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HOW DO HIGH-RISE BUILDINGS AFFECT THE MENTAL IMAGE OF USERS? CASE STUDY: SELJUK TOWER IN KONYA

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Abstract
Due to their physical and identity features, high-rise buildings play a key role in influencing the citizens' mental image. This study aims to investigate the bilateral link between the environment and people based on user evaluations of the formal and physical features of high-rise buildings. By emphasizing the impacts of formal, functional, and semantic aspects of high-rise buildings on users' preferences, the study identifies perceptual components and physical features that shape mental image. To this end, using the library research method, the perceptual components of high-rise buildings are introduced as the conceptual model of the study. Then, the relevant components are evaluated using a survey of 217 users of the Seljuk Tower in Konya. The results show that the 'sense of pleasure when facing the tower' has the most significant correlation with the users' perception. The "degree of innovation of the form" and the "materials used in the building" are the other priorities that influence the users" perception. The results also show that affective and cognitive perceptual dimensions influence users' mental image significantly more than evaluative and interpretative dimensions.

Keywords: **High-rise buildings, Mental image, Perceptual components, Seljuk Tower, Users' preferences.**

1. INTRODUCTION

Humans have long been fascinated by the creation of high-rise buildings. With the breakthroughs of the Industrial Revolution and subsequent population migration to cities, the construction of high-rise buildings became an inescapable event, particularly in the previous two decades. It should not be overlooked that the physical and aesthetic characteristics of high-rise structures have a significant impact on inhabitants' mental images. Under the title of urban landmarks, Kevin Lynch [1] recommends high-rise buildings as one of the five aspects of city legibility. Because of their distinctiveness, recognizability in their surroundings, and serving as a symbol and sign for the entire city, high-rise buildings have a significant impact on inhabitants' perceptions of the city. In addition to formal and functional characteristics, these buildings include semantic and symbolic properties that influence citizens' perceptions, emotions, and memories and assist individuals in recognizing the features of their surroundings. Because of their formal traits and the connection, they establish with peoples memories and mental images, the objective and subjective characteristics of these buildings have a major impact on citizens' perceptions and behaviour [2]. According to this viewpoint, appearance is the tangible aspect of the form in which the visual, functional, and semantic crystallization of the elements that comprise the space becomes visible [3]. As a result, the appearance of high-rise structures is regarded as the physical and objective embodiment of the city's visual elements (colour, form, etc.), functional elements, and semantic features (meanings and concepts). Mental perception, on the other hand, requires models, theories, and frameworks to provide a basic picture of the phases of environmental perception [4]. In this regard, the current research aims to explain the bilateral interaction between the environment and humans through user

evaluations of the form and physical environment in the form of high-rise buildings. The study tries to address the following questions based on this goal:

1) What are the components of citizens' perception of high-rise buildings in the city?
2) Which of the dimensions of environmental perception and which physical feature of high-rise buildings is more effective in forming the citizens' mental image?
3) What guidelines for the design of landmarks can be obtained from the findings of this study?

To answer the questions, the study uses a mixed research method (library research and survey). In this context, the data from different studies and theories about the mental image and perception of high-rise buildings are analysed and measurements are extracted. Then, the conceptual model of the study is proposed, which represents the process of the impact of high-rise buildings on citizens' perception and the components of high-rise buildings' perception. The corresponding model is investigated using the most famous high-rise building in the city of Konya, the Seljuk Tower, through a survey. Finally, the perceptual factors of high-rise buildings are classified and guidelines for the design of high-rise buildings are proposed.

2. CONCEPTUAL FRAMEWORK

2.1. Environmental perception and mental image variables

Perception is the biological and psychological process of acquiring information from the environment [5], and as an active process, it is a critical component of understanding an individual's surroundings. Perception is a mental phenomenon in which sensory encounters throughout a cognitive process become meaningful, allowing people to comprehend object relationships and meanings [6]. Environmental data is collected, stored, sorted, and remembered during this process. This data can be used to determine the location, distances, and arrangement of buildings [7]. The environment is conveyed from objective to subjective and from subjective to objective throughout the process of environmental perception. In the objective environment, environmental stimuli are received and sensory input from the environment is sent to humans. However, objective data is transformed into subjective findings in the mental environment. Furthermore, giving meaning to and conceptualizing mental facts in the cognitive stage is intra-mental in nature and originates in the mental environment. As mental concepts become the basis for the emergence of environmental behaviours, this transformation returns from the mental environment to the objective environment. This characteristic is self-explanatory of the dynamism and diversity of the perceptual relationship between man and the environment [8]. User behaviour plays a fundamental role in defining the environment and space. Perceptual processes and mental schemas stimulated environmental information. These schemas are both innate and learned, and they serve as the fundamental link between perception and cognition [9]. In this respect, William Ittelson [10] considers humans as part of perceptual stimuli. He identified four distinct dimensions of perception and believes that these dimensions operate in tandem [11]:

