

Abstract

Neuroscience and architecture are often combined to study the impact of environment, physical spaces, colors, shapes, and buildings on brain activity and health. This is an emerging field with distinct areas examining architecture in relation to neuroscience. Among the numerous elements of architecture, imageability seems to be of particular interest. Imageability refers to the quality of a physical space that evokes strong images in people's mind, and influence cognitive functions including visual, memory, and spatial recall. It is hypothesized that environments, spaces, and buildings with poor imageability might negatively affect cognition, behavior, and brain health. Diverse studies have been conducted to test such a hypothesis however, there is a lack of compiled evidence that highlights how imageability and neurosciences are connected. Therefore, we conducted this systematic review to explore the current understanding of imageability from an architectural perspective in the study of neuroscience with a focus on its implications for cognitive health and well-being.

Hypothesis

Based on the findings related to neuroscience, architecture, and environment, we formulated the following hypothesis:

- Architectural environments with high imageability, could influence positively cognitive functions.
- An environment with poor imageability may negatively impact cognitive functions, contributing to the deterioration of mental well-being.
- The perception of imageability will decrease in patients with Alzheimer Disease.

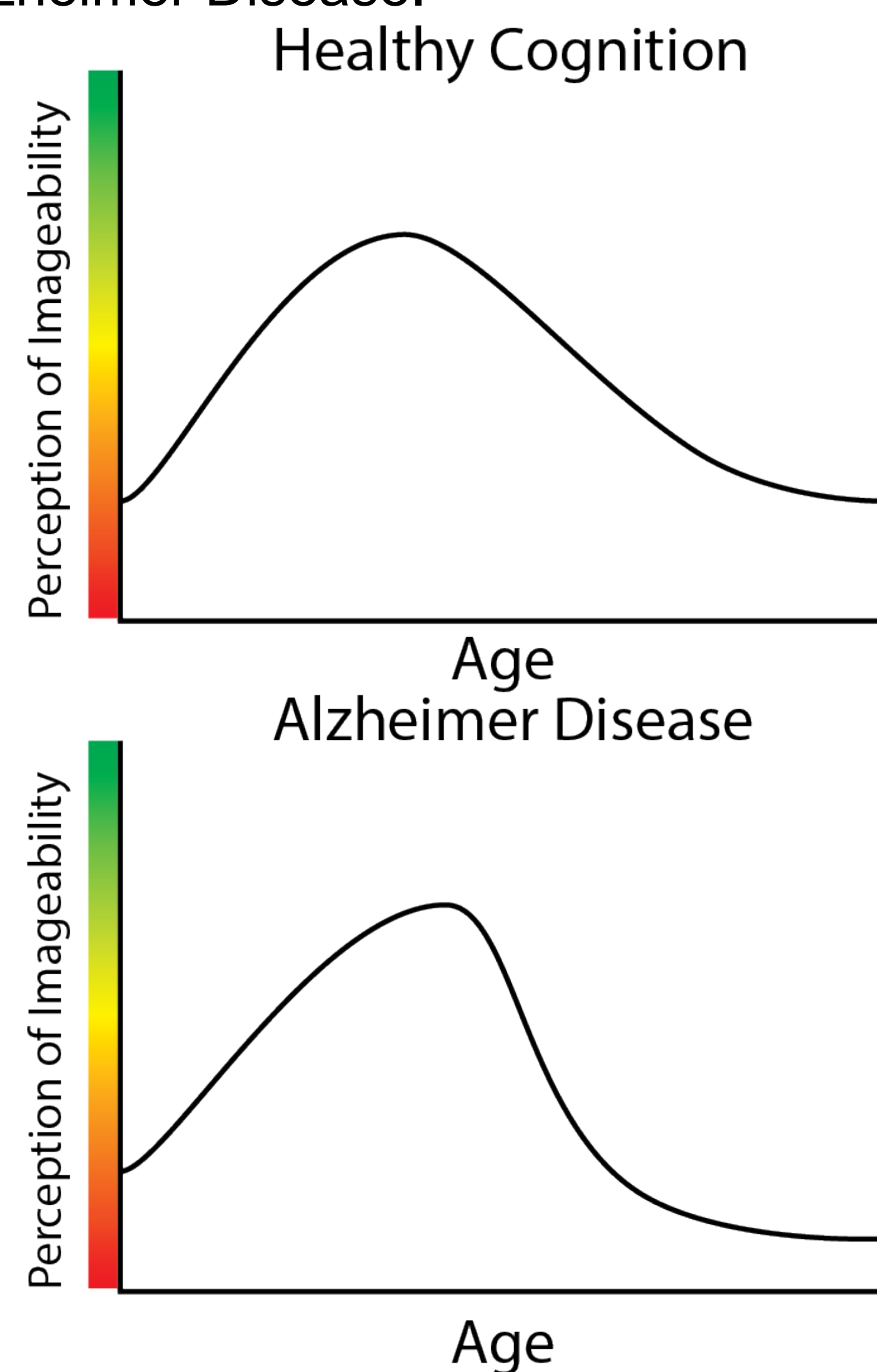


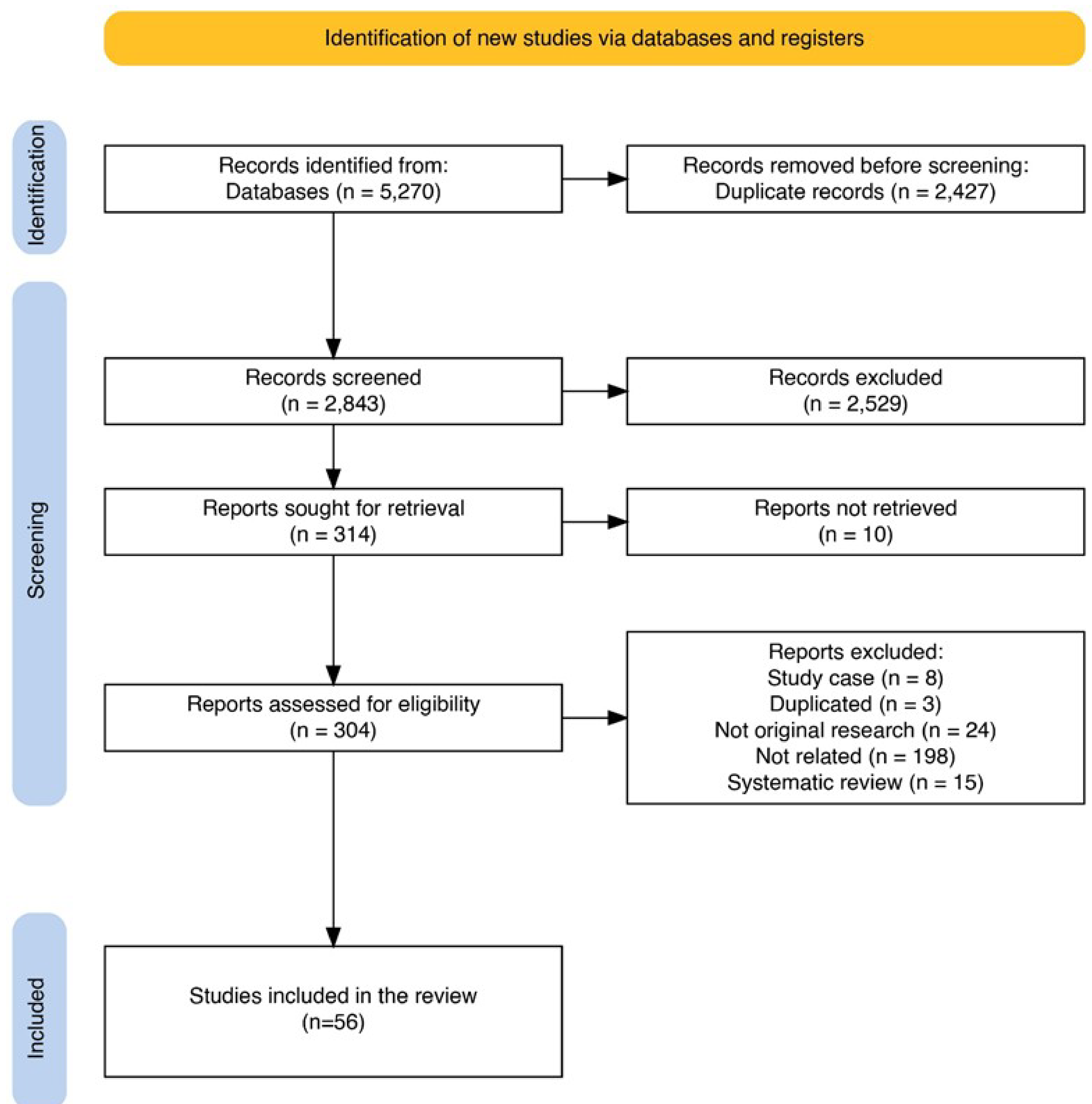
Figure 1. Hypothetical graphics

The graphic represents the early and pronounced decline in the perception of imageability in patients with Alzheimer's compared to healthy cognition.

Methods

This review conducted a comprehensive search across four electronic databases: EBSCO, OVID, PubMed, and Web of Science. Our search term included "Imageability" as the main keyword combined (AND) with architecture, environment, built environment, neuroarchitecture, aphantasia, urban design, memorability, visual recall, mental visualization, architectural features, façade, wayfinding, familiarity, familiarity, architecture, familiarity, environment, and vividness. Eligibility criteria included peer-reviewed articles in English that focused on the relationship between imageability, health, and architecture. The synthesis of results was conducted following PRISMA's four-phase flow diagram.

