Understanding Synesthesia’s Causes and Forms

Why I chose this topic

“My seven is light blue,” I said as I leaned over from the back seat to argue with my father. “For me,” he said, “it’s definitely orange.” “Nine is orange,” I responded, my feet kicking the back of his seat, “Seven is light blue.” Occasionally, we agreed. Four was definitely red; ten was black. We continued this ongoing debate throughout my childhood, turning it into games, and not-so-secretly enjoying the fact that my mother had no clue about what we were playing at. We liked to compare our numbers, words, and names to see where we agreed and where the other was clearly wrong. Because my father and I didn’t otherwise share a lot of great times together, these are moments I remember fondly. The playful conversations we had and the games we enjoyed centering around the colors of numbers, words, places, and people were a way for us to have fun together.

When I was older, in college, I recognized that almost no one “saw” numbers, words, names in color. I remember a road trip I took with several of my closest friends. As our initial excitement lagged on the long drive across the Pennsylvania turnpike, we started playing games in the car. At one point, I suggested that we all tell each other what color we were. My friends started saying things like, “Well, Karen, you are a very crazy, active person with a giant
personality, so you are like a bright yellow sun,” or, “Jeannette, you are calm and quiet, so you are like a pale blue sky.” I explained that they weren’t playing right -- it wasn’t that you thought of a color to express someone’s personality type; it was the color that person WAS. They all looked at me like I was crazy, and didn’t understand when I tried to explain. Subsequently, I rarely ever spoke about “my colors” again. Not because I was ashamed, but because it felt like a waste if nobody could understand me. Then, several years ago, a friend of mine who is a journalist was doing a series about the science of the brain. In one of her shows, she was interviewing a man who she said was a synesthete. When I asked her what that was, and she explained, I was incredulous. I had decided that my father and I were the only people like this. I chose to research this topic so that I could understand better what synesthesia is.

What I know and what I want to know

My friend gave me the book her guest, Richard Cytowic, had written, *The Man Who Tasted Shapes*. A couple years later I found another book written by a synesthete, Patricia Lynne Duffy, *Blue Cats and Chartreuse Kittens*. I learned from my reading that there were some, though not many, other people with synesthesia -- people who saw names and numbers as colors, thought of shapes as having flavors, or associated music with textures.

So, I know that synesthesia is a condition that causes people to experience simultaneous sensory input that most people do not experience. I know that it is not common, and I know that it has likely affected several famous writers, composers, and painters. What I don’t know, but would like to understand, is what causes it, and if it is more common among certain types of people (e.g., women vs. men). I’d also like to know if it associated with any particular behaviors or tendencies. I’m curious, as well, about the various forms it can take.
Understanding Synesthesia’s Causes and Forms:

An Annotated Bibliography


In "Why George Gershwin May Have Called It 'Rhapsody in Blue','" Begley discusses synesthesia. Begley explains why some scientists see studying synesthesia as a likely pathway to understanding a range of puzzles, from the roots of creativity to the origins of language. Carol Steen, an artist and synesthete refers to the condition as "a gift," and UCSD brain researcher Ramachandran says that "synesthesia is a gold mine for neuroscience." The article enumerates many forms of synesthesia, including seeing letters in colors (the most common form), seeing musical notes in colors, and tasting shapes. Begley explains that is in the brain's gyrus, where information from different senses converges, that synesthetes have some crossed wires. Studying this phenomenon may provide insight into other aspects of brain function.


In "Everyday Fantasia: The World of Synesthesia," Siri Carpenter provides a comprehensive overview of what is currently known about synesthesia. She explains what synesthesia is, some historical background about it, and current research. Carpenter
explains that the name "derives from the Greek, meaning 'to perceive together' " and that is a condition causing two or more senses to be experienced at the same time. It occurs in many forms. The most likely cause of synesthesia is an "overabundance of neural connections in the brain." Synesthesia is "biological, automatic and apparently unlearned, distinct from . . . hallucination," runs in families, and is more common among women. Current research involves using "modern behavioral, brain-imaging and molecular genetic tools" and may result in better understanding of "how the brain normally organizes perception and cognition." It is estimated that about one in 3,000 people have the condition.


I decided to use this website, even though there is no date associated with it, because other elements made me believe it was reliable. It is maintained and published by a reputable university in the U.S., there are many high-quality references included in its bibliography, it is well-written and organized, and doesn't appear to be trying to persuade, only to inform. The site explains the criteria for diagnosis of synesthesia: the perceptions are involuntary, projected, durable, generic, memorable, and emotional. Synesthetes tend to be women, left-handed, be of above-average or normal intelligence, have a relative who is also a synesthete. The page also includes a synesthesia experiment.


