

When 6+2 Equals Orange

Color synesthetes find life a chromatic existence: They believe the number 9 is burgundy, the word for owl is orange, and G major is brownish-gold. But what happens when these additional sensory experiences come up against today's systems of education and learning? We delved into this unusual dimension of perception.

Text: Alexandra Dittmar

"As a historian, I deal with dates every day of my life. For me, every number's got a characteristic color. So it's easy to make a mental note of it, and categorize it. It always amazes me how people can get by without using colored numbers."

Martin Bremer, a historian by profession, experiences synesthetic colors when he hears and reads numbers. He is one of those people for whom sensory experiences automatically elicit a parallel sensory experience such as color sensitivity. Famous examples of people with synesthesia include composer Franz Liszt and musician Elisabeth Sulser. While in Liszt's case listening to music evoked colors, for Sulser sounds trigger specific taste sensations. Synesthesia (derived from Greek: syn = together; esthesia = sen-

sation, perception) cannot be switched off and generally occurs throughout life, though this varies from person to person – visual synesthesia being the most common type. These become apparent, for instance, in the form of circles or lines; some pass by like strips of color, while others resemble reflections of light on a window pane. