The Cognition of the City at Night

(Investigating the Role of the Night in Citizens Cognitive Maps- Case Studies: Zanjan and Abadan)

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ABSTRACT: Human presence and accordingly establishing suitable condition for social interactions are important factors in shaping urban spaces. Caring to different aspects of improving environmental qualities especially perception aspect and ease of perception from the environment with legibility improvement is an element that was emphasized from the base of urban design. The role of time, commence of day and night and its effect on perception and legibility of the environment have not been investigated deeply. Although time effects the level and the way of perception and legibility and it should be noted that there is clear difference between human perception and space legibility during day and night. This research is looking for effective major factors on urban spaces qualities in day and night with descriptive and comparison method on the case studies and their images of Zanjan and Abadan cities and tries to approve the differences of these images. Results of performing this research clearly approving that, social, functional and perceptional dimensions are the most important dimensions of improving space quality at night. It should be declared that there are a lot of differences between the images and the perception of the city during day and night. In addition, the mention priority to urban five elements in shaping these maps are differ either.

Keywords : *Perception, Legibility, Cognitive maps, Night.*

INTRODUCTION

Urban design is related to the living environment with two realms of human mentality and objectivity. According to the studies of environmental psychology, there is effective and defined communication between human behavior and the environment. This communication effects human behavior, lead it and make it limited. So human continuously has measurement point of view toward the surrounding environment which depends on level and style of mentioned effect. This measurement and assessment based on factors and characteristics which human piled in his mind according to his own imaginations and experiences as assessing and desirable factors. Human judgments of what he sees from his environment are assessed and measured by his mental experiences and intellectual possession. Environment cognition is one of the most important aspects of urban design realm. This importance is adapted from mental maps shaping that person can acquire from environment in his life. So this imagination can be his factor of judgment of the environment. This paper in presented in three main parts. First part explores the definitions and literature about the topic. Second part discusses mainly about investigating

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cognitive maps gathered from the case studies and their differences during day and night and then comparison and assessment of the maps are written. At the end conclusion and some suggestions are presented with finding analyzing.

Spatial Recognition and Environment Cognition

Hart and Moore (1973, 248) defined spatial cognition as "the knowledge and internal or cognitive rpresentations of the structure, entities, and relations of space; in other words, the internalized reflection and recontruction of space in thoughts" .In general, spatial cognition is the human understanding and perception of geograhic space.We acquire facts and opinions about the world around us, and we remember emotional reactions to environments from experience. Presumably, this mental representation of environment can use to make plans, to understand the terrain around, or solve problems involving an environmental context. In general, researcher refer to this ability to image and think about the spatial world as environmental cognition(Bell et al., 2001, 57).

In cognitive studies, quite often researchers use another term, environmental perception, instead of environmental cognition or recognition, to describe the human's ability to

comprehend, interpret, and evaluate the physical world surrounding us. While these two terms have been used in a confusing variety of contexts, there is a difference between them. According to Bell et al., (2001), the term perception involves experiences and memory, which imply that cognitive processes are involved. In addition to cognitive process, our feelings about the environment influence our perception of it, and our perceptions influence our feelings. Thus, it includes both assessment of what is in a scene and an evaluation of the good and bad elements. In contrast, the recognition focuses on perception as a process for gathering information about the world and as a resource of affective responses and associations (Long, 2007).

In contemporary psychology, perception means a mental process that is responsible for the selection and classification of sensational information and at the end it put together a meaning for the phenomenon. Perception is a mental process that emotional experiences become meaningful and in this way, human will recognize the relationships and meaning of objects. Human brain with the help of existing information and potential abilities of mind, it can classify coming information and considers their priority (Irvani, 2011). Rather than being simply a biological process, perception is also socially and culturally learnt. While sensations may be similar for everyone, how individuals filter, react to, organize and value those sensations differs (Carmona et al., 2006).

