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Dr. Roi Cohen Kadosh: One step closer to understanding the causes of synesthesia.

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Health

Research team unravels the secrets of synesthesia [VIDEO]

By Nicky Blackburn

November 02, 2008

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An Israeli researcher working with team members from Britain and Spain has discovered that synesthetic experiences - where one sense triggers the involuntary use of other senses - can be induced by hypnosis.



Synesthesia is a rare condition in which one sense, sight for example, is simultaneously perceived with an additional sense. Someone with the disorder can look at a cityscape and taste blackberries, say, or experience a word or number as a specific color.

The condition is thought to affect anything from one in 200 people to one in 100,000. Many people suffer the disorder without even realizing what it is, and it has been found to be more common amongst women, and the left-handed than the general population. Famous synesthetics include Pythagoras, the writer Valdimir Nabokov, who complained as a toddler to his mother that the letter colors on his wooden alphabet blocks were all wrong, and painter David Hockney.

Up to now the most common theory put forward to explain this phenomenon, which was first discovered 300 years ago, was the existence of extra connections between brain areas, but this is highly contested according to Dr. Roi Cohen Kadosh, previously a doctoral student at Ben Gurion University of the Negev, who took part in the study.

Cross-talking

The new research suggests that people with the condition do not necessarily have extra connections in their brain, but rather that their brains simply do more 'cross-talking", and that this can be induced by changing inhibitory processes in the average brain.

The research, recently published in the journal, *Psychological Science*, the main publication of the Association for Psychological Society, was conducted by an international group of scientists including Cohen Kadosh, under the supervision of Prof. Avishai Henik from BGU's Department of Psychology. Other researchers included Andres Catena from the University of Granada, Spain; Vincent Walsh from University College London; and Luis J. Fuentes from University of Murcia, Spain.

To explore the alternative theory of more cross talk (disinhibition) between brain areas in synesthetes, Cohen Kadosh and colleagues used posthypnotic suggestion to show that people who are not synesthetes can be induced to have synesthetic experiences.

After inducing digit-color synesthesia, the volunteers reported similar experiences to those undergone by real synesthetes in their everyday life. For example, one participant described her experience while under posthypnotic suggestion as: "When I'm walking on the street, the car registration numbers, if those numbers are on the registration, I see them in those colors."

Hypnotized participants also failed a catch test, failed in turn by real

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synesthetes: when subjects were hypnotized to experience seven as red (for example) they could not detect the number when a black seven was presented on a red background.

"This research shows that abnormal neuronal connections are not prerequisite in order to have synesthesia," Cohen Kadosh, who is now studying for his post-doctorate at University College London, tells ISRAEL21c. "Probably other abnormal cross-modal interaction, such as the one that is experienced after neurological damage, is also not due to excess neuronal connections, but rather a change in the inhibition between or within brain areas.

Moving closer to the cause

"This takes us one step closer to understanding the causes of synesthesia and abnormal cross-brain interactions," he adds.


The research, "Induced cross-modal synesthetic experience without abnormal neuronal connections," was funded by a Marie Curie Intra-European Fellowship; the Royal Society; Israel Science Foundation; Junta de Andalucía and the Spanish Ministry of Education and Science, and the Spanish Ministry of Science and Innovation and Fundación Séneca.

Cohen-Kadosh, who specializes in numerical cognition, believes that understanding the neuronal basis of synesthesia "may provide insights into the way in which sensory systems become organized developmentally, the way in which sensory and non-sensory information processing are integrated, and the origins of conscious sensory experience.

"Synesthesia is a fascinating phenomenon that can shed light on interesting questions in the fields of consciousness, or automaticity," he adds. "You will be surprised to find out how many people are synesthetes but do not know about it. They just believe that everyone experiences the world in the same way that they do."



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