Reading of Elements of Cognitive Maps in Perception of different Age Groups of Tourists; Case Study: Paein Khiaban and Tabarsi Neighborhoods

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ABSTRACT

The cognitive maps are the representations of the individual's perception of the environment and are consciously or unconsciously important in the tourists' travel itinerary. Due to their different perceptions and expectations of the environment, different age groups of tourist have cognitive maps with different structures . Therefore, the current study aims to analyze the constituent elements of the tourists' cognitive maps in different age groups. The research is applied survey. The data is collected by the use of field study, questionnaire, observation, and the cognitive map technique. The data is analyzed by overlapping the cognitive maps of tourists of different age groups and comparing their perceptual similarities and differences. The sample size was calculated to be 357 by the use of Cochran's formula. The samples are selected from the residents of Paein Khiaban and Tabarsi Neighborhood using the systemic sampling method and then, they are asked to complete the cognitive map questionnaire by sketching.. The results indicate that different age groups (youth to seniors) have different perceptions of the environment. The 20-30 age group are very capable in the direction detection and use a wayfinding strategy to determine the route. The 30-50 age group have difficulties in distance detection. Their travel itinerary pattern is destination region loop and base site. The 50-65 years old period is a period of maturity, but due to the aging, there are difficulties in direction detection . In the above-65 age group, the travel pattern is chaining loop and base site.

Keywords: Perception, Travel Pattern, Tourists, Cognitive Maps, Age Groups.

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1. INTRODUCTION

According to the statistics provided by WTO, in 2015 and 2016, 1.184 and 1.234 billion people have involved in the international tourism activities and a sum of 1.2 trillion dollars has been spent as the tourism costs (WTO, 2015; WTO, 2016). People are different in many aspects such as the behavioral, cultural, and physical aspects, and also, the tourists can be categorized based on different motivations including the tendency to visit a specific destination (Park & Yoon, 2009), distance between the tourist destinations (Cai & Li, 2009), spatial behavior and movement towards the destination (Lew & McKercher, 2006), cognitive responses to tourist attractions (San Martín & Rodríguez del Bosque, 2008), selection of different destinations (Hough & Hassanien, 2010), cultural attitudes towards tourist attractions (Richards, 2002), and purchase and consumption behavior (Kamaruddin & Terengganu, 2008; Odunga, 2005).

The individuals' needs and values may be effective on their perceptions (Colledge & Stimson, 1997). The individual values are formed from childhood in different people and their relevant factors such as the individual cultural values and social background are also effective in this regard (Davis, 2009; Smallwood, 2012).

The cognitive abilities are effective in formation of the individuals' cognitive maps of the environment, and these maps are somehow a mental representation of the built environment (Gärling & Golledge, 1989;

Hart, 1973; Kim & Penn, 2004; Kuipers, 2001).

2. THEORETICAL FOUDNATIONS

The increase in tourism demand leads to an economic growth of the societies (Khoshkam et al., 2016). The movement patterns of tourists can be defined by spatial changes in the activity place. Globally, these patterns are analyzed between the origin and destination while locally, it is analyzed from one activity to another (Leiper, 1979). In addition, locally, the destination can be different based on whether one destination is visited or several destinations are visited (Dejbakhsh, Arrowsmith, & Jackson, 2011; Lau & McKercher, 2007). Analysis of these movements towards a destination is highly important (Lew & McKercher, 2006). Based on Lew & McKercher's theory (2007), these factors can be categorized as human, trip, and physical factors. The human factors are determined by the tourist itself. The socio-demographic variables include the origin or cultural backgrounds (Dejbakhsh et al., 2011; Smallwood, Beckley, & Moore, 2012), or even the psychological and so-called mental features (Plog, 1974; 2002; Debbage, 1991), specific trip factors such as length of stay (Pearce, 1990; Shoval & Raveh, 2004), interest (Fennel, 1996), familiarity with destination (McKercher et al., 2012), or business trip combination (Decrop, 2005) which can affect the spatial extent and intensity of tourists' movements.