Cognitive Maps and Environment Legibility

The term 'cognitive map' is widely used in a number of disciplines such as environmental psychology, social psychology, anthropology, geography, cognitive studies, urban planning, urban design and architecture. Cognitive maps are mental constructs that encompass all the internal processes that enable people to acquire and manipulate information about the nature of their spatial environment (Downs and Stea, 1973). They are incomplete, segmented and mentally distorted internal representations of the environment. They are constantly being updated and so at any one instance it is merely a snapshot of the contemporary state of physical knowledge. "Cognitive maps are the internal information structure that people use to represent information about everyday physical environment"(Garling et al., 1984,98). There is a public image of each city which is the overlap of many individual images. Or there is a series of public images, each held by some significant number of citizens. Such group images are necessary if an individual is to operate successfully within environment and to cooperate with his fellows. Each individual picture is unique. with some content that is rarely or never communicated, yet it approximates the public image, which, in different environments, is more or less compelling, more or less embracing (Lynch,1960).

As early as the 1960s, from interviewing and studying sketch map of 36 residents in three American cities, Kevin Lynch suggested five key "imaginable" elements that comprise cognitive maps of urban settings: path, node, landmark, district, and edge. After Lynch's pilot study, many studies (Appleyard, 1969, 1970; de Jonge, 1962; Francescato and Mebane, 1973; Gulick, 1963) have confirmed the results, but varying in importance of elements (long, 2007).
− Paths are the channels along which the observer customarily, occasionally, or potentially moves
− Edges are the linear elements not used or considered as paths by the observer. They are the boundaries between two phases, linear breaks in continuity: shores, railroad cuts, edges of development, walls.
− Districts are the medium-to-Large sections of the city, conceived of as having two-dimensional extent, which the observer mentally enters "inside of," and which are recognizable as having some common, identifying character. Always identifiable from the inside, they are also used for exterior reference invisible from the outside.
− Nodes are points, the strategic spots in a city into which an observer can enter, and which are the intensive foci to and from which he is traveling.
− Landmarks are another type of point-reference, but in this case the observer does not enter within them, they are external. They are usually a rather simply defined physical object: building, sign, store, or mountain (Lynch, 1960).
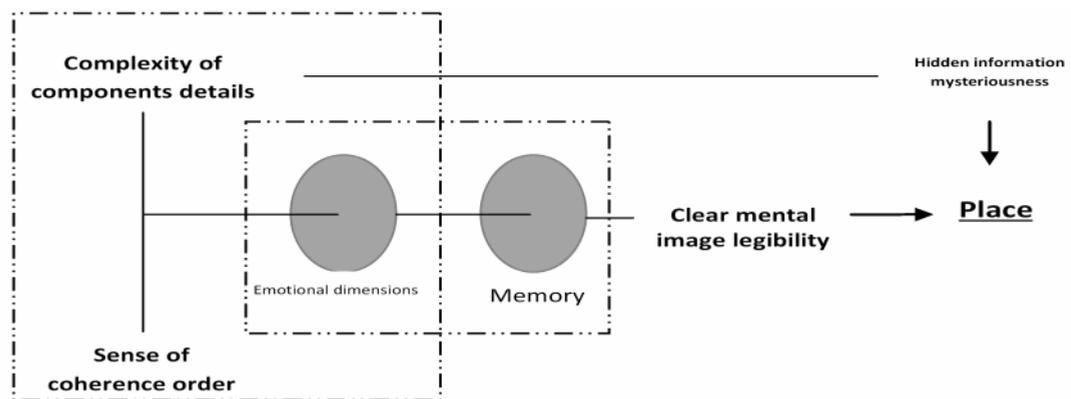

Fig.1: Integrated chart of place (Manlar and Vodvarka, 2004)

Moreover, According to Rapoport, image of the city "is the entity that remains in the memory even after leaving mentioned environment, because it put human in a count of the set of components and engage him with the whole city. Image is the result of observer and environment interaction. Image or view of the city, is a value added scheme that stays in individual`s mind. Various physiologic, personal, social and religious. factors play important roles in creating mental image or view. Studies of urban history reveals that human always looks for organizing street patterns and the hierarchy of spaces to achieve a coherent mental image of the environment. More the clarity of these images, more legible would a city be for the observer to feel more secure. A clear environment, not only creates a sense of security, but also increases the depth and intensity of spatial experience (Ibid, 162). Thus, Kaplan presented four different patterns for spatial arrangement includes complexity, coherence, legibility, and mysteriousness. Complexity means the complexity of information or information presenting in particular place, in our idea coherence refers to special discipline and our awareness of vast environment. Complexity has conceptual relations with coherence, either. Complexity of the units can be perceived in the coherence of larger patterns. So, legibility is the ability to form a clear mental image and mysteriousness contains hidden information of space that transforms enjoyment at the moment of exploring the environment by the individual (Manlar and Vodvarka, 2004).

MATERIALS AND METHODS
The Method of Mental Map Evaluation
The essential methodological problem faced by investigators of cognitive representations of the real-world environment is how to externalize the individual's mental map of the environment. The process of sketch mapping and the map itself have been used as research tools to measure how people perceive and recognize their built environments and how people act in them. It has long appeared to be a useful instrument for recovering information about the way we represent the environment to ourselves. Kim and Penn (2004) stated that although sketch maps are generally incomplete, distorted, and employed with mixed metric or no metric modes of representation, they provide data, such as the number of features; the mix of point, line, and area features; and the topological relations of elements; including the sequences of cues along routes or the sequence of segments and turns along routes (Long, 2007). A literature review in methodology reveals that sketch map as the main approach has always been utilized by researchers to investigate human spatial cognition/cognitive maps since the 1960s. However, sketch maps themselves are generally incomplete, distorted, and mixed with human metric or no metric modes of representation. In earlier days, researchers often use a qualitative method to analyze humans' sketches. They simply calculated the frequency of physical elements appearing in humans' sketches and then categorized them

in the behavior mapping by percentage (Lynch, 1960; Appleyard, 1969; Francesto and Mebane, 1973 cited in Long, 2007). Since the 1980s, researchers have begun to introduce statistical methods into the analysis of sketches. They assigned the ordinal values to the physical elements drawn by the respondent and used T-tests or correlations to compare sketches across different behavior settings. For example, Wiseman (1981), Peponis et al., (1990) and Haq (2001) analyzed sketches by counting the number of times each corridor or line was drawn; a value was given to each of the sketches based on a comparison of an actual plan of the setting. This was done so that the overall "correctness" or configuration of the sketches or relations between behavior mappings and objective properties of the buildings could be analyzed and compared.

Measuring legibility is a hard task in practice. So according to mentioned definitions of legibility, researchers have taken advantage of two methods of assessment that adapted from the level of environment legibility based of cognitive maps. In the first method, the period time needed to find a destination from the starting point is being measured or some interviews has been conducted to find out how people find their ways (Haq, 2001; Wiseman, 1981). In the second method, the level of accuracy of grid maps of the environment or the precision in imaged determination of the environment will be evaluated in a trial (Evans, 1980; Evans et al., 1984; Sauch 1996 cited in Long, 2007). This research has used the second method and investigates on day and night mental map of two cities in Iran including Zanjan and Abadan. The survey conducted by asking urbanism university students in each city. Selecting the mentioned cities was based on different climate, cultural differences and their size. During the research, students were asked to draw their own cities' mental map. Afterward respondents were asked for imagine their cities at night and draw its mental map again. Then all the produced mental maps of day and night times of the cities and main elements of them were examined. A comprehensive mental map of each city had been reproduced and presented in this way. Furthermore for determining the priority of referring to each of the five elements that proposed by Kevin Lynch, it was asked from the people to clarify the orders of the elements with numbering, in this case that the first showed with number one and so on.

RESULTS AND DISCUSSION
The Analysis of Cognitive Maps of Zanjan in Day and Night
As it is determined from the maps mentioned here, it can revealed that the elements of city imagination that proposed by Kevin Lynch are involved in the mental maps of Zanjan's residents, but there are some differences in these maps and the nightly kind of maps. In all cases, city residents clearly named the main accessing roads such as SaadiVasat and Imam streets and northern and southern highway, then they identified the edges of the city such as the train station and
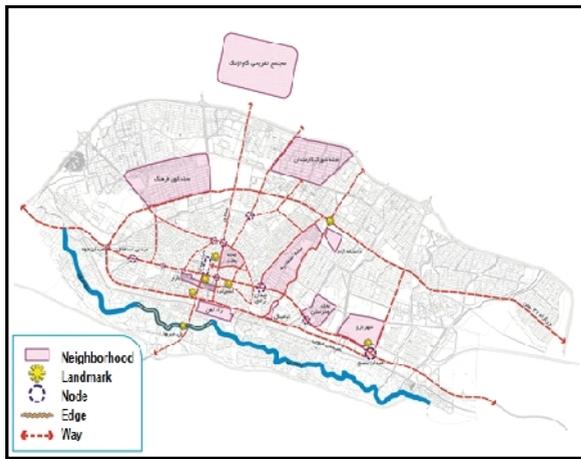
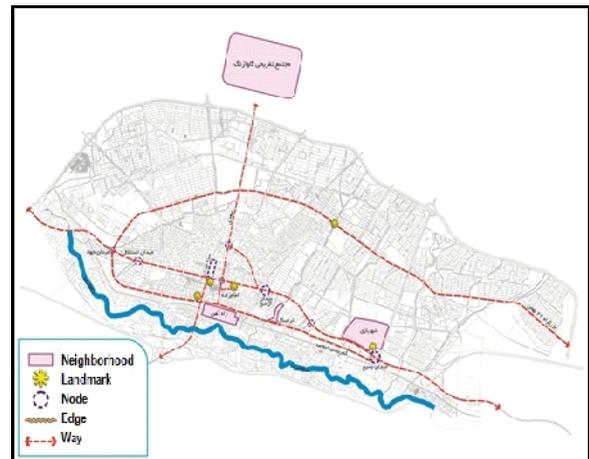Fig. 2: Mental maps of the residents of Zanjan in day

Fig. 3: Mental maps of the residents of Zanjan in night

Zanjan River. They also mentioned the main city squares as nodes and some specific areas like Karmandan and Ansarieh Neighborhood to make up their mental maps. Comparing these maps (day mental maps) and people's nightly maps, decrease of referring to less active roads is noticeable. People just drew the roads which are used at night and contain some activities on their edge. Neighborhoods have got no role in people's night mental map and they have been omitted either. In addition, the nightly mental map clearly referred to places that contain nightly and entertainment activities such as Zanjan amusement park, Gavazang entertainment complex and some land uses like Bus terminal and Zanjan Train station.

The Priority of Referring to Zanjan Urban Elements

Comprehensive investigation performed in the city, Zanjan, shows that, the first mentioned element in mental maps of day, urban ways seem to be considered important. Afterwards referring to landmarks, nodes and neighborhoods and eventually edges include the other priorities respectively. This matter changes in the second priority only with changing places of nodes and landmarks. Review of the mental and cognition maps shows that in the third priority the importance of urban landmarks increases but in fourth and fifth choices neighborhoods and edges considered important to the respondents. Review of nightly mental images in Zanjan shows vast difference to the mental images of the people during day. In this study the first choice of the people was landmarks. It means that landmarks seem more important than the other elements of the city. In this choice nodes and ways respectively are the other priority. Neighborhoods and edges are the last choices in the point of view of the people of Zanajan which it can be understood that it is just due to lack of lively and nightly active land uses in neighborhoods and consequently lack of security

feeling in urban edges. In the review of second choices referring to ways are in the highest priority and nodes and landmarks include the other which followed by neighborhoods and edges. In third, fourth and fifth choices include logical proportions. Overall, adjustment comparison and review of mental images of night and day in Zanjan show that despite the importance of node, landmark and way in development of the maps, referring to spotted elements in the city like landmarks and active nodes seem to be important at night. It has been shown in diagram that referring to urban landmarks in mental images of day is important to the people in the third choices, but it was more important to people in the maps of night as the first choice.

The Analysis of Cognitive Maps of Abadan in Day and Night

The most noticeable item in this city's mental map is that most of places and spaces mentioned in nightly mental maps are just because of current activities or spectacular lighting overnight. For instance, nightly activities by Arvand River, Moalem and Shapour Parks, Amir Intersection and surrounding area of Seyed Abbas Shrine can be implied. Takhti Stadium, Karvansara Hotel and Enghelab Movie theater due to lighting and Taleghani Hospital, airport and refinery because of 24 hours activity during day and night are considered as landmarks. Studies of mental maps of Abadan shows that Barim and Bavardeh neighborhood which had drown in days mental maps, had been neglected in the mental maps of night.

The Priority of Referring to Abadan Urban Elements

Diagrams are prepared by the priority according to urban elements referring of the people mental maps during day and at night. Referring to urban elements which is 63% at night is includes more priority than day which is 52%.
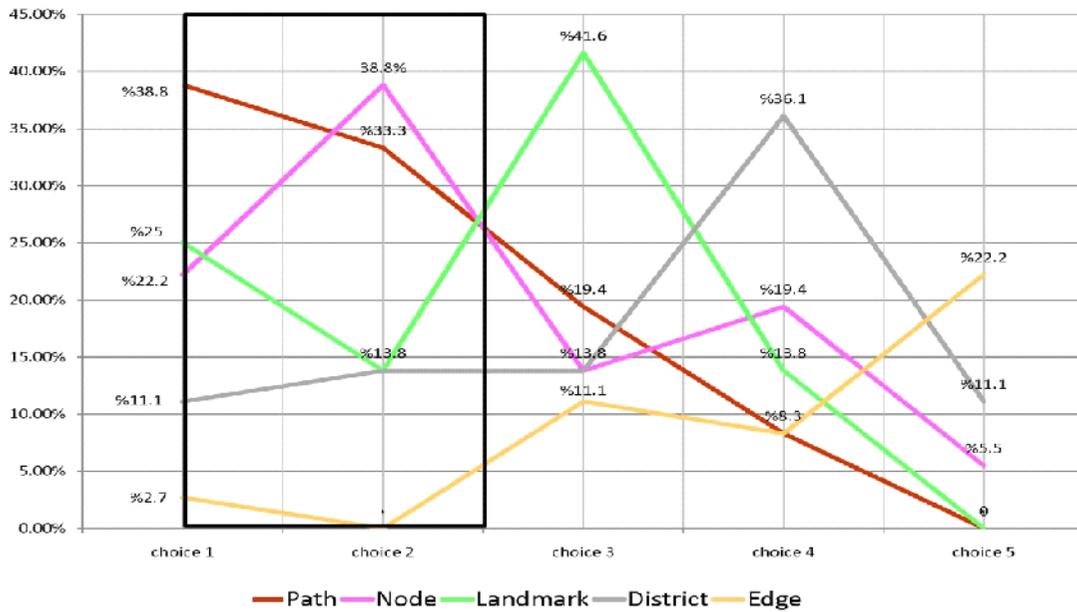
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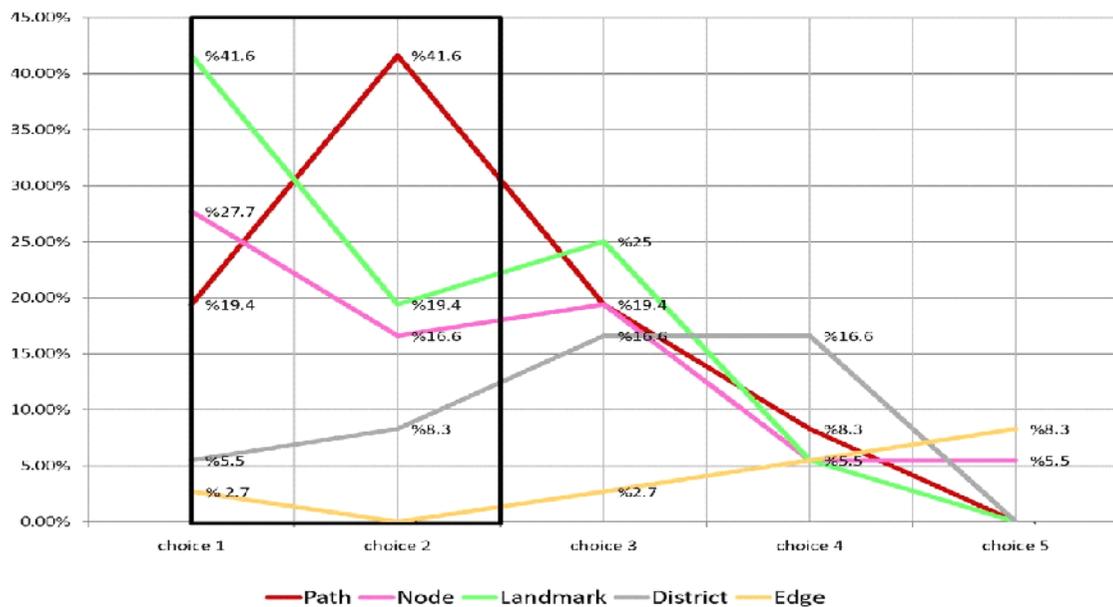Fig. 4: Drawing priority of the five elements in day (Zanajan)

