When People See a Sound and Hear a Color

By ERICA GOODE

Most people, when not under the influence of hallucinogenic drugs, experience the sensory world in a condition called synesthesia, in which the customary boundaries between the senses appear to break down, sight mingling with sound, or taste with touch.

"In a dozen experiments, speaking of the union of color and tone in his music, explained to an interviewer: "When I hear music, I see in my mind the eyes, colors which move with the music. This is not imagination, nor is it a psychic phenomenon. It is an immediate reality."

A 31-year-old woman, participating in an ongoing synesthesia study at the National Institute of Mental Health, told researchers that when she ate buttered toast, "It is rough, but not pointy, and it has jelly on it the rough texture is rounded."

And Carol Stein, a New York artist who, like most synesthetes, has had synesthetic experiences from an early age and who uses her perceptions in her work, says she distinguishes different types of headaches by their colors. "If it's a sinus headache, it's green," Ms. Stein said.

In synesthesia, there is a disparity of attention from artists and psychologists at the turn of the century. But until recently, the neurological phenomenon largely ignored it. Those who experienced synesthesia rarely complained. "It's a wonderful thing, the world!" exclaimed one synesthetic woman.

And the private nature of the perceptions made diagnosis impossible. "There was no objective way to test what, if anything, unusual was taking place."

A handful of researchers, however, are tapping the arrival of imaging techniques and other new technologies for studying the brain at work. This has revived interest in synesthesia, capturing the interest of a small core of researchers in a variety of countries and disciplines. PET scanners, electrophysiological recording, DNA analysis and other techniques are increasingly being used to the current issue of The Journal of Neurophysiology and Clinical Neurosciences, for example.

German researchers from the University of Hanover Medical School report electrophysiological findings from a group of subjects in a study suggesting that in understanding of synesthesia as a perceptual anomaly, researchers hope, eventually help elucidate the neurological basis of the experience.

For instance, in a study involving 5,086 people reported sympthological experiences. Scientists offer differing theories of synesthesia's cause: Some argue that it represents an innate difference in neurophysiology, others that it is a result of associations learned through experience. Synesthetes are described as seeing words in colored letters, hearing sounds in various directions or seeing colors associated with certain numbers or letters. Depending on the individual, the colors vary and the associations are different. In one study, Dr. Baron-Cohen and his colleagues found that synesthetes showed a 92 percent consistency in their color-sound associations after a full year, in contrast to only 37 percent consistency after one week in control subjects.

What makes senses mingle is the mystery of synesthesia.