– *Affective dimension*: including emotions that affect the perception of the environment and, on the other hand, the perception of the environment also affects the emotions.
– *Cognitive dimension*: includes thinking about the environmental stimulus, organizing and storing information. In fact, this aspect helps to make the environment meaningful for individuals.
– *Interpretative dimension*: includes meanings and concepts that are obtained from the environment. In this dimension, we rely on our memories and mental reserves to compare and interpret new environmental stimuli.
– *Evaluative dimension*: includes values and preferences. The mental image of the environment is the result of a process in which personal experiences of the environment along with the value system play a major role in understanding environmental stimuli.

Aesthetic perception is another significant aspect of perceptual notions. George Santayana proposed a three-tiered categorization of aesthetics: sensuous, formal, and symbolic aesthetics. Internal and subjective aesthetics are the first category, whereas formal aesthetics (the value of the shapes and structures of the environment) and symbolic aesthetics (the meanings connected with the environment) are concerned with features of environment design [12]. Grutter [13] has validated aesthetic perception by developing a conceptual model. He believes that the work's originality should be greater than the mind's potential to be recognized as beautiful at whatever level of consciousness. According to Karimi Moshaver et al. [14], there are two perspectives on aesthetics in urban spaces: one caused by a pleasurable experience of the environment regardless of its functional concepts and goals, and the other by knowledge, culture, and pre-

determined patterns. This enables the realization of a relationship between the pleasurable feeling, the perception of beauty, and the meanings associated with the urban perspective. As a result, formal aesthetics (materials, colour, and body) and symbolic aesthetics (meanings and symbols), as well as other public viewpoints based on Ittelson's four dimensions, will be studied in this article.

2.2. Factors affecting high-rise buildings perception

Concepts are formed in the user's mind as a result of the primary sensory inputs, leading to a more in-depth experience of the surrounding area. The first category is concerned with conceptions of space structure and form that the user has based on mental experiences. The second category is concerned with notions that the user understands as a result of mental interactions with non-physical structures. Individuals' reactions to such early views include both intellectual and sensory and emotional responses. According to Pakzad [15], form, function and meaning are considered the perceptual components of the environment and urban space. Lang [5] based on Appleyard [16] considers three reasons to be the cause of a better understanding of buildings, which are: form characteristics (the visible limit of the building in such a way that it is completely distinguishable from its surroundings and has a unified shape, other factors such as the complexity of the facades, colouring and lighting of the facades are less important), visibility characteristics (buildings located at intersections, adjacent open spaces, or on the side of highways are better seen and remembered), and functional characteristics (specific use leads to better identification). As a result, high-rise buildings will be essential as landmarks because of their distinctiveness, ability to be recognized in their context, visibility from various sections of the city, and the amount of contrast they have with the surrounding elements. Furthermore, by contrasting with a certain context and situation, these buildings provide a special significance for users [10].

The cases provided focus primarily on small nuances. High-rise buildings, on the other hand, have semantic and symbolic properties. The semantic meaning of high-rise buildings in a city is significant since they introduce a city's identity. Furthermore, the symbols play a crucial role in the design of high-rise buildings as landmark locations in a city because citizens must be able to communicate with these symbols as urban signs [17]. Understanding how visuals are perceived in the mind is one of the factors that aid individuals in identifying environmental characteristics [18].