Table 1. Types of Travel Itinerary

Types of Travel Itinerary	Theoreticians
Single Point, with or without Diversions	Lue et al. (1993); Mings & McHugh (1992); Oppermann (1995); Flognfeldt (1999); Lew & McKercher (2002)
Destination Region Loop (Partial Orbit, Fly-Drive, Regional (Tour, Destination-Area Loop	Mings & McHugh; Lue et al.; Oppermann; Lew & McKercher
Chaining Loop (Full Orbit, Trip-Chanining, Full Loop, Open-Jaw Loop, Round-Trip)	Mings & McHugh; Lue et al.; Oppermann; Flognfeldt; Lew & McKercher
Base Site (Base Camp, Base Holiday, Day-Trip)	Lue et al.; Oppermann; Flognfeldt; Lew & McKercher

Some other theoreticians have discussed the destination in terms of the role of history and repeat visit to the place and familiarity with it (Smallwood, Beckley, & Moore, 2012; Lau & McKercher, 2007; McKercher et al., 2012). The effective physical elements determine the destination features such as the configuration (Lew & McKercher, 2006), transportation network (Becken & Schiff, 2011), accomodation (Shoval et al., 2011), and attractive places (Dredge, 1999).

Table 2. The Perspectives about Tourism

Theoreticians	Perspectives about Tourism
Khoshkam et al., 2016	Tourism in developed countries is better than in less developed countries
Cai & Li, 2009; Park & Yoon, 2009; Lew & McKercher, 2006; San Martín & Rodríguez del Bosque, 2008; Hough & Hassanien, 2010; Richards, 2002	Categorization based on destination motives, distance, spatial movement, cognitive and emotional responses, selection of different destinations, cultural attitudes
Dejbakhsh, Arrowsmith, & Jackson, 2011	Different tourist movements at the local level depending on one or more destinations
Lew & McKercher, 2006	Analyzing tourist movement patterns for a destination
Lew & McKercher, 2007	Identification of human factors by the tourist
Dejbakhsh et al., 2011; Smallwood, Beckley, & Moore, 2012; Plog, 1974; 2002; Debbage, 1991; Pearce, 1990; Shoval & Raveh, 2004; Fennel, 1996; McKercher et al., 2012; Decrop, 2005	Socio-demographic variables including origin, cultural background, mental characteristics, length of stay, interest in getting to know the destination or the combination of the business trip affect the spatial intensity and extent of tourist movements
Lau & McKercher, 2007	Longer and more extensive visits to destination by the domestic tourists, repeat visits, but international tourists are interested in major attractions
Thornton, Shaw, & Williams, 1997	The time spent is influenced by group travel or with children
Smallwood, Beckley, & Moore, 2012; Lau & McKercher, 2007; McKercher et al., 2012	Unfamiliar tourists tend to visit first-time attractions, but more familiar tourists tend to visit more places and perform more spatial activities
McKercher & Lew, 2003; Becken & Schiff, 2011; Shoval et al., 2011; Dredge, 1999	Physically influential elements determine the characteristics of the destination itself, such as the configuration, the transportation network, the accommodation, and the attractive places.
McKercher & Lew, 2003	Spending more time and money to get to different places

2.1. Effects of the Age on Behavior

The individual needs and values may affect their perception (Colledge & Stimson, 1997). The personal factors and internal demands are emerged under the influence of its relevant factors. The motivational factors relevant to the educational environment, financial status, age, etc. are effective on any individual's demands from the environment (Hsu, Cai, & Wong, 2007).

The motivational demands might be intended for access to new knowledge, adventure, fun, relaxation, and improvement of skills (Hsu et al., 2007; P. Pearce, & Lee, 2005). The age of tourists and different age groups might affect the decision-making, behaviors, motivations, recreation activities patterns, perceptions and expectations, costs, type of behavior, selection of the tourism destination, and the way of interaction in familiar and unfamiliar environments (Glover & Prideaux, 2008; Shaw & Williams, 2002; Unbehaun, Pröbstl, & Haider, 2008).

Table 3. Effects of Age on the Tourists' Behaviors

Theoreticians	Tourists Age and Behavior
Golledge & Stimson, 1997	The effect of individual needs and values on people's perception
Hsu, Cai, & Wong, 2007; Hsu et al., 2007; Pearce & Lee, 2005	Influence of motivational factors related to educational environment, financial status, age, etc. on each person's demands. Acquiring new knowledge, adventure, fun, relaxation, and improving skills
Glover & Prideaux, 2008; Shaw & Williams, 2002; Unbehaun, Pröbstl, & Haider, 2008	Age-related elements including changes in physical ability, financial status, experience, adventure, and sense of responsibility.

