Individual differences and tourist wayfinding behaviours

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Abstract:

The aim of the paper is to ascertain if tourist wayfinding behaviours correlate with individual differences. Individual differences in this study refers to age, gender, type of travel group and familiarity with the environment. The specific tourist wayfinding behaviours of in this paper are utilising landmarks and wayfinding strategies.. The methods used to identify the individual differences are Pearson Chi-square test and Odds ratio. Pearson Chi-square test is used to identify the significant differences and Odds ratio measures strength of association.

A case study was conducted at the Koala Conservation Centre at Phillip Island Nature Park, Victoria, Australia. Differences in wayfinding behaviours between gender, age group, type of travel group and level of familiarity with the environment are identified. Females tend to follow a crowd and are more likely to use wayfinding strategies such as Least Time, First Noticed, and Different from Previous Route Taken than males. Males are more likely than females to use Vegetation Types and Track Surfaces as their wayfinding landmarks, and they prefer Most Scenic wayfinding strategies. When age is considered, the middle aged tourist group tends to find its destination based on a Shortest Path strategy while younger tourists prefer First Notice wayfinding strategies. Furthermore, tourists who are familiar with the environment are more likely than others to navigate using Shortest Path and Few Turns wayfinding strategies.

Understanding individual differences among tourist wayfinding behaviours can be beneficial in developing wayfinding systems/devices that can assist tourists as they move from attraction to attraction within a tourist site. In addition, this information will be useful in park or urban design. In the future, we compare individual differences in tourist wayfinding behaviours with tourists' physical movements as tracked by GPS. The key question is how the individual differences of tourist wayfinding behaviours influence tourists' physical movements.

Keywords: Individual differences, tourist, wayfinding, decision - making process

1. INTRODUCTION

"Wayfinding is a complex process and is different for individuals, depending on the purpose of the trip and their response to external environmental conditions"(Golledg 1999) . The aim of the paper is to explore the relationship between tourist wayfinding behaviours and individual differences. The specific individual differences of interest are gender, age, type of travel group, and familiarity with the environment. The hypotheses focus on answering the question whether particular groups are more similar within than between groups. For example, in order to identify any gender differences, females and males are compared to identify whether there are gender preferences for landmarks. Tourist wayfinding behaviours reflect tourist's use of both landmarks ans wayfinding strategies. A landmark is a salient object used as a reference to help people memorise and recognise routes, and locate themselves in terms of their ultimate destination (Sorrows and Hirtle 1999).. Landmarks in the tourism context are extensively utilised as tourist wayfinding signs, for example, "region welcome signs", "region trailblazers", "gateway markers" and "resource direction signs"(Asper 1996). Wayfinding behaviours transpose into wayfinding strategies, which can be defined as decisions tourists make in their exploration of a tourist site. This kind of information is useful in developing wayfinding systems/devices that can assist tourists in their wayfinding; it can also assist park and urban designers in their decisions about landmarks, signposts and other tourist wayfinding devices

2. ARE THERE DIFFERENCES IN THE WAY WE WAYFIND?

2.1. Gender

Research results on any difference between orientation and gender are inconclusive at best. Some studies show that males outperform females (Schmitz 1999; Malinowski and Gillespie 2000), while others show that such differences are absent (Brown, et al. 1998). Currently, to assert the existence of gender differences in spatial orientation would be unsupported by the literature (Coluccia and Iouse 2004).

However, when wayfinding strategies are considered, differences according to gender are more evident. For example, Bosco, Longoni et al. (2004) report that, even if males and females do not significantly differ in orientation task performance, the two genders use somewhat different strategies in carrying out wayfinding strategie Other studies using verbal descriptions of a route (Dabbs, et al. 1998) found that males pay greater attention to configural aspects. For instance, they use terms indicating cardinal directions and distances. On the contrary, females more frequently use terms related to landmarks. Self-report questionnaires (Lawton 1996) indicate that males maintain a survey perspective when they imagine moving in the environment, preferentially relying on the visuo-spatial properties of the environment and on configural, orientation strategies. On the other hand, females maintain a route perspective; hence, their reliance on landmarks. The differing performances between males and females are not due to a better orientation ability in males than in females. Rather, the differences are due to the strategies employed: males are likely to use survey strategies, which are usually more efficient than using landmarks (Saucier, Green et al. 2002). .

2.2. Age

Route memory, which may involve both scene and layout representation, is differentially sensitive to age. Older people tend to view the environment more personally and less holistically than young people. They may be able to encode and remember scene-based aspects of a route, such as landmarks, but they have difficulty with the more integrative aspects involved in layout memory (Lipman PD 1992). When age difference is considered, Iaria (2009) found that decreased efficiency in the formation and use of cognitive maps occurs with aging, which likely contributes to difficulties in navigation among aged people..