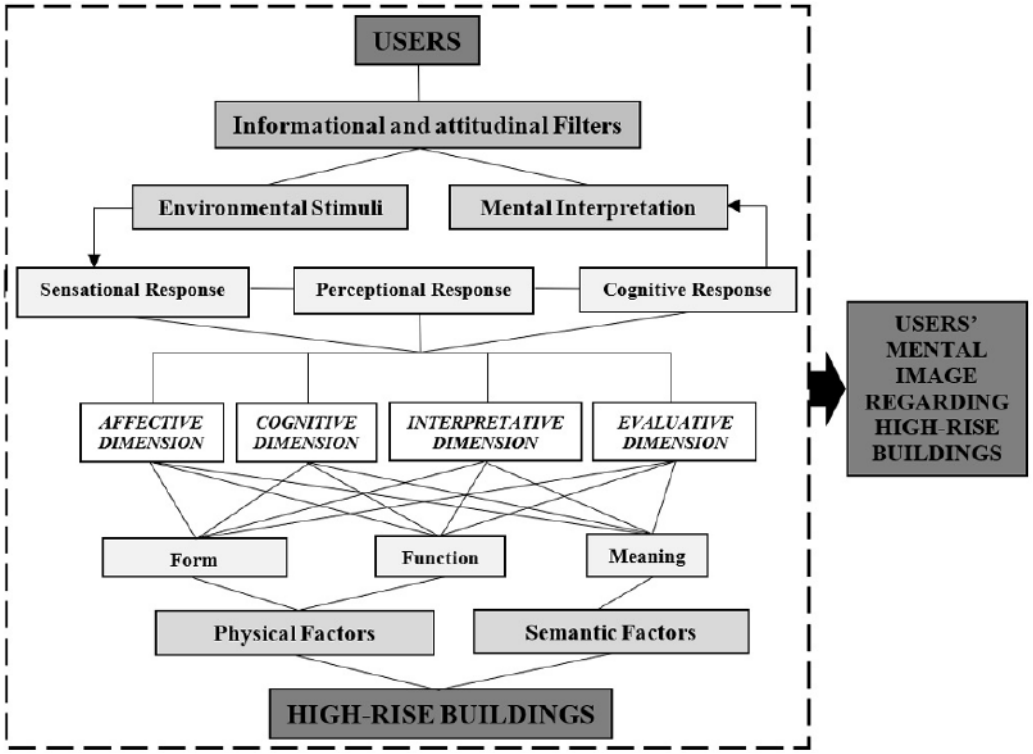


Figure 1.
The conceptual model of study [Source: Author]

A high-rise building influences the skyline and produces a height difference from its surroundings, giving the building a symbolic character in the background. Therefore, it is critical to consider the identity dimension of high-rise buildings [19]. Citizens' prior knowledge and personal experiences will have a significant impact on semiotic perception; understanding symbolic signs is easier than understanding symbolic and indexical signals due to the more objective relationship between the signifier and the signified. This nature can also be seen in postmodern architectural currents. Buildings can have emotional as well as semiotic meanings in the eyes of occupants. These scenarios involve emotional reactions like pleasure and arousal (interesting aspects of the environment) [20, 21]. Based on a review of the studies, the conceptual model of the research that explains the process of the effects of high-rise buildings on the users' environmental perception and mental image is presented in Figure 1.



Figure 2.
First row: the location of Konya [Source: satellites.pro/Google_plan/Konya map]; The second row: the location of the case study in the city [Source: Google maps]; The third and fourth row: Case study photos [Source: Author]

3. CASE STUDY

The Seljuk Tower, with a height of 163 meters and 42 floors, is known as the tallest building in Konya City, Turkey. It is also considered the sixth tallest skyscraper in Turkey and has been used for commercial purposes since 2006 (see Figure 2). The building has gained prominence due to its central location and proximity to the city's main hospital, Kule shopping centre, Konya Culture Park, security police, the city's industrial bazaar, and residential complexes. In addition, due to the height of the building and the lack of towering buildings in the immediate vicinity, the Seljuk Tower is visible from many places in the city. Therefore, it fulfils an important function as an urban landmark. In terms of architectural design, the Seljuk Tower is centrally organised in plan and volume. The entrance and the ground floor of the building are at a higher level than the pavement. Tempered glass and composite materials were used for the building's façade. It includes private floors such as businesses or offices and public floors such as lobbies, shops, restaurants, a children's playground, and cafes. On the top floor of the tower, there is a revolving restaurant and a terrace from which you can view the cityscape of Konya.

4. METHOD

As previously stated, the present study seeks to explain the interaction between the built environment and humans through users' perceptual evaluations of high-rise buildings. In this respect, it aims to propose a conceptual framework that identifies components that influence users' perceptions of high-rise buildings. To this end, the text content analysis method (library research) was used to categorize the measures of users' mental and perceptual evaluations of high-rise buildings extracted from previous studies. Then, to examine the impacts of dimensions and features introduced in the conceptual model of study on users' mental image and perception, a survey method was used. In this context, 217 citizens of Konya (114 women and 103 men; M = 29.65) volunteered to participate. The participants were randomly selected and were all located at the case study site. The content of the questionnaire included 12 questions (two open questions and ten closed questions) to evaluate the preferences and perceptions of the citizens regarding the architecture and form of the Seljuk Tower. The closed-ended questions were rated on a Likert scale including very low, low, medium, high, and very high. The questionnaires were distributed and collected over two days. The questions were divided based on the four dimensions of Ittelsons' perception as follows:

– *Affective dimension*: including questions about "the feeling of pleasure when facing the tower", "the degree of beauty of the tower's form", and "the feeling the tower evokes in the user (open question)".
– *Cognitive dimension: this includes questions about "the degree of visibi*lity and legibility of the tower among other buildings in the city and "the degree of novelty and innovation of the form of the tower".
– Interpretive dimension: this includes questions on the "degree of compatibility of the height of the tower with the surroundings", the "degree of differentiation of the tower with the surroundings" and the "perceived significance of the form of the tower".
– *Evaluative dimension*: including questions about "the need to distinguish the form of the tower in the context of the city, "the pleasantness of the tower's location in the city centre", "the convenience of using glass and composite in the tower's façade" and "the degree of users' interest in the construction of the tower based on dimensions and its form" and "the need for tall buildings in Konya (open question)'.