Results



The initial phase of the systematic review was the identification of the actual papers across selected databases, which yielded 5270 articles. 2427 articles were removed due to duplication. The screening process involved a review of the remaining 2843 articles, searching for the presence of "imageability" in the title or the abstract. This led to the exclusion of 2529 articles that did not meet this criteria. This resulted in a collection of 314 articles. Of these, 10 were inaccessible or not available in English.

The final eligibility assessment was performed on 304 articles, from which 248 were further excluded due to a variety of reasons: they were not original research, were not pertinent to the research question, were duplicates, were case studies, or were other systematic reviews.

Conclusions

This systematic review evaluated the intersection of health and architecture considering the concept of Imageability. The process of screening articles and the selection highlighted an extensive number of articles where imageability has been used in numerous fields, but most importantly, imageability is related to cognitive health and related to Alzheimer's disease.

Our findings suggest an opportunity to create a bridge between architecture, environment, and health and yield a scientific base for neuroarchitecture. These findings will be useful for policy-makers, scientists, designers, and professionals in the public health area fostering an interdisciplinary dialogue aimed at enhancing the built environment and cognitive well-being.

Future Studies

- Review each article after screening, to generate a systematic review that could be used as a novel way to study imageability and its different implications in the field of architecture, urbanism, and health.
- Generate a quantitative study where we can determine the perception of imageability, using Google Street View and Virtual reality. This could be extremely useful to understand the development of cognitive decline across the imageability of the place where the people live.
- Generate a study where we can study the imageability in a controlled space, and how this space could interact with the sensations of the human body.

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