Fig. 5: Drawing priority of the five elements at night (Zanajan)

Referring to nodes during day and at night are the same. This matter in second choices has the highest percent of priority. Overall, the comparison between two diagrams of day and night expresses that in the choice of landmarks, nodes, and ways of nightly mental images, respectively are more important than mentioned elements of the day's mental maps, but after fourth choice neighborhoods of the day mental maps considered more important than the night one. Moreover, the average of referring to edges is higher during the day, either.

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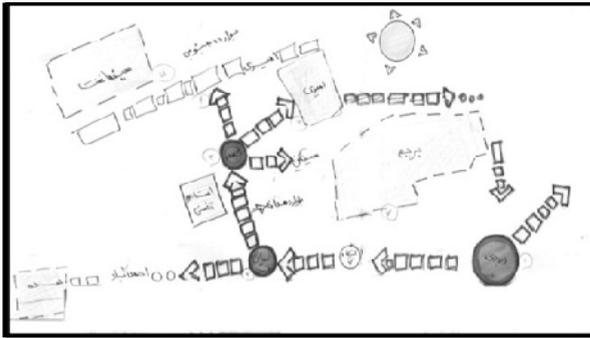
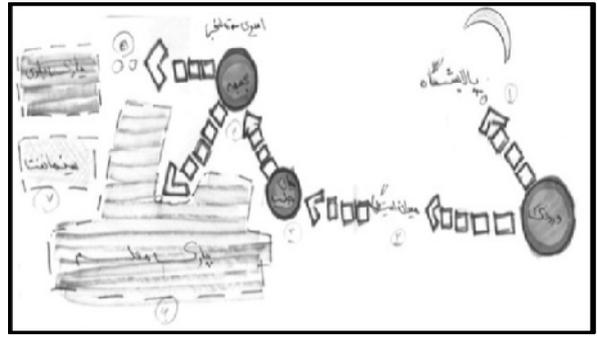Fig. 6:Sample of mental map of Abadan in day