Questionnaire data were analyzed with SPSS software, using Pearson correlation tests and one-sample t-tests. Cronbach's alpha coefficient was used to test the validity of the questions. Of the questions that dealt with the perceptual characteristics of the tower, 2 questions, including "the degree of visibility of the tower among other buildings in the city and "the degree of distinction of the tower from its surroundings" were removed due to the respondents' ambiguity or lack of appropriate answers on this topic, and the purpose of the research based on the data generated in the SPSS software were removed. After these corrections, the reliability coefficient of the remaining 9 questions in this section was $\alpha = 0.863$, which is considered a satisfactory value according to the acceptance threshold (0.7) and indicates adequate validity of the questionnaire.

5. RESULTS

In line with the conceptual structure of the study, data collection and analysis were conducted. Accordingly, 49% of the respondents had a bachelor's degree, 12.9% had a master's degree, 6.4% had

a postgraduate degree and 17% had an associate's degree. 14.7% of the respondents reported having only a high school degree. Table 1 shows the data on the general profile of the participants. In response to the open-ended question "How much do you need high-rise buildings in Konya?", 43% rated this need as moderate, 31% as very high, 11% as high, 9% as low and 6% as very low.

To investigate the relationship between the research variables in the perception of high-rise buildings, the analyses were divided into the two categories of "physical components (formal and functional)" and "semantic components" in the perception of high-rise buildings, and Pearson's correlation test was used to examine the relationship between them. The statistical results of the analyses were presented in the form of histograms (Figure 3). In these graphs, Likert scale responses were presented on the horizontal axis and frequencies on the vertical axis. As far as the affective dimension is concerned, the results of the correlation coefficient between the questions and the variables show significant relationships between the aesthetic preference for the tower and the degree of interest people have in it. 2% of the participants rated the beauty of the tower form as very high, 3% as high, 49% as average, 34% as low and 12% as very low. For the cognitive dimension, in measuring users' preference regarding the innovativeness of the tower form, they evaluated 14% as very high, 26% as high, 42% as medium, 11% as low and 7% as very low.

The results of the Spearman correlation coefficient in Table 2 show that, from the participants' point of view, there is a significant relationship between the degree of perception of the "beauty of the tower's form" and the degree of "feeling of pleasantness when looking at the tower" (0.591), the "degree of novelty and innovation of the tower's form" (0.512), the "materials used for the façade" (0.421) and the "pleasantness of the tower's location in the city centre" (0.311). This means that the aesthetic preference of the participants is caused by the affective aspects of perception rather than the cognitive and interpretative aspects of the perception of the tower.

Table 1.
Frequency distribution by gender of participants [Source: Author]

Participants		Education Degree					Total
		High school	Associate	Bachelor	Master	Post Graduate	
Gender	Male	13 13%	24 23%	40 39%	17 16.5%	9 8.5%	103 100%
	Female	19 17%	13 11%	67 57%	11 9.60%	4 5.40%	114 100%
Total		32 14.7%	37 17%	107 49%	28 12.9%	13 6.40%	217 100%

Table 2.
The relationship between the beauty of the tower's form and its physical characteristics [Source: Author]

Variable	Correlation Coefficient	Significance Level
The sense of pleasure when facing the tower	0.587	0.001
Distinguishing the tower's form in the city context	0.494	0.001
Newness and innovations in the form of the tower	0.449	0.000
The pleasantness of the materials used in the facade	0.310	0.000
The pleasantness of the tower's location in the city centre	0.214	0.001