2.3. Type of group

Individual differences between types of tourist groups (individuals, couples, families, and groups) may be an important factor in wayfinding behaviours and strategies because of the various influences each member may have on group wayfinding decisions. The literature has not revealed any specific discussion on this aspect thus far.

2.4. Familiarity with the environment

Wayfinding tasks were categorised by Allen (1999) into three types: travel to a familiar destination; travel to a novel destination; and exploratory travel in an unfamiliar environment. Because of the differences in familiarity, people in these three situations might use different landmarks and choose different wayfinding strategies.

3. METHODS

3.1. Case study area

The Koala Conservation Centre (the KCC) is centrally located on Phillip Island, Victoria, Australia. It was established in 1991 to protect koalas from cars and dogs and provide close viewing opportunities for tourists. The KCC is composed of 6 hectares of enclosed woodland, a 0.5 hectare koala viewing area that includes two boardwalks, a 9 hectare plantation and an information centre. A further 7 hectares is available for expansion of the woodland habitat (Reed 2000) (See Figure 1).

3.2. Task and procedure

A series of hypotheses about individual differences and wayfinding behaviours were tested in a case study at the Koala Conservation Centre (KCC) on Phillip Island, Victoria, Australia, from January 17 to 20 in 2005. 124 tourists, six group tour guides and two rangers were surveyed, and tourist movements were recorded by Global Positioning System (GPS) receivers. The tourists were interviewed before and after their visit to the KCC. The pre-survey was designed to collect tourist

Figure1. Map of the Koala Conservation Centre

profile information such as age, gender, education, and residence. Travel behaviour information such as the configuration of travel groups (individuals, couples, or families) visit motivation, and familiarity with the site, as measured by number of times to have visited the KCC, was also collected.
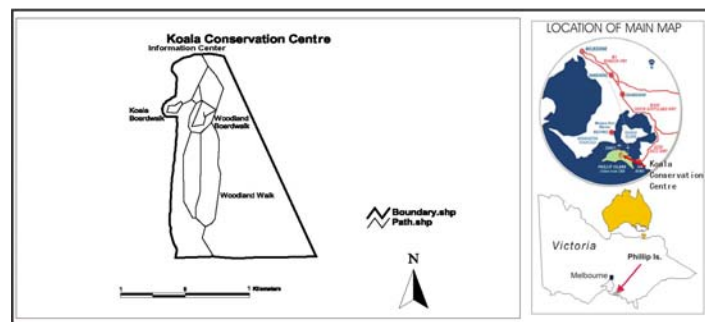
Post-survey data were used to identify tourist wayfinding methods, including landmarks used and wayfinding strategies. Landmarks include Signboards, Signposts, Track Surfaces, Vegetation Types and Following the Crowd. Signboards contain general maps of tracks and introductions. Signposts are used to direct people to the attractions. They are usually put at an intersection, an entrance or at an exit from an attraction. Track surfaces are also considered as landmarks for people to find their way. Vegetation Types can also be landmarks if the vegetation is noticeably different from location to location. Other people are also very important landmarks; they are landmarks because other tourists see them moving to another location and so, they follow them. Some tourists may decide to go a destination such as the KCC because they see people there. As the main motivation of a visit may be to view a koala, a crowd around an area could indicate the location of a sighting. To the contrary, in some cases, tourists might like to avoid crowds and choose to go a different route or to a different destination.

Wayfinding strategies used in the case study are Shortest Path, Least Time, Fewest Turns, Most Scenic, First Noticed, and Different from Previous Route Taken.. The Shortest Path means that tourists use the shortest pathway to navigate to their destination. The Least Time refers to the use of least time to arrive at a destination. Fewest turns is the strategy to move from one destination to the next in the straightest line possible. The Most Scenic indicates tourists' preference to enjoy the scenery as they make their way from one attraction to the next.. First Noticed and Different from Previous Route Taken are related to exploration wayfinding behaviours. Tourists find their way without making conscience decisions; they are responding to the external environment conditions if they use the First Noticed strategy. Those who are guided by the Different from Previous Route Taken strategy do so because they want to travel from site to site along an unfamiliar pathway; this adds to the enjoyment of their visit.

3.3. Data analysis

Pearson Chi-square test is used to test the individual differences among tourist wayfinding behaviours. Pearson Chi-square test is used to test the null hypothesis, which is, there is no difference between groups. A significant chi-square statistic, i.e., $p<0.1$, suggests that individual differences exist. Odds ratio is a method to compare whether the probability of a certain event is the same for two groups; in other words, how strong the difference is. For example, this method can be used to compare the probability of females and males using Track Surfaces in the KCC. An odds ratio greater than one implies that the behaviour is more likely in the first group. An odds ratio less than one implies that the event is less likely in the first group.

