaretler. Deneyin yönlendiği sokağın ortasına yüründüğünde denek durdurulur ve bu sefer deneye, bulunduğu sokağa hissettiği sokak kapalılık hissiyatını 1'den 5'e (1 en az 5 en çok) puanlaması istenir. Bu puanlama deneyin yönlendiği her sokak için uygulanır ve haritanın üzerine rotayla birlikte işlenir. Çalışma süresince denek, alanın dışına çıkamaz ve yürütücü deneyi alanın dışına yönlendirecek her hangi bir yol alternatifini söyleyemez. Ayrıca çalışma süresince denek, geçtiği yollardan tekrar geçebilmekte ve geçtiği yoldan geri gidebilmektedir. Çalışma sonucunda istenilen bitiş noktasına ulaşılır ve çalışma sonlanır.

Figure A.1 : Eminönü study area worksheet.

SUBJECT INFORMATION / DENEK BİLGİLERİ

SUBJECT NO/DENEK NO:

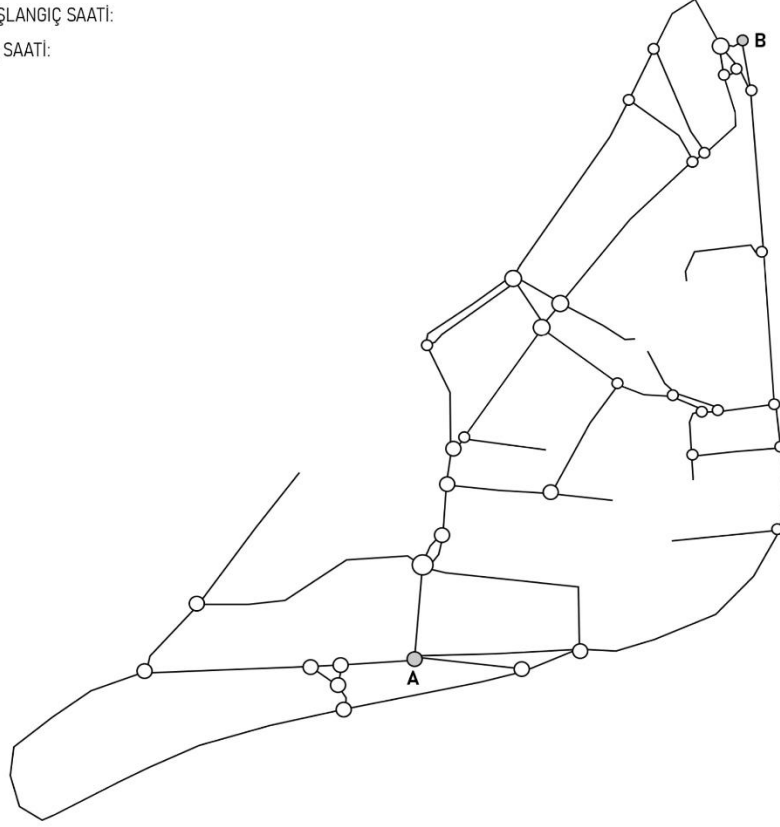
AGE/YAŞ:

GENDER/CİNSİYET:

EDUCATIONAL LEVEL/EĞİTİM DÜZEYİ:

START TIME/BAŞLANGIÇ SAATİ:

END TIME/BİTİŞ SAATİ:



EN

This study worksheet was prepared as part of the master's thesis. After the field study, the data obtained from the worksheet will be used for the thesis.

Map: When the map below is examined, The streets in the study area are shown with (—), and the intersections of these streets are shown with (○).

Method: The study observer (facilitator) walks the area with the subject. The observer shows the worksheet to the subject once at the beginning of the study. During the study, the worksheet is only in the hands of the observer, and she processes the outputs onto the worksheet during the study. Subjects are walked from point A to point B on the map or from point B to point A, depending on the observers' guidance. The observer stops the subject at street intersections (○) tells him/her the street alternatives to which he/she can navigate and asks him/her which direction he/she wants to go. The subject has to choose the street where he/she feels most comfortable and most attractive to him/her. After the subject makes his/her choice, the observer marks the subject's route followed on the worksheet. When the subject walks to the middle of the street, the subject is stopped by the observer and this time the subject is asked to score the feeling of street enclosure he/she feels on the street, from 1 to 5 (1.least, 5.most). This scoring is applied to each street that the subject directs and is displayed on the map along with the route. During the study, the subject cannot leave the area and the observer cannot suggest any alternative route to outside the area. In addition, during the study, the subject can re-pass the roads he/she passed and can return from the road he/she passed. As a result of the study, when the desired endpoint is reached, the study ends.

TR

Bu çalışma altı yüksek lisans tezi kapsamında hazırlanmıştır. Yapılacak alan çalışması sonrasında altıktan elde edilen veriler tez için kullanılacaktır.

Harita: Altıta yer alan harita incelendiğinde, Çalışma alanındaki sokaklar (—) ile, bu sokakların kesişim noktaları (○) ile gösterilmektedir.

Yöntem: Çalışma yürütücüsü (gözetimci) alanı denekle birlikte yürür. Yürütücü, altıta çalışmanın başında deneye 1 kere gösterir. Çalışma boyunca altıta sadece çalışma yürütücüsünün elinde bulunur ve çalışma esnasında çıktıkları altıta kendisi işler. Denekler, yürütücünün yönlendirmesine göre, haritada yer alan A noktasından B noktasına doğru, ya da tam tersi, B noktasından A noktasına doğru yürütülür. Yürütücü sokak kesişim noktalarında (○) deneyi durdurur ve ona yönlenebileceği sokak alternatiflerini altıktan yardım alarak söyler, ve deneye hangi yöne gitmek istediğini sorar. Denekten kendisinin en konforlu hissettiği ve kendisine en çekici gelen sokağa yönelmesi ister. Denek tercihini yaptıktan sonra izlediği rotayı yürütücü altıta işaretler. Deneyin yönlediği sokağın ortasına yüründüğünde denek durdurulur ve bu sefer deneye, bulunduğu sokakta hissettiği sokak kapallılık hissiyatını 1'den 5'e (1'en az 5'en çok) puanlaması istenir. Bu puanlama deneyin yönlediği her sokak için uygulanır ve haritanın üzerine rotayla birlikte işlenir. Çalışma süresince denek, alanın dışına çıkamaz ve yürütücü deneyi alanın dışına yönlendirecek her hangi bir yol alternatifini söyleyemez. Ayrıca çalışma süresince denek, geçtiği yollardan tekrar geçebilmekte ve geçtiği yoldan geri gidebilmektedir. Çalışma sonucunda istenilen bitiş noktasına ulaşılır ve çalışma sonlanır.

Figure A.2 : Maslak study area worksheet.



CURRICULUM VITAE

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PUBLICATIONS, PRESENTATIONS AND PATENTS ON THE THESIS:

- **Toprak, D., Kurkcuoglu, E.** (2023) “Effects of Human Scale on Wayfinding in Urban Areas: The Case of Beşiktaş” IGRS’23–2nd International Graduate Research Symposium, Istanbul Technical University, 16-18 May, 2023, Full Text Proceedings.

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