2.2. Tourists Wayfinding

Finding one's way in different environments is essential and requires a wide range of cognitive skills (Spiers, 2008). The landmarks are tools that help with wayfinding (Beneicke, 2003). Wayfinding is finding the routes including the selection of the route between origin and destination (College, 1999). Majority of tourism and recreation models are based on the assumption that all tourists travel to a single destination, although, on the contrary, in many studies, the multi-destination travel has been evaluated in the field of tourism (Rodríguez & Abdul-Jalbar, 2012; Yang, Fik, & Zhang, 2013). The urban destinations should be identified, facilitated, and to some extent, managed for spatial activities of tourism and attaining positive experiences, with a high precision (Edwards & Griffin, 2013). Although the study of tourists movement, over time and in the space, has been well specified and stabilized, it should be admitted that it is a very complex phenomenon (Leung et al., 2011). Generally, it is difficult to investigate it in terms of effectiveness on the surface and specific patterns (Edwards, Dickson, Griffin, & Hayllar, 2010; Shoval & Isaacson, 2007). And also, it should be investigated in the process of tourists' mental decision-making (Chang, 2012; Hall, 2012). Also, the tourists' movements are analyzed in terms of how, how fast, and when the tourists move from one attraction to another (Xia et al., 2011, p. 844). The research on wayfinding is related to the cognitive processes in decision-making and planning (Weisman, 1981; Passini & Proulx, 1988). One type of map includes the landmark-route-survey model or so-called the LRS that describes how the environmental information are represented by self-centered information for the wayfinding guide (Siegel & White, 1975; Thorndyke & Hayes-Roth, 1982). In this regard, three types of knowledge produce cognitive maps including landmarks-point elements; Routes - Linear Elements; And survey knowledge (Siegel & White, 1975). The unique structure and visible form of the landmarks, and sometimes, the socio-cultural importance, make them identifiable and remindable in the spectators' minds (Appleyard, 1969; 1970).

Table 4. Categorization of Perspectives on Tourists Wayfinding

Category of Perspectives	Tourists Wayfinding	Theoretician
Mental Process	wayfinding is the ability to find the route and is an independent and essential function	Davis, 2009; Gollege, 1999
	The importance of cognitive abilities for wayfinding	Spiers, 2008
	The mental process of problem solving, information processing, decision making and execution	Passini, 1984
	Wayfinding including the cognitive processes	Hong, 2007
	Tourist behavior is influenced by several factors in mental decision making	Chang, 2012; Hall, 2012
	The LRS model includes a landmark-route-survey model to represent how environmental information is formed	Siegel & White, 1975; Thorndyke & Hayes-Roth, 1982
	Learning mental representation of the environment in an integrated way while examining the environment	Weisman, 1981; Passini & Proulx, 1988

Category of Perspectives	Tourists Wayfinding	Theoretician
Mental Process	Unique and memorable features in people's minds	Gärling et al., 1986; O'Neill, 1991
	Unique structure and visible form of landmarks, social and cultural significance and mental recall	Appleyard, 1969; 1970
	Unique formation in the minds of users and the role of reference points in wayfinding	De Jonge, 1962; Gulick, 1963; Heft, 1997; Jones, 1972
Effects of Individual and Environmental Factors	The effect of behavioral characteristics on travel models	Janssens et al., 2003
	Wayfinding is the result of interactions between environmental and individual characteristics	Allen, 1999
	Environmental variables including the visual access, differentiation, configuration and landmarks	Weisman, 1981
	Landmarks as guide wayfinding tools	Beneicke, 2003
Analysis of Attractions, and Temporal and Spatial Dimensions in the Tourist Destinations	Multipurpose capability and variety of destinations attract tourists with multiple motivations and benefits	Rodríguez & Abdul-Jalbar, 2012; Yang, Fik, & Zhang, 2013
	Analyzing how, how fast and when tourists move	Xia et al., 2011
	Tourism experience has temporal and spatial dimensions from one destination to another	Tussyadiah & Fesenmaier, 2007; Xia, Ciesielski, & Arrowsmith, 2005; Aho, 2001; Gnoth, 2003; Li, 2000; Edwards & Griffin, 2013
	Study how tourists move in a complex activity	Leung, Wang, Wu, Bai, Stahura & Xie, 2012
	Understanding tourism behavior for destination planning and management actions	McKercher & Lau, 2008; Xia et al., 2010

