



KEY POINT SUMMARY

OBJECTIVES

The study objective was to examine wayfinding behavior in relation to design elements (signage) in a complex building type (the targeted hospital's circulation area).

An experimental research on the impact of spatial configurations of complex hospitals on human wayfinding performances

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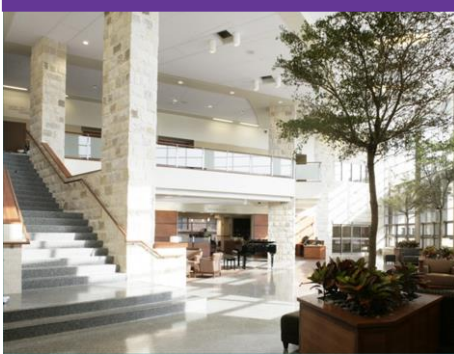
Key Concepts/Context

Research shows that human wayfinding behavior in hospitals depends on the spatial configuration of an environment. As successful wayfinding also depends on cognitive abilities, the crowded and busy hospital setting, compounded with any emotional distress, causes challenges for people when navigating the facility. People also tend to trust signage systems in hospitals; however, signage systems may not be designed in a manner that guarantees successful navigation for all users.

Methods

This is a quasi-experimental research study with qualitative and quantitative components. Twenty pre-license university students between 18-24 years of age (10 males, 10 females) were recruited to navigate their way through the Nazilli National Hospital, a complex hospital building in Turkey. The hospital's bed capacity was 481 and it had 11 structures. Participants' navigation strategies were directly observed by the researchers and recorded through verbal reports from the participants. GoPro action cameras were put on each participant's head to record wayfinding strategies, and they were asked to "think out loud" so researchers could capture their cognitive processes when making directional decisions. Each participant received an envelope with the information about the routes they would take and their destination points. They were asked not use elevators or ask for help/talk to anyone.

A visibility graph analysis (VGA) was employed using Depthmap software to map routes taken by the participants and route tasks, which included two destination points. Wayfinding performance measures from participants were combined with qualitative/observational data to provide a comprehensive understanding of complex areas. Performance measures included: factors contributing to complexity,



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routes taken by participants that resulted in confusion, amount of unnecessary paths taken compared to the shortest path, environmental factors that guided participants the most during navigation, areas where participants required direction, key elements facilitating correct decision-making and route-taking, the impact of circulation area on navigation, the influence of signage systems on wayfinding behaviors, and the effects of environmental factors (such as color, lighting, and artistic elements) on wayfinding behaviors. Statistical analysis was completed using SPSS v24, and included probability analyses such as Pearson correlation coefficient levels, regression analyses, and t-tests.

Findings

Natural daylight helped participants remember main areas, such as the circulation area on the first floor. Some participants did use the directory signboard; however, the signage was misinterpreted as to the proceeding direction, which caused a loss of time and wasted effort. The corridor walls were painted the same color and no artistic elements on the walls were evident to support participants in remembering or distinguishing areas, causing confusion. Participants used their environment, such as stationary objects or persons, to then create navigation points for themselves. The signage was found to be too shiny in appearance and reflected sunlight, which limited readability. Participants also noted the excessive information on each sign, which also prompted negative connotations in wayfinding. The VGA analyses showed that the participants could not locate the directory signboard at the entry of the area.

As shown by GoPro data, participants stopped most frequently at the node points situated at the beginning of corridor areas. Interview data showed that the most important factor the participants experienced and helped them find their way through the area were areas of direct daylight and having views outside the building. Wayfinding performances of participants were positively affected in the areas where connectivity and integration values are found to be high and step-depth values are found to be low. There was no statistically significant correlation between spatial configuration variables and wayfinding performance parameters. However, the higher the connectivity values are, the higher the wayfinding performance measures were of time, pause time, getting lost time, distance and extra corridors taken. Step-depth and wayfinding performances were found to have weak to moderate correlation coefficients ($r=0.01$ and $r=0.26$, respectively).

Limitations

This study focused on complex hospital buildings (over 300 bed capacity, multilevel) and those that were less than 10 years old, which limits the generalizability of the findings. This study focused on a single site, and participants were unable to use elevators or ask for directions, which may limit validity of findings compared to a real-world scenario across other buildings. Further, by using young adults, the



findings may not be generalizable to other age groups that typically frequent health care facilities.

Design Implications

Common areas of buildings need to be designed in a more memorable and consistent manner with the help of lighting, reduced step-depth, and with signage attention to interpretability (color, type size, frame shape). Use of daylight and views outside the building may contribute to enhanced wayfinding in complex buildings.

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