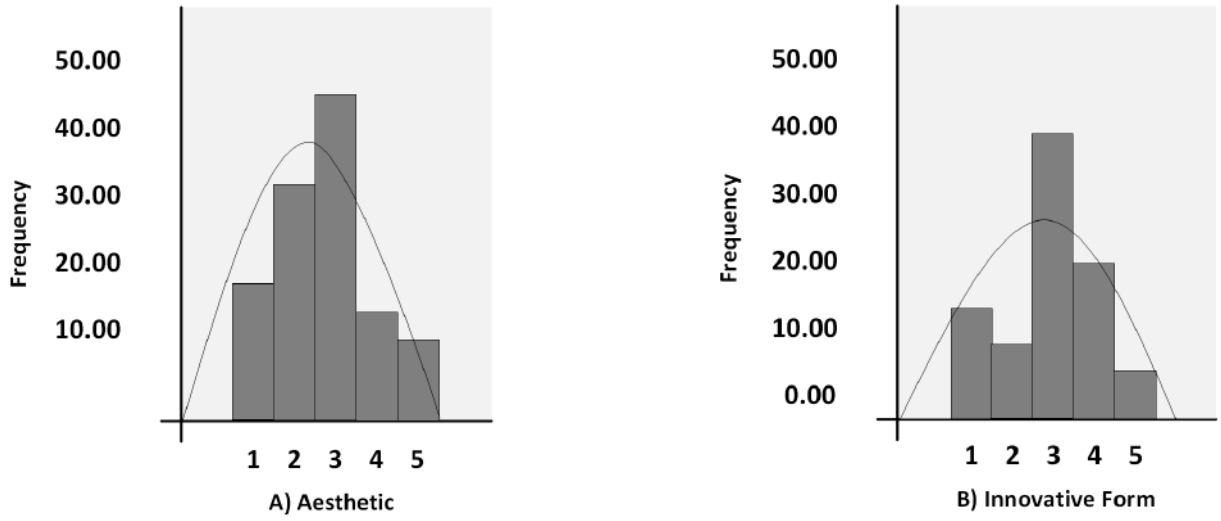


Figure 3.
Scattering of answers in response to the question: A) How do you rate the beauty of the tower form? And B) How new and innovative is the form of the tower in your opinion? [Source: Author]

Measuring participants' interest in the tower is another important variable that has the highest correlation with the other variables in this study (Table 3). Accordingly, users' interest in the tower correlates most strongly with the "sense of pleasure at seeing the tower" (0.587), the "need to distinguish the form of the tower in the context of the city" (0.494), the "degree of beauty of the shape of the tower" (0.449), the "type of materials used for the façade" (0.310), and the pleasantness of the tower's location in the city centre" (0.214). This interest is more due to the affective aspect of the participants' perception than to the cognitive and evaluative dimensions because the evaluation of the citizens' opinion about the appropriateness of the materials used for the tower's façade shows that 71% of them evaluate the appropriateness of these materials as inappropriate and only 29% evaluate them as favourable. Moreover, 42% of people do not experience a pleasant feeling when facing the tower (Figure 4).

71% of the participants rated the compatibility of the height of the tower with the surroundings as moderate and weak. This is despite the fact that 37% of the participants saw the need for differentiation with the surroundings. Thus, it appears that despite the need for physical differentiation with the texture, the Seljuk Tower was unable to create an adequate level of visual differentiation from the audience's perspective (Figure 5).

Examining the correlation between gender and educational level with the esthetic preference and interest of the participants in the tower shows that there is no significant correlation in this regard. However, there is a negative correlation between the level of education and the evaluation of the "degree of novelty and innovativeness of the tower form" (0.214) and the evaluation of the "degree of compatibility of the height of the tower with the surroundings" (0.260). Although this negative correlation is not very strong and significant, it shows that improving the level of education can help to increase interpretive and cognitive perception. This means that with the increase in the level of education, the degree of creativity of the tower shape and its harmony with the surrounding context became less preferred. Analyzing the open question of the survey, it was found that the shape of the tower has no importance from the point of view of 67% of the participants, and 33% believe that the shape of the tower reminds them of a rocket, stands out from the surroundings, is pride, creates an income-generating environment, and attracts customers by making the tower a symbol of the city of Konya. The content classification of the above cases into "object" (e.g. rocket), "attribute" (e.g. pride) and "quality" (e.g. development of the

Table 3.
The relationship between users' interest in the tower and its physical characteristics in the city context [Source: Author]

Variable	Correlation Coefficient	Significance Level
The sense of pleasure when facing the tower	0.591	0.000
Newness and innovations in the form of the tower	0.512	0.000
The pleasantness of the materials used in the facade	0.421	0.001
The pleasantness of the tower's location in the city centre	0.311	0.000

