

2026 Synesthesia Congress Proposal

Title:

How Homophones Shape Color Perception Across Languages (Chinese, English, Spanish)
in Grapheme-Color Synesthesia

Author:

Zihan YU (Claire), synesthete, artist, and researcher
Perkiomen School, Pennsylvania, USA
claireyu1571017@gmail.com

Homophones, especially in spelling, are a universal linguistic phenomenon across languages. Words that share the same pronunciation but differ in meaning are often used as a creative device in literature and poetry. For example, ancient people in China used 蝠(bat, fú) to symbolize 福(happiness, fú); English writers use pairs in literature and songs, such as soul/sole; Spanish, though, is more transparent phonetically, has homophones with subtle differences like se/sé, botar/votar. These uses reveal how homophones naturally create excellence and complexity across language in art, culture, and communication.

For most, homophones primarily rely on context, whether auditory or written, depending on the language. In the daily use of language, meaning acquisition forms from semantic memory and orthographic distinctions. Meanwhile, for grapheme-color synesthetes, homophones bring a new dimension of language perception. Since each word form can infer immediate colors, synesthetes may experience homophones in ways that are fundamentally different from non-synesthetes.

Therefore, this study aims to show a set of self-experiments conducted by the author, within the grapheme-color perceived in Chinese (logographic), English (deep alphabetic), and Spanish (shallow alphabetic). The homophones in the three languages differ greatly, specifically in density, orthographic depth, and writing-system structure, which offers a rare opportunity to examine how a synesthetic adapts across languages.

According to some existing research, different languages activate different neural pathways during reading, such as the distinction between the Chinese logographic process and the English alphabetic process. This project provides new evidence for how cross-linguistic differences interact with the grapheme-color presentation of synesthesia. With the same individual conditions by the same synesthete, the experiments demonstrate the following:

1. How color associations remain stable within each writing system, yet shift according to linguistic structure.
2. How semantic information modulates grapheme-color experiences, more specifically, how semantic context modulates word-grapheme-color associations
3. How different systems of language may influence reading focus and language acquisition, and synesthesia may contribute to these processes

The study also displays how color perceptions extend from individual characters to whole words, and how this transition influences concentration and processing speed in reading.

These observations contribute to understanding the role of grapheme-color synesthesia in linking script structure, semantics, and synesthetic experience itself.

Although this study is a single case investigation, the findings lead to potential directions for future research. Understanding how synesthetes differentiate homophones naturally may offer inspiration for improving the ambiguity resolution in modern technologies. Future work may explore how these insights could inform language acquisition education, audio-driven artificial intelligence systems, and multilingual language processing tools.