

# When the Inducing Grapheme Changes and When the Induced Synesthetic Color Changes

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## Abstract

Background: It has been shown that conscious awareness of an inducing grapheme is necessary for synesthetic color experience (Mattingley et al., 2001; Rich & Mattingley, 2005). However, whether grapheme recognition should precede synesthetic color perception has not been addressed. Using particular grapheme pairs that entail ambiguous recognition when rotated, i.e., W-M or 6-9, we investigated the temporal relationship between grapheme recognition and synesthetic color perception. Experiment 1: In 2 separate blocks of trials, 9 synesthetes observed either the letter W(M) or the digit 6(9) followed by a pattern mask. The presented graphemes were in one of seven different angles between 0 and 180 degrees. Observers responded by pressing one of two keyboard buttons indicating the perceived identity of the grapheme in the grapheme recognition task (e.g., W or M) or the experienced synesthetic color (e.g., purple or green for SK) in the synesthetic color task. For the most synesthetes tested, reaction time(RT) was slower in the synesthetic color task than in the grapheme recognition task. Experiment 2: In 2 separate blocks of trials, a subset of synesthetes who participated in Experiment 1 observed either the letter or the digit rotating in clockwise or counterclockwise direction. The initial angle of the grapheme was varied. Observers responded by pressing a button indicating the moment the grapheme changes its identity (e.g., from W to M or from M to W) or the moment the experienced synesthetic color changes (e.g., from purple to green or from green to purple for SK). For all the synesthetes tested, the pattern of results shown by perceptual latency in Experiment 2 was parallel to that shown by RT in Experiment 1. To further investigate whether grapheme familiarity influences the microgenesis of synesthetic color experiences, we're now testing Korean synesthetes who see colors on both alphanumeric and Korean characters.

## Footnotes

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