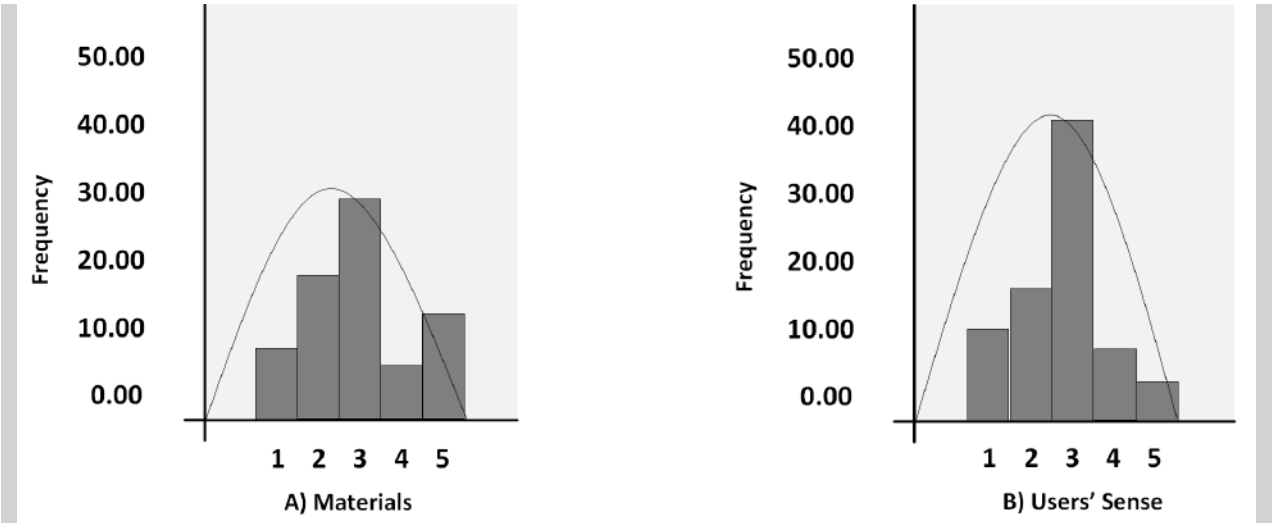


Figure 4.
Scattering of answers in response to the question: A) How suitable is the using composite and glass for the facade of this building? And B) To what extent does standing next to the tower give you a pleasant feeling? [Source: Author]

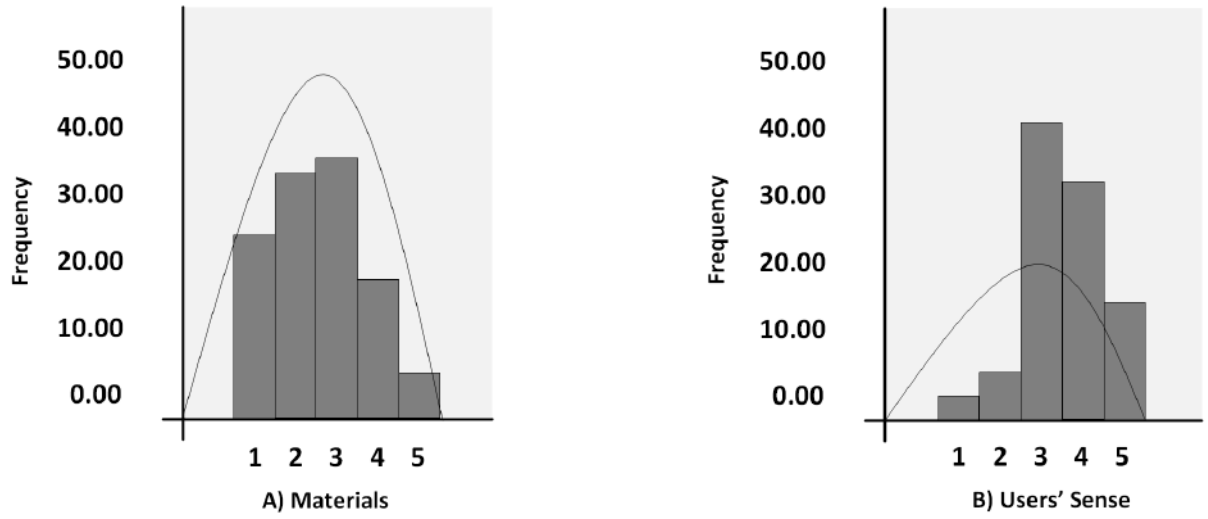


Figure 5.
A) What extent does the height of the tower match the surrounding environment? And B) to what extent has the tower distinguished itself from the surrounding environment due to its height? [Source: Author]

city) shows that 63% of the citizens perceive the importance of the object from the perspective of the tower and only 12% consider it as a qualitative sign and 25% attribute it. Such perception expresses the symbolic dimension of this building as a city landmark.

In response to the open-ended question, "How do you feel about the tower form?", citizens expressed words like impermanence and transience, struggle with nature, sense of anxiety, sense of formality, simplicity, height, grandeur, power, sense of inconsistency, heartbreak, disproportionality, lack of connection with the surroundings, sense of selfishness, lack of belonging to the city, heterogeneity, surprise, humiliation, impatience, ordinariness, apprehension, detachment, and pessimism. 79% of the audience expressed no feelings towards the tower. Examination of the responses shows that these feelings are not positive and tend to have negative emotional aspects.