2.3. Cognitive Map

Cognitive map is a type of mental process performed by an individual to receive, regulate, store, and represent information about related places and the characteristics of phenomena in the environment (Kuipers, 1982). In 1960, Lynch was one of the first researchers to study cognitive map and its relationship to human navigation in the environment. He pointed to the significant connection between the images obtained from cognitive maps and the design of the environment by designers and planners (Passini et al., 1990; Casakin et al., 2000; Passini, 1981). Other terms such as cognitive collage by Torsky (1993) and cognitive atlas by Hirtel (1998) have also been suggested. Neiser (1976) uses the term orienting as a synonym for cognitive maps, emphasizing the structure of information search instead of defining the mental image (Hirtle, 1998; Tversky, 1993; Neisser, 1976). Passini (1984) argues that wayfinding actually requires three types of abilities, including mind mapping (to understand the spatial environment), decision-making (to allow the individual to take action), and decision-building (execution, to do and act) (Golledge, 2003).

Cognitive maps have been used by Garling et al., (1984) as representations that are formed in the mind and function similar to survey maps (Garling et al., 1984). Kitchen and Freundshaw (2000) stated that cognitive maps depict the representation of "spatial knowledge" regardless of form (Golledge, 1999). In this study, cognitive map is considered as a virtual map of each individual's specific knowledge and abilities in the route selection process (Kitchin and Freundschuh, 2000). Darken & Peterson (2004) introduce the development and use of cognitive maps as an important part of wayfinding (Darken & Peterson, 2004). According to Rudell et al. (1998), during the process of wayfinding, through the fragmentation of routes into discrete parts, people remember and perceive the decision points (loop), and landmarks at decision points or along the way (Ruddle et al., 1998). From Golledge's point of view, the decision maker may not be fully aware of using specific wayfinding strategies or metrics. According to Cornell and Heath (2000), people can reach their destination even without comprehensive knowledge of the environment. Similarly, people use the layout of ordinary buildings to find their way into new environments (Whitaker & CuqlockKnopp, 1992).

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Table 5. Categorization of the Perspectives about the Cognitive Maps

Categorization	Perspectives about the Cognitive Maps	Theoreticians
Mental Representation The Guide for Wayfinding between the Origin and the Destination	On familiar trips to represent the cognitive map and perception in the real world	Kuipers, 1982
	Instead of defining the mental image of the structure and search of information	Hirtle, 1998; Tversky, 1993; Neisser, 1976
	Mental representation with the help of cognitive abilities	Gärling & Golledge, 1989; Kim & Penn, 2004; Kuipers, 2001
	Wayfinding map with mental map, decision-making, and decision-building	Passini, 1984
	Transfer of existing information in cognitive and successful wayfinding maps	Golledge, 2003
	Cognitive maps of mental representation	Garling et al., 1984
	Cognitive maps of planning and decision-making in wayfinding	Kaplan & Kaplan, 1982
	Cognitive Map, Virtual Map for each individual's knowledge and abilities in the route selection process	Kitchin & Freundschuh, 2000
	Using a cognitive maps in wayfinding	Darken & Peterson, 2004
LRS Model	Knowledge of landmarks	Whitaker & CuqlockKnopp, 1992
	Survey knowledge, condition for successful wayfinding (Survey Knowledge)	Hart & Moore, 1973; Siegel & White, 1975
	Cognitive Maps of "Spatial Knowledge" regardless of the shape and form	Golledge, 1999
	Dividing the route into discrete sections, decision -making points, and landmarks	Ruddle et al., 1998
	Knowledge of landmarks	Cornell & Heth, 2006; 2000
Effects of Individual and Environmental Characteristics	Cognitive Map, a set of psychological processes through knowledge of elements, places, distances and directions, or general environmental pattern	Rapoport, 2013
	Wayfinding under the influence of age, gender, occupation, individual psychology and the degree of familiarity with the environment, emotional considerations, values, and beliefs	O'Neill, 1991; Peponis et al., 1989; Weisman, 1981
	Conscious or unconscious processes in wayfinding and cognitive errors	Wang et al., 2011
Cognitive Errors	Weaker Structures of Cognitive Maps, More Errors and Higher Ambiguity	Kitchin, 1994