Fig. 7: Sample of mental map of Abadan in night

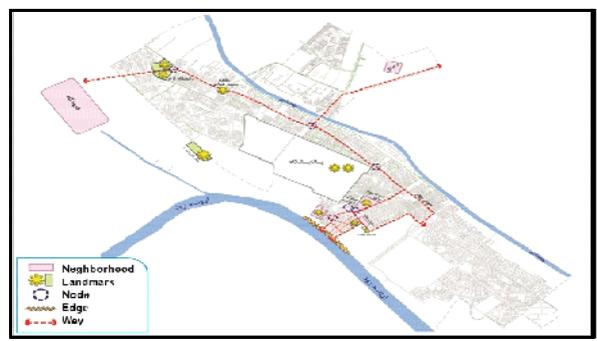

Fig. 8: Mental maps of the residents of Abadan in day

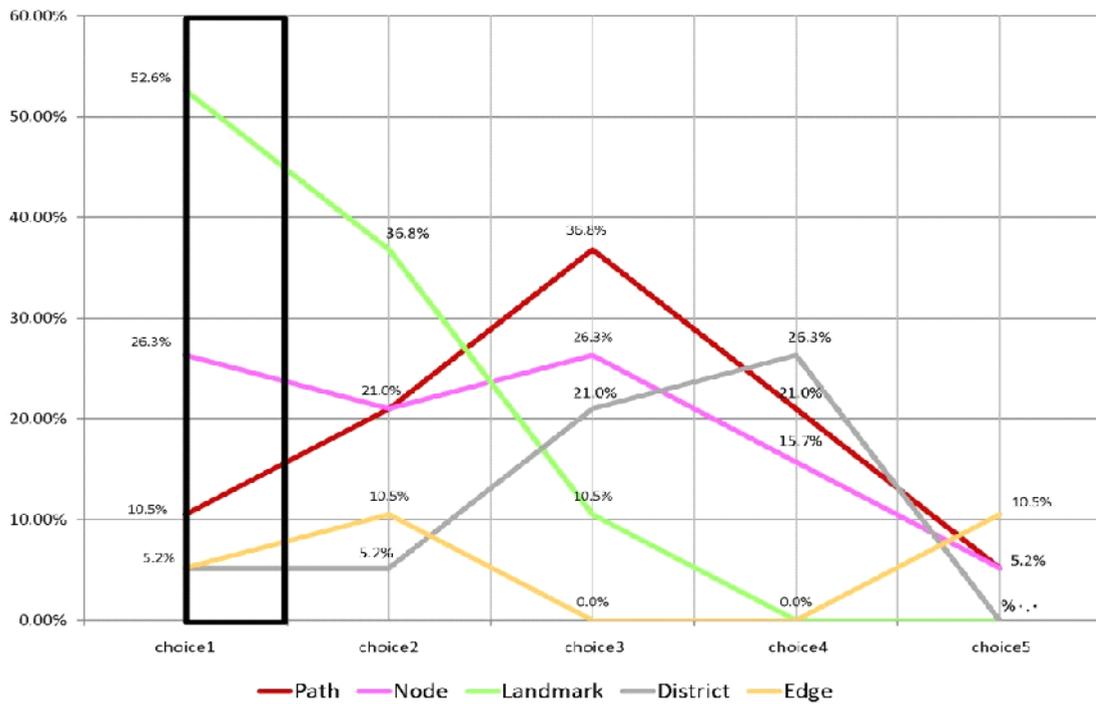Fig. 9: Mental maps of the residents of Abadan in night