Finally, to determine the importance of each of the four dimensions of research (affective, cognitive, interpretative, and evaluative), a sample t-test on the Likert scale and the number 3 was considered the reliability average of each question. As seen in Table 4, the participants' average score in the affective, cognitive, interpretive, and evaluative aspects is greater than the average score of 3. As a result, the affective dimension is ranked first with an average of 4.49, followed by the cognitive dimension with an average of 4.01, and the evaluative (M = 3.46) and interpretative (M = 3.09) dimensions are ranked third and fourth, respectively.

Table 4.
A sample t-test of affective, cognitive, interpretative, and evaluative dimensions [Source: Author]

Dimension	N	Mean Value	Average	SD	T	*P*-Value
Affective	217	3	4.49	0.63	17.87	0.001
Cognitive	217	3	4.01	0.49	15.63	0.001
Evaluative	217	3	3.46	0.51	18.07	0.001
Interpretative	217	3	3.09	0.78	16.35	0.001

6. INTERPRETATION OF RESULTS AND DISCUSSION

High-rise buildings, especially in big cities, are more important to citizens than other buildings and can affect their perception. Understanding the bilateral effects of humans and the physical environment consisting of high-rise buildings can provide a platform for comfort, peace, creativity, and health for life. Several factors can influence the beauty of these structures as well as people's interest in them. According to the findings of this study, Konya Seljuk Tower, as the city's highest building, has been unable to exploit its spatial and physical capacities to create a desirable and appealing urban landscape, as well as to excite users' feeling of pleasure when confronting the tower. The analysis of the preferences of the citizens who participated in this research reveals that "the degree of innovation in form and design" and "the materials used in the construction of the tower" are the second and third priorities in affecting people's aesthetic perception. Meanwhile, people's pleasant feelings when confronted with a towering building that has never been in the city have the most

link with their aesthetic perception. This factor is also the most strongly related to the increased interest in this building. The necessity to distinguish the tower's form in the context of the city centre, as well as its beauty are among the other goals in raising people's interest in this project. In this approach, the uniqueness of its height in the city is regarded as the primary component influencing people's attention and pleasant sensation, which is mostly influenced by sensory perception.

Lack of attention to architecture's cognitive and interpretive capacity, which is caused by a lack of interpretation and idealism, is mostly dominated by economic speculation and extreme pragmatism, which cannot enrich citizens' mental images or add to the life of the city's memories. Hence, buildings like Seljuk Tower are simply transitory impressions that will fade with time, and the occurrence of such events on a regular basis will lead to mental disintegration and a deterioration in inhabitants' appreciation of the city. As a result, it is appropriate to pay more attention to the unique and creative aspects of high-rise buildings" physical design and façade because this aids aesthetic preference and increases people's interest in such buildings. Using materials with varied compositions and colours in facade design is regarded as a significant component that substantially aids people's perception of high-rise buildings in this regard. Although differentiating with the surrounding texture can help attract people's attention, aesthetic perception has no significant relationship with contrast and distinguishing, so it is recommended that in the design of other similar buildings, pay attention to the visual harmony with the natural and physical texture of the city. Furthermore, attention must be paid to the meanings, conceptions, and identities of high-rise buildings in order to avoid the creation of buildings that lack meaning and identity. Symbolic components in signs such as landmarks have a direct relationship with the perception process, and grasping the meanings and concepts of high-rise buildings necessitates symbolic aspects that are very important in design.

7. CONCLUSION

This study considered the physical and identical characteristics of high-rise buildings and examined their effects on the mental image of users. Namely, the main purpose of the study was to investigate the bilateral connection between the environment and people through users' evaluations of high-rise features. By emphasizing the effects of formal, functional, and semantic aspects of high-rise buildings on users' preferences, the study identified perceptual components and physical features that shape the mental image. To this end, the library research method was used to introduce the perceptual components of high-rise buildings as the conceptual model of the study. Then, the relevant components were evaluated by conducting a survey among the users of the Seljuk Tower in Konya. The results showed that the "feeling of pleasure when looking at the tower" has the most significant correlation with user perception. The "degree of innovation of the form" and the "materials used in the building" are the other priorities that influence the users' perception. The results also showed that affective and cognitive perceptual dimensions influence users' mental image significantly more than evaluative and interpretative dimensions.

The neglect of architecture's cognitive and interpretive capabilities, due to a lack of visionary insight and imaginative thinking, has allowed economic speculation and an overly pragmatic approach to take over. These forces are not able to promote the imaginative landscapes of citizens or contribute to the historical memory of the city. Structures such as the Seljuk tower are thus only ephemeral imprints that will disappear with time. If such examples are repeated, it could lead to a fragmentation of spiritual experiences and diminish the affection of the inhabitants for the city. Therefore, it is essential to focus on the distinctive and innovative elements inherent in the physical structure and exterior of tall buildings. This concerted action not only enhances the esthetic inclination but also the appeal of these architectural marvels. The use of different materials with a variety of compositions and shades of colours in the façade construction proves to be a decisive factor that significantly enhances the perception of the towering structures in this area by individuals. Future research can address the appropriate symbolic aspects for citizens to recognize and understand, as well as the macro patterns and major components that can be defined in the façade and construction of large urban buildings. In addition, the comparison of similar studies with the identification of local preferences can provide the basis for obtaining results for the creation of design guidelines in the architecture and urban planning system and identify certain patterns that other researchers could study in the future.