Cognitive mapping is the main component of spatial knowledge that includes processes that one must perform consciously or unconsciously during wayfinding (O'neill, 1991; Peponis et al., 1989; 1981). Cognitive maps, as mental representations of a familiar environment, are based on survey knowledge. Survey knowledge includes metric information and relationships between landmarks and routes, distances, directions, and configuration of objects and can be displayed simultaneously as the bird's eye view (Hart & Moore, 1973; Siegel & White, 1975). The environmental information extracted from the cognitive map allows the person to plan and decide on the route selection (Kaplan & Kaplan, 1982). In short,

a cognitive map is the result of a set of psychological processes through which individuals can code, store, remember, and decode their knowledge of elements, places, distances, and directions, or the overall pattern of their surroundings coded, stored, and decipher (Rapoport, 2013). In the following, the theoretical foundation has been developed in Figure 1 based on the theoretical literature in various sections.
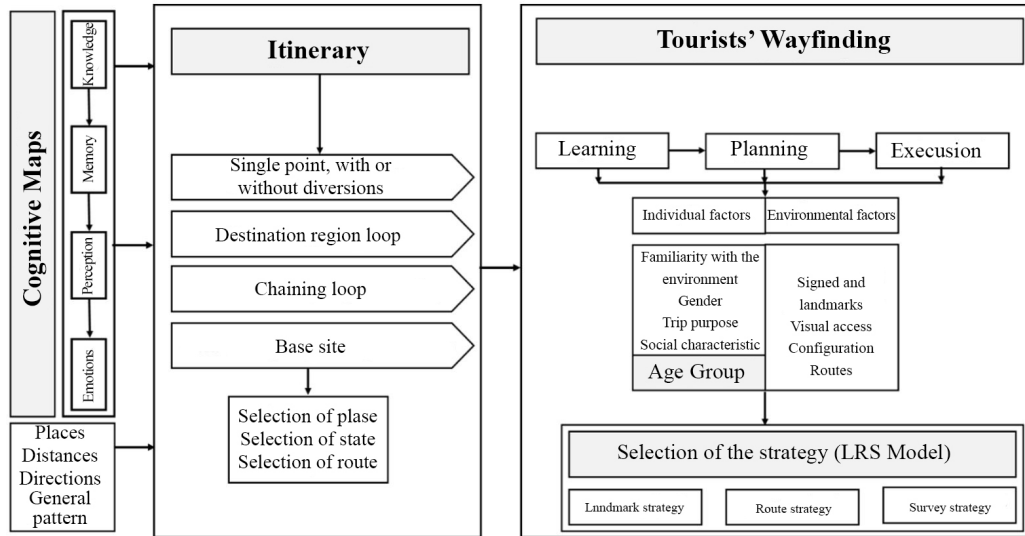
Fig. 1. Theoretical Framework

3. METHODOLOGY

The current study aimed to analyze cognitive maps in different age groups of tourists. It is an applied survey research. The process of research analysis is qualitative and the questionnaire has been formulated based on the research objective, questions and theoretical model of the research. Cochran sampling method has been used to estimate the statistical sample. Using the Cochran method, 357 questionnaires were filled in by the tourists who were selected by the simple random sampling method. Data collection has been conducted by reviewing theoretical literature on tourism, wayfinding, the impact of age on behavior, and cognitive maps in related scientific sources. Then, the questionnaires and cognitive maps of tourists were analyzed. In terms of the cognitive maps, tourists were asked to draw different sketches of the environment. They were also interviewed by some questions. The location of the study is Sector 3 of District 13, which includes Paein Khiaban and Tabarsi neighborhoods, with a population of 5365 people in 2011. The reason for the selection of these neighborhoods is the target group of tourists. There is a large number of hotels and commercial and accommodation centers of Mashhad in the Paein Khiaban and Tabarsi neighborhoods. The target group in this study was selected through systematic sampling in the summer of 2018 at the routes leading to the Holy Shrine of Imam Reza (AS) located in the Tabarsi and Paein Khiaban neighborhoods. 357 persons were equally divided into four age groups in this study and 90 questionnaires were drawn in each age group in the form of a sketch. The differences and similarities of cognitive perceptions in four age groups were analyzed by overlapping the drawn maps and analyzing the descriptive statistics of the tourist cognitive maps.

