

“Gießener Abendgespräche Kognition und Gehirn“

Mittwochs, 18.00 bis 20.00 Uhr, Raum F009

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“Training synesthetic letter-color associations by reading in color”

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Grapheme-color synesthesia is defined as the experience of color in relation to letters, words and numbers. Grapheme-color and linguistic-color synesthesia have a genetic component. Language (the most common synesthetic inducer) is acquired through an interaction between genes and the environment. Similarly, grapheme-color synesthesia is likely shaped by both genetic and environmental factors. In order to probe this interaction, we compared non-synesthetic relatives of grapheme-color synesthetes to a group of matched controls in a reading-in-color training paradigm. All participants read specially prepared books in which four high-frequency letters were paired with four high-frequency colors.

Magnetic resonance images were acquired before and after training.

Behavioral results indicated learned automatic letter-color associations by reading in color tested with a Stroop task, indicating associations at a semantic-level had been acquired. Imaging results showed significant brain activation related to congruency in regions known to be involved in (authentic) grapheme-color synesthesia, including inferior occipital lobe near V4, inferior and superior parietal lobe, precentral gyrus, and insular cortex. There was no evidence of increased acquisition of the letter-color associations in the behavior of the relatives of synesthetes, however, neural activation was found to be significantly different between groups in regions associated with synesthesia, including near area V4. We conclude that activation related to training synesthetic associations was significantly different in the relatives of synesthetes compared to controls and most notably in multi-sensory brain regions, even though the behavior was indistinguishable between the two groups.