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REFERENCES

[1] Lynch, K. (1960). The image of the city. Harvard-MIT Joint Center for Urban Studies Series. Cambridge, Mass.: MIT Press.

[2] Tavernor, R. (2007). Visual and cultural sustainability: The impact of tall buildings on London. *Landscape and Urban Planning, 83*(1), 2–12.

[3] Faizi, M., & Asadpour, A. (2013). Residence perception of urban high rise buildings scape, Case study: Shiraz Chamran Hotel. *JIAS Journal of Iranian Architecture Studies, 2*(3), 107–121.

[4] Ng, C. F. (2017). Living and working in tall buildings: satisfaction and perceived benefits and concerns of occupants. *Frontiers in Built Environment, 3*(70), 1–7.

[5] Lang, J. T. (2004). Creating Architectural Theory: The Role of the Behavioral Sciences in Environmental Design. Translated into Persian by Alireza Aeinifar. Tehran University.

[6] Lawson, B. (2007). Space as language. New York: Routledge.

[7] Kettunen, P., Putto, K., Gyselinck, V., Krause, C. M. Sarjakoski, L. T. (2015). Perception and Recall of Landmarks for Personal Navigation in Nature at Night Versus Day. In: Brus, J., Vondrakova, A., Vozenilek, V. (eds) Modern Trends in Cartography. Lecture Notes in Geoinformation and Cartography. Springer, Cham.

[8] Behzadipour, H, Davoudpour, Z., & Zabihi, H. (2022). Measuring the Dimensions of Environmental Perceptions of Citizens among High- Rise Building, Case Study: Tehran's 22th district. *Journal of Applied Researches in Geographical Sciences, 22*(64), 349–368.

[9] Rezaei, H., Keramati, G., Dehbashi Sharif, M., & Nasir Salami, M. (2018). A Schematic Explanatory Pattern for the Psychological Process of Achieving Environmental Meaning and Actualizing Sense of Place Focusing on the Intervening Role of the Perception. *Bagh-e Nazar, 15*(65), 55–76.

[10] Ittelson, W. H. (1987). Environmental Perception and Urban Experience. *Environment and Behavior, 10*(2), 193–213.

[11] Carmona, M., Heath, T., OC, T., & Tiesdell, S. (2003). Urban Spaces-Public Places: The Dimensions of Urban Design. Oxford: Architectural Press.

[12] Lang, J. (2004). Creating architectural theory: The role of the behavioral sciences in environmental design (A. Aeinifar, Trans.): Tehran University Publishing.

[13] Grutter, J. K. (2015). Ästhetik der Architektur: Grundlagen der Architektur-Wahrnehmung (J. Pakzad. Trans.): Tehran, Shahid Beheshti University Publishing.

[14] Karimi Moshaver, M., Mansouri, S. A., & Adibi, A. A. (2010). *Relationship Between the Urban Landscape and Position of Tall Building in the City, 7*(13), 89–99.

[15] Pakzad, J. (2014). Theoretical foundations and urban design process. Tehran: Shahidi Publishing.

[16] Appleyard, D. (1979). The Environment as a Social Symbol: Within a Theory of Environmental Action and Perception. *Journal of the American Planning Association, 45*(2), 143–153.

[17] Lamb, S., & Kwok, R. C. (2017). Sopite syndrome in wind-excited buildings: productivity and wellbeing impacts. *Building Research & Information*, 3, 347–358.

[18] Filomena, G., Verstegen, J. A., & Manley, E. (2019). A computational approach to "The Image of the City". *Cities*, 89, 14–25.

[19] Ahmed, M., & Ashour, A. S. (2023). The effect of architectural landmarks on a skyline and the mental images of the cities of ancient civilizations. *AIP Conference Proceedings, 2651*(1), 1–15.

[20] Sharma, G., Kaushal, Y., Chandra, S., Singh, V., Mittal, A. P., & Dutt, V. (2017). Influence of Landmarks on Wayfinding and Brain Connectivity in Immersive Virtual Reality Environment. *Frontiers in Psychology, 8*(1220), 1–12.

[21] Drapela, E., & Brozkova, T. (2016). The Importance of Landmarks for the Perception of the Region's Attractiveness. *ACC Journal, 22*(3), 7–13.