4. FINDINGS

First, the cognitive maps were analyzed through the descriptive statistics to analyze the data, and then, the cognitive maps of different age groups were evaluated by overlapping them.

4.1. The Landmarks and Routes in the Cognitive Maps of Different Age Groups

This section identifies landmarks and routes in the cognitive maps of tourists. Among the five elements of Lynch, this study emphasizes the landmarks and routes, although the definition of the landmarks and routes is compatible with the definition expressed by Lynch. The reason for the emphasis on landmarks and routes is the analysis of wayfinding behavior of tourists using the LRS model that includes landmark strategy, route strategy, and survey strategy. People who are 20-30 years old have paid more attention to new elements. Among the elements mentioned in their cognitive maps are the Arman and Zamen Business Complexes. These elements have a distinct form and size compared to other elements in the Navvab Safavi Street. The Holy Shrine of Razavi is also one of the elements that is evident in all cognitive maps of different age groups, which plays an important role in the mental image of individuals in different ages in terms of its religious importance. Among the streets mentioned by tourists of the age group of 20-30 years old, the Navvab Safavi, Tabarsi, Shirazi and Shahid Shooshtari can be mentioned.

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Table 6. The Landmarks and Routes in the Cognitive Maps in Cognitive Maps of Different Age Groups

Different Age Groups	landmarks								Routes							
	Holy Shrine of Imam Reza (AS)	Shrine of Pir-e Palan Dooz	Tavakkoli House	Amin Complex	Arman Complex	Zamen Complex	Gonbad Kheshti	Darougheh House	Vahdat Park	Navvab Safavi Street	Tabarsi Street	Shirazi	Imam Reza	Shooshtari	Amir al-Momenin	Vahdat
20-30 Years Old	*				*	*			*	*	*	*		*	*	*
30-50 Years Old	*	*		*	*				*	*	*	*	*			*
50-65 Years Old	*	*	*			*	*	*	*	*	*	*	*			*
Above 65	*					*			*	*	*	*	*			*

Cognitive maps of the age group of 30-50 years old: the human age is directly related to his perception of the environment. Among the elements referred to by this age group are the Holy Shrine of Imam Reza (AS), the Shrine of Pir-e Palan Dooz, Amin Business Complex, Arman Business Complex, the Zamen Complex, and the Vahdat Park. The routes referred to by this group are Navvab Safavi, Shirazi, Tabarsi, Imam Reza, and Vahdat Streets. The age group of 55-65 years old: This group of people has mentioned the historical and modern elements. This group of people mentioned the Holy Shrine of Imam Reza (AS), the Shrine of Pir-e Palan Dooz, the Tavakoli Historical House, Zamen Commercial Complex, Gonbad Kheshti, and the Historical House of Darougheh. In general, the main element of the cognitive maps of the tourists is the Holy Shrine of Imam Reza (AS), so the routes also form the main framework of the cognitive maps of tourists. People who are above 65 years old have referred to elements with an identity. These people have mentioned the elements that are on the main route.

4.2. Analysis of Cognitive Maps and Errors

In the analysis of location detection ability, the distance, direction, and formation of the general mental pattern among different age groups, the 30-50 years old group is more successful in distance detection than all other groups, with the minimum number of errors. on the contrary, the above-65 age group has the most problems and the highest errors in drawing cognitive maps and it is very difficult for them to detect distance and direction. The 20-30 and 50-65 age groups were similar in terms of number of errors, but their cognitive errors vary. The first group has difficulty in detecting the location and the second group in distance detection.