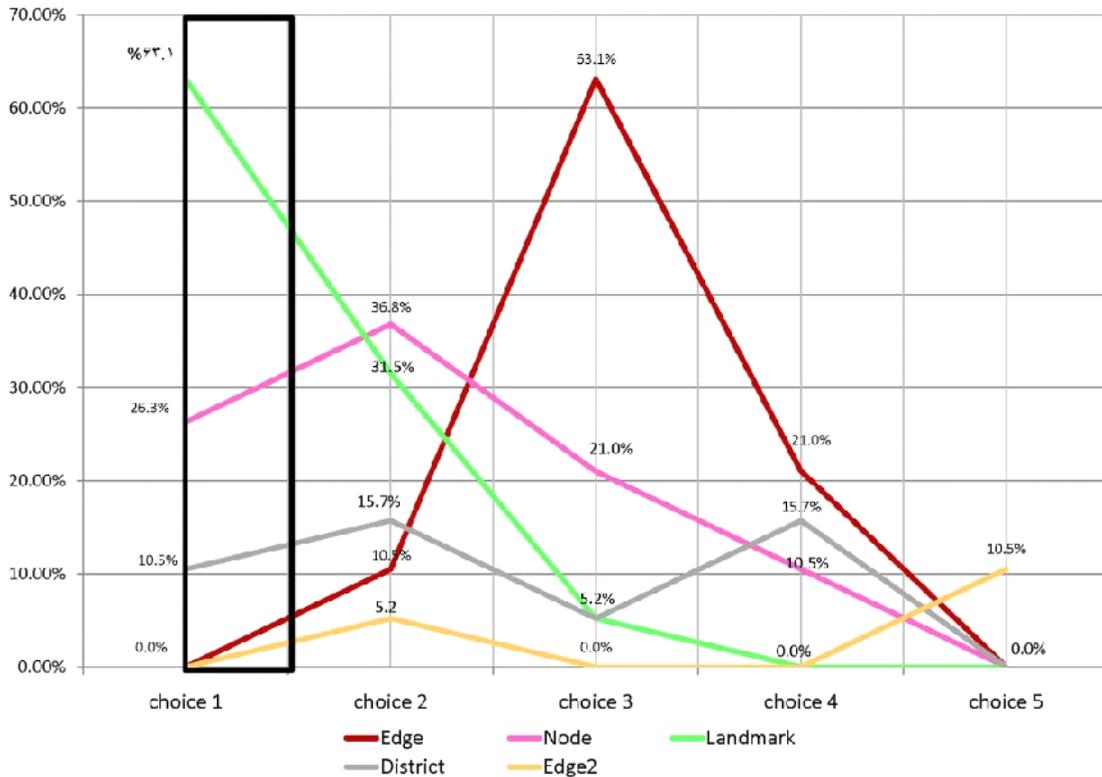Fig.10: Drawing priority of the five elements in day (Abadan)

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Fig.11: Drawing priority of the five elements at night (Abadan)

CONCLUSION

The experimental studies that revealed the mental maps of these cities at days and nights confirm that there are clear night. Some of the differences are as follow:

− Mental maps of cities at night show the reduction of neighborhood role and fundamental role of path as one of the five elements of lynch's image of cities and active commercial nodes at night.

− Priority in pointing to nightly active landmarks and nodes in mental maps.

− The importance of lighting in visualization and remembrance of landmarks and urban significant buildings.

− Emphasis on recreational land use and the positive effects of these functions on live nightly urban spaces improvement

− Significance role of land uses that are active 24 hours a day such as hospitals, terminals, airports, gas stations in the formation of mental maps.

− Climate and cultural differences are effective factors on mental images mentioning, for instance in Abadan mentioning to the streets of the central area of the city due to hand sellers at night and hot and humid weather of the city seems important.

− Overalla comprehensive integrity of the resident's mental maps during day and night can be developed and it shows that these mental maps can be used to present a design based on public cognition. According to this research one of the main recommendations to improve the legibility of cities at night is priorities the 24 hours land uses in public realms and have proper lighting for landmarks and significant buildings But the light planning should be in a way that does not disrupt calmness of residential neighborhoods therefore light pollution should avoided.

Preparation of appropriate measures for suitable urban designing and environmental and physical quality increasing will cause legibility which lead to correct and accurate cognition of the city in the minds of its residents. Increase in legibility of the city would also increase the beauty cognition of the citizens. Unless a matter become observable and understandable for people, the opportunity of beauty cognition and enjoyment of that matter would be impossible.

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