4. RESULTS

This research seeks significant individual differences in tourist wayfinding behaviour based on age, gender, type of travel group, and familiarity with the environment using the Pearson Chi-Square test. No significant differences have been found; however, the likelihood of one group or another acting in certain ways or using certain wayfinding strategies, as shown by Odds ratios, suggests the wayfinding behaviours reported here are more likely in one group than in another.

4.1. Gender

In terms of wayfinding behaviours, the odds of Following a Crowd for females is 1.649 times higher than the odds for males. Furthermore, females are 2.198 times more likely to use Signboards to find their way, while males are more likely to use Vegetation Types and Track Surfaces as their wayfinding landmarks. The Odds ratios show that males may take more notice of vegetation types to guide them. It is interesting to find that males are about twice more likely to choose *Most Scenic* as their wayfinding behaviour than females Given these outcomes, better spatial ability is associated with more use of linear landmarks. The results also suggest that females and males may differ in the strategies they use for finding a destination. For example, females are more likely to use wayfinding strategies such as Least Time. First Noticed and Different from Previous Route Taken than males (respectively 3.311, 2.046, 1.643) (See table 1).

Table **1**. Gender differences and tourist wayfinding behaviours

Gender		Female	Male	Odds Ratio for Gender (F/M)	95% Confidence Interva		Pearson Chi-Square		
Follow a crowd	Yes(%)	21(26.6%)	9(18%)	1.649	.686	3.966	1.264	1	.261
	No(%)	58(73.4)	41(82%)						
Signboard	Yes(%)	64(81.0%)	33(66.0%)	2.198	.976	4.948	3.700	1	.054
	No(%)	15(19.0%)	17(34.0%)						
Surface Track	Yes(%)	30(38.5%)	24(48.0%)	.677	.330	1.389	1.137	1	.286
	No(%)	48(61.5%)	26(52.0%)						
Vegetation	Yes(%)	3(3.8%)	5(10%)	.355	.081	1.558	2.025	1	.155
	No(%)	76(96.2%)	45(90%)						
Least Time	Yes(%)	5(6.3%)	1(2.0%)	3.311	.375	29.206	1.294	1	.255
	No(%)	74(93.7%)	49(98.0%)						
Most Scenic	Yes(%)	45(57.0%)	21(42.0%)	.547	.267	1.120	2.743	1	.098
	No(%)	34(43.0%)	29(58%)						
First Noticed	Yes(%)	48(60.8%)	38(76.0%)	2.045	.928	4.509	3.201	1	.074
	No(%)	31(39.2%)	12(24.0%)						
Different from Previous Route Taken	Yes(%)	56(70.9%)	40(80.0%)	1.643	.705	3.829	1.336	1	.248
	No(%)	23(29.1%)	10(20.0%)						

4.2. Age

Tourists older than 55 are more likely than other age groups to use Vegetation Type and Signpost as landmarks for wayfinding. The middle age group tourists tend to find their destination based on a Shortest Path strategy. Younger tourists seem to prefer First Noticed as a wayfinding strategy (See Table 2).

Table **2**. Age difference and tourist wayfinding behaviours

Age		Young (18-34)	Middle (35-54)	Old (55+)	Pearson Chi-Square		
					Value	df	Asymp. Sig. (2-sided)
Signpost	Yes(%)	15(29.4%)	9(18%)	12(42.9%)	5.607	2	.061
	No(%)	36(70.6%)	41(82.0%)	16(57.1%)			
Track surface	Yes(%)	18(36.0%)	24(48.0%)	42.9%	1.483	2	.476
	No(%)	32(64.0%)	26(52.0%)	57.1%			
Vegetation Type	Yes(%)	1(2.0%)	2(4.0%)	5(17.9%)	8.533	2	.014
	No(%)	50(98.0%)	48(96.0%)	23(82.1%)			
Shortest Path	Yes(%)	4(7.8%)	7(14.0%)	1(3.6%)	2.527	2	.283
	No(%)	47(92.2%)	43(86.0%)	27(96.4%)			
First Noticed	Yes(%)	20(39.2%)	17(34.0%)	6(21.6%)	2.590	2	.274
	No(%)	31(60.8%)	33(66.0%)	22(78.6%)			

4.3. Type of travel group

While the differences are not significant, individuals are much less likely than other travel groups to navigate using Signposts, while couples are more likely than other types of groups to do so (See Table 3).