Table 7. Analysis of the Cognitive Maps of Different Age Groups

Age Groups	Location Detection	Distance Detection	Direction Detection	General Pattern
20-30	-	+	+	+
30-50	+	-	+	+
50-65	+	+	-	+
Above 65	+	-	-	+

4.3. Different Wayfinding Strategies in Different Age Groups of Tourists

The wayfinding strategy is performed in the form of three LRS models that were discussed in the theoretical literature. The analysis of cognitive maps indicates the existence of differences in the use of wayfinding strategies among different age groups. The age group of 20-30 years old has a very good spatial vision due to their youth, and they usually do not use the route and landmark strategy alone, but because of their favorable understanding of the coordinates, they determine the route with the wayfinding strategy. The age group of 30-50 years old is middle-aged and they prefer to use a variety of wayfinding strategies. In the analysis of the maps drawn by them, some of them find the way only with landmarks or routes, and in some cases they have a survey wayfinding strategy.

5. CONCLUSION

Different age groups (from the youth to the elderly) have different perceptions of the environment and their cognitive maps, mental representation, and travel itineraries are different. The age group of 20 to 30 years are very capable of recognizing directions and

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Table 8: Different types of wayfinding strategies by various age groups

Age Groups	Route Strategy	Landmark Strategy	Survey Strategy
20-30	-	-	- The importance of survey strategy - Very good direction detection - Ability to establish a relationship between landmarks and routes
30-50		- Using different types of wayfinding strategies - The ability to establish a relationship between landmarks and routes following landmarks at certain distances - The use of main and secondary routes and the general formation of framework of routes in cognitive maps	
50-65	- Using different types of wayfinding strategies - Following landmarks at specified distances - The use of main and secondary routes and framework of routes in cognitive maps		-
Above 65	- Using different types of wayfinding strategies - Following landmarks at specified distances - The use of main and secondary routes and framework of routes in cognitive maps		-

The 50-65 years old age group is mature and due to its cognitive problems, the members of this group have less spatial vision. In the process of wayfinding, they seek to ensure the correct route and prefer to use the landmark and route strategies. The age group above-65 years old are the elderly and has problems such as amnesia. They mentioned that they are looking for a landmark or a route in close distances to recognize the origin position and determine the correct route to the destination.

4.4. Different Types of Travel Itinerary

In the analysis of the types of travel itineraries in different age groups, as seen in Table 9, none of the age groups use the single destination without diversions. According to the tourists, this situation causes a waste of time and money on their trip. The destination region loop is used by the 20-30 and 30-50 years old age group. In this case, the travel pattern requires survey data and spatial recognition of the area to determine the route to reach the destination. This itinerary saves time and money.

Table 9. Different Types of Itineraries by Various Age Groups

Age Groups	Single Destination without Diversions	Chaining Loop	Destination Region Loop	Base Site
20-30			+	
30-50			+	+
50-65		+		
Above 65				+

The chaining loop is used by the age group of 50 to 65 years old. In this type, the knowledge of landmark and routes is used and only one specific destination is the tourist's target. The age groups of 50 to 65 and 30 to 50 years old use base site movement for wayfinding. The analysis of the cognitive maps of this age group indicates the use of route and landmark knowledge. This mode of route determination among different travel destinations that are considered landmarks is done by following routes within the initial origin range. Also, this mode of route determination is very reliable from the tourists perspective and guides them to reach the correct destination. The age group of 65 years old and above use the base site movement by taking the routes leading to the landmarks and returning from the same routes.

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have a good spatial perception, which is a good guide in using the survey strategy for route determination. This group travels in destination region loop due to the recognition of distances and the general pattern of the environment. The age group of 30 to 50 years old is middle-aged and has difficulty in recognizing the distances in a few cases, however, in general, they have the least amount of error in route determination and have the ability to use all the strategies of route determination. The travel pattern of these people is both destination region loop and base site movements.

The 50-65 age group is a period of maturity, however, due to aging, they face problems in recognizing directions, and they travel with a chaining loop pattern to ensure they have detected the correct route. The age group of 65 years and above has cognitive and memory problems in old age and have the highest number of errors in recognizing directions and distances. And they don't have the ability to use a wayfinding strategy. Their travel pattern is both chaining loop and base site movements.
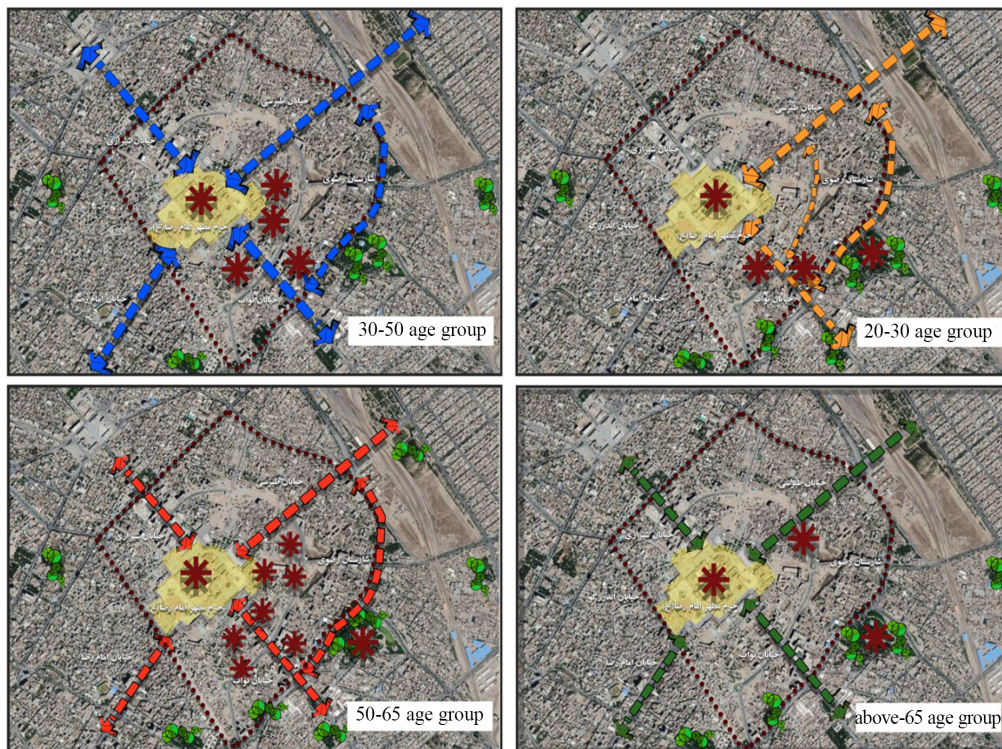

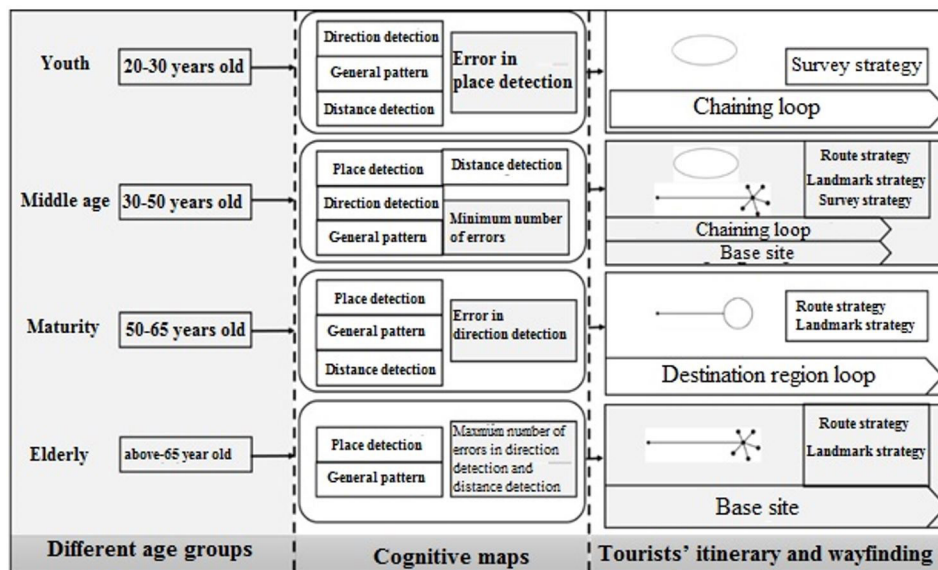**Fig. 2. Elements of Cognitive Maps of Different Age Groups**

Fig. 3. Differences in Itineraries and Cognitive Maps in Terms of Wayfinding Behavior between Different Age Groups

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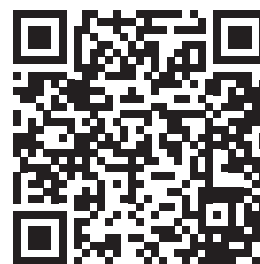
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