The American Synesthesia Association is a non-profit organization, created in 1995 by Carol Steen and Patricia Lynne Duffy to promote the advancement of knowledge
about synesthesia and provide a means for the people who experience or study
synesthesia to be in contact with each other. In the last two decades it has been seriously
studied by scientists, aided by the development of fMRI scans and the Internet. The ASA
has held eight major conferences at which scientists, artists, and synesthetes have made
presentations of their studies of and experiences with synesthesia. Scientists and
academics seem most interested in exploring how the understanding of synesthesia can
contribute to our awareness of overall brain function.


I decided to reject this website, even though it had some interesting information,
because when I checked for information about who published it and when it was
published, all I could find was the name "Sarah" and this message: "This page is sorely
neglected so don't be coming back expecting changes anytime soon HAHAHA." I
determined it was unreliable.

"The Synesthetic Experience." MIT - Massachusetts Institute of Technology. Council for the Arts

I evaluated this site using the CREEP test, and, although it seems to be from a
highly respected university (MIT), there is much about it that is suspect. It was last
updated back in 1997. There is no author associated with it, and when I explored the site,
it seemed that it was actually written by two women who say they are synesthetes and
whose purpose is to talk about their personal experiences, while trying to make it appear
scientific. In the end, I rejected this website.

Vila, J. et al. "Congruence Or Coherence? Emotional And Physiological Responses To Colours

I decided not to include a summary of this article in my bibliography because it turns out to be much more scientific and technical than what I was looking for. The title led me to believe that I might learn something about the effects of colors on synesthetes, both emotional and physical, but the writing style and content were not appropriate to a non-scientific reader.


In “Synaesthesia, Creativity and Art: What Is the Link?.” the authors discuss the reputed link between synesthesia and creativity. Because a number of famous creative people (writers, artists, composers) were thought to have been synesthetes, the theory grew that there was a connection between the condition and creative talent, though current research suggests that is not the case. The authors report the results of a scientifically-designed study that indicate there is some small relationship, but not the large cause-effect relationship previously assumed. Depending on the type of synesthesia one has, there is an increased tendency for a synesthete to engage in creative activities, but little evidence exists that synesthetes are any more talented in the arts than non-synesthetes.
What I learned about doing research

I learned several things about doing research, in general, and conducting research here at DCCC, specifically. I was reminded while doing this research project that it is important to remain flexible during the process. I started off with a set of three questions to guide my search for sources, but realized pretty quickly that I was finding lots of information that was interesting about my topic, but about which I hadn’t focused my questioning. That’s okay, I decided, and made notes from sources that were interesting, deciding to file the sources and notes away for future research, when I have the opportunity. I learned about how to use the library website, especially which databases were most likely to contain sources relevant to my research (MasterFILE Premier via EBSCO in particular). I learned that I could chat (live) with a librarian 24/7, if I needed to! This amazed me, and, though I didn’t need to chat with anyone for help at 3:00 a.m., it was reassuring to know that I could, if necessary!

What I learned about my topic

I learned that the name synesthesia derives from its Greek roots and means “to perceive together.” This makes sense to me because I experience a visual color perception associated with letter, numbers and names. It is thought to be caused by an overabundance of connections in the brain, and is recognized as a biologically-based phenomenon (as opposed to a hallucination). Further proof that it is biological is the fact that it runs in families (like my father and me). It is fairly uncommon, estimated that about one in 3,000 people experience it.

I learned that, though it was once assumed that synesthesia was a condition that made a person likely to be a “creative” sort and choose an artistic career, that is no longer as prominent an opinion. Synesthetes report that having the condition feels very normal to them and it is a type
of “gift.” In other words, it is a pleasant, non-disruptive phenomenon, sometimes causing people who have it to be drawn to creative pursuits, but not necessarily doing so. It does not seem to make people more gifted creatively. The only other information I could find about characteristics common to synesthetes were that it occurs more frequently in women than men, and one site indicated that a majority of synesthetes are left-handed and of normal or above-average intelligence.

There are various forms that synesthesia can take. I have the most common, the association of letters with colors. I also associate words and numbers with colors. Other synesthetes experience musical notes as colors and some even experience shapes simultaneously as tastes. I read about many painters who say they paint images using colors that appear in conjunction with the image in their heads. Some also say they paint music in this way.

I learned a few things along the way that were not directly related to my questions, but that I found very interesting. Modern brain imaging technology is allowing curious scientists to explore the brains of synesthetes. They are curious to see if they can learn more about how the brain organizes perception and thinking by looking at what synesthete’s brains do perceptually. fMRI scans are particularly useful in this quest. One article, in particular, surprised me with its discussion of the amount of scientific interest in researching synesthesia on the theory that it can tell us something about an age-old puzzle: the origin of language among humans. Also, the Internet, as in many other cases, has provided a pathway for synesthetes and those who study the condition to build networks, so there is growing likelihood that understanding about the condition will increase.
I have some questions for further research. I didn’t find out enough about my question regarding behaviors or tendencies, other than creativity, associated with synesthesia. Also, I’m curious if there is anyone in the Philadelphia area, perhaps at one of the universities, who is studying synesthesia.