Table **3**. Type of ravel group difference of tourist wayfinding behaviours

Type of group		Individual	Couples	With friends or family	Group	Pearson Chi-Square		
						Value	df	Asymp. Sig. (2-sided)
Signboard	Yes(%)	5(71.4%)	31(93.9%)	54(68.4%)	7(70%)	8.396	3	.039
	No(%)	2(28.6%)	2(6.1%)	25(31.6%)	3(30%)			
Signpost	Yes(%)	2(28.6%)	26(78.8%)	59(74.7%)	6(60%)	8.316	3	.040
	No(%)	5(71.4%)	7(21.2%)	20(25.3%)	4(40%)			

4.4. Familiarity with the environment

The more tourists are familiar with the environment, the less chance they use landmarks. For example, there was a decreased likelihood that tourists, the more familiar they were with the site, used Signposts and Signboards as they navigated through the KCC. It is interesting to find that only two types of visitors used Track Surfaces as landmarks. They are first-visit tourists and frequent-visit tourists (more than 6 visits). More than 41% of tourists who were visiting the KCC for their first time chose Track Surfaces as their landmarks. One explanation may be Track Surfaces are the linear landmarks and are immediately recognisable as different because of their shape, size, and direction. The first-visit tourists may concentrate more on these environmental differences or on the things that they First Noticed. Therefore, the first-timers may prefer Track surfaces as their landmarks (See Table 4).

During the process of developing cognitive maps, tourists are more likely to be goal-oriented and will choose a landmark which is possibly more salient and easier to focus on to help them find their way. That is the

reason almost no tourists who visited the KCC more than once but less than 6 times used Track Surfaces as landmarks. However, after this cognitive map had been developed, visitors revert to the Track Surfaces again; this means their internal and external views change from line to point to line again as their familiarity with the site increases..

The data also show that first time visitors are more likely to follow a crowd than others. Tourists who had visited the KCC more than three times seldom followed others to find their way. In addition, tourists who were familiar with the environment were more likely than other types of tourists to navigate using Shortest Path and Few Turn wayfinding strategies. We can assume that the more tourists are familiar with the environment the more economical their wayfinding behaviours will be.

Table 4. Visiting Times Differences of Tourist Wayfinding Behaviours

Visiting Times		Once	Twice	Three or more	Pearson Chi-Square		
					Value	df	Asymp. Sig. (2-sided)
Signboard	Yes(%)	87(80.6%)	7(58.3%)	4(40%)	10.184	2	.006
	No(%)	21(19.4%)	5(41.7%)	6(60%)			
Signpost	Yes(%)	82(75.9%)	7(58.3%)	5(50%)	4.362	2	.113
	No(%)	26(24.1%)	5(41.7%)	5(50%)			
track surface	Yes(%)	51(47.7%)	1(8.3%)	3(30%)	7.532	2	.023
	No(%)	56(52.3%)	11(91.7%)	7(70%)			
Shortest Path	Yes(%)	9(8.3%)	1(8.3%)	3(30%)	4.815	2	.090
	No(%)	99(91.7%)	11(91.7%)	7(70%)			
Fewest Turns	Yes(%)	5(4.6%)	0(0%)	2(20%)	4.997	2	.082
	No(%)	103(95.4%)	12(100%)	8(80%)			
Different from Previous Route Taken	Yes(%)	30(27.8%)	2(16.7%)	1(10%)	2.058	2	.357
	No(%)	78(72.2%)	10(83.3%)	9(90%)			

5. DISCUSSION AND CONCLUSIONS

The aim of this study was to explore the relationship between tourist wayfinding behaviours and individual differences. Hypotheses of individual differences were developed based on a review of the literature. The Pearson Chi-square test was used to identify significant differences. Odds ratio, which is a measure of strength of association between two groups, was also employed. The data were generated in a case study conducted at the Koala Conservation Centre (KCC), Phillip Island Nature Park, Victoria, Australia.

Gender, age, type of travel group, and familiarity with the environment differences in tourist wayfinding behaviours are identified from the case study. Females tend to follow a crowd more than males, but males are more likely to use Vegetation Types and Track Surfaces as their wayfinding landmarks. Females are more likely to use wayfinding strategies such as Least Time, First Noticed and Different from Previous Route Taken than males, while males prefer Most Scenic wayfinding strategies. Middle aged tourists tend to find their destination based on a Shortest Path strategy while younger tourists prefer the First Noticed wayfinding strategy. The more tourists are familiar with the environment, the less chance they will use landmarks. Tourists who are familiar with the environment are more likely than other types of tourists to navigate using the Shortest Path and Fewest Turns wayfinding strategies.

In conclusion, there are individual differences in tourist wayfinding behaviours according to gender, age, type of travel group, and familiarity with the environment. This information can be useful for developing wayfinding systems/devices that can assist tourist wayfinding and park or urban design. In the future, it would be useful to compare individual differences in tourist wayfinding behaviours with tourists' physical movements.

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