

# A study into how buildings may provide reassurance to unfamiliar users when wayfinding

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**Abstract.** This paper introduces wayfinding strategies for people in unfamiliar environments, providing reassurance that the correct route is being followed. Two studies are reported, an observation of route choices made by people walking around an unfamiliar building, and judgements of reassurance given by people on defined routes in an unfamiliar building. The objective of the study is to identify how buildings can be designed to improve wayfinding.

**Key words:** Wayfinding, Reassurance, Building design

## 1 Introduction

Wayfinding within any unfamiliar environment places a degree of stress on the people involved [1] [2]. This may compound external stresses present, such as that due to attending a job interview or catching a plane, may distract from the wayfinding task being conducted, which in turn may lead to an error that may cause an even greater level of stress. This situation is likely to escalate if a clear understanding of the environment is difficult to achieve quickly and unnecessary time has to be devoted to information gathering and orientation in order to complete the wayfinding task [2]. Two critical characteristics of human wayfinding are destination choice and path selection [3].

A range of strategies have been identified that relate to path selection in wayfinding behaviour of unfamiliar users at decision points:

- Maintain a straight bearing. If the decision point comprises an option to continue in the same direction, this will be followed in preference to a deviation in direction. This strategy is linked to the Least Angle Strategy [4] [5] and Initial Segment Strategy [6].
- Avoid changes of level. If the decision point permits an option to change vertical level within the building, this will be ignored in favour of remaining at the same level. This may arise from an expectation of confusion on different floors if the floor plans are not consistent [7] [8].

- Choose the wider path. Where the decision points permits two or more exit paths, the wider of these will be chosen. There is some evidence for this from Zacharias [9] and this may be because public routes are associated with greater levels of traffic than private routes and are therefore wider [10].
- Move towards a bright, daylit space. Taylor & Sucoy found a preference for walking towards higher light levels [11].

The aim of this research is to identify how the environment influences wayfinding, particularly in unfamiliar buildings, and whether wayfinding behaviour can be anticipated from studying the building design. The possibility of using this information in building design is then investigated. While there are many studies into wayfinding, relatively few relate the findings back to the built environment in this way [5].

In order to identify how a particular strategy or trait influences wayfinding they have been categorised as either 'reassurance' or 'tool'. The 'tool' category includes visual and spatial cues that make wayfinding information easier to obtain. The 'reassurance' category includes visual and spatial cues that reassure the wayfinder that they are heading in the correct direction.

This article describes research carried out to address the reassurance element of wayfinding in unfamiliar buildings, by consideration of the four wayfinding strategies at decision points.

## 2 Observations of wayfinding behaviour

Two investigations have been carried out in real buildings using test participants who were not previously familiar with the buildings. The first was an observation of wayfinding behaviour, and this provided anecdotal support for the wayfinding strategies. The second was a more rigorous test of wayfinding difficulty, comparing the reported difficulty of the route with a-priori predictions made by consideration of the wayfinding strategies. Both investigations were carried out in University of Sheffield buildings - the Students Union and the St George's Complex.

Two sets of observations were conducted. The first involved participants being asked to walk around the building in accordance with one of three sets of rules; follow a list of directions using named landmarks such as a feature; follow a set of instructions (e.g. turn left when you reach a particular feature); and the (control) third group walked without any directional instructions [12] [13]. The second observation involved participants being taken around the building once then being asked to give directions to various spaces within the building. This aimed to identify elements of the building the participants felt were significant to the wayfinding task and whether there was evidence of the known wayfinding strategies in the routes given.

Analysis of the routes followed by the control group subjects of the first observation provide some support for the wayfinding reassurance strategies. Their routes were analysed to determine the number of decision points at which each

strategy was possible. Each strategy was followed on at least 75% of the occasions when it was viable.

Twenty-four volunteer subjects were instructed to follow five routes, in a random order, and report on the perceived difficulty of each route. These routes were within the St Georges building at Sheffield University and the test participants reported that they had not previously entered this building. The difficulty of each route was initially rated by consideration of the four proposed wayfinding strategies.

Test participants initially followed two practise routes, conducted in a separate part of the building to the five test routes. These were chosen as examples of easy and difficult routes, and this was conveyed to the participants to anchor their responses. Following each individual test route, its difficulty was rated using a category rating scale (1=very easy, 2=moderately easy, 3=moderately difficult and 4=very difficult). Four categories were chosen to avoid the potential contraction bias possible when the scale includes an obvious middle (neutral) category [14]. On completion of all five routes, their difficulty was judged by listing them in rank order (1= easiest to 5 = most difficult) with tied ranks not a permitted response. The use of two mechanisms for judging difficulty offsets the bias inherent within each, and this enables more confidence to be placed in the findings. Each participant undertook all seven routes.

	Route A	Route B	Route C	Route D	Route E
Predicted rating	2	3	4	1	3
Recorded rating (mean)	2.29	2.83	3.50	1.25	3.17
Recorded rating (std. dev.)	0.54	0.55	0.5	0.43	0.69
Predicted ranking	2	3	5	1	4
Recorded ranking (mean)	2.17	3.25	4.38	1.08	4.13
Recorded ranking (std. dev.)	0.47	0.66	0.70	0.28	1.09

**Table 1.** route difficulty and mean rating and rank order of route difficulty recorded in tests

The Friedman test shows that the ratings applied to each of the five routes are significantly different ( $p < 0.001$ ). Subsequent application of the Wilcoxon signed ranks test to individual route pairs revealed significant differences in ratings of difficulty and these differences followed the a-priori predictions. Kendall's W test suggest that the rankings of the five routes are highly concordant ( $w = 0.76$ ,  $p < 0.001$ ) - participants tended to agree on ratings of route difficulty. The Friedman test reveals significant differences ( $p < 0.001$ ) in the rank order of route difficulty and this is again supported by application of the Wilcoxon signed ranks test to individual pairs of routes.

### 3 Discussion

The two studies reported in this article provide some evidence that when people are wayfinding in unfamiliar buildings they make use of four reassurance strategies at decision points; maintain a straight path, avoid changes of level, choose the wider path and move towards a bright, daylit space. Both studies have limitations. The first was a post-hoc analysis, and does not account for other environmental variables nor for the purpose with which the test subjects were walking in a given direction. The second test considered the four strategies as a group and does not reveal the interaction and weighting of each. Further work in this area will involve studying each of the strategies individually in order to identify whether there is any precedence of choice between strategies. There may be situations where the decision has to be made to adhere to one strategy or another (but both aren't possible), in which case it is felt it would be valuable to know if particular strategies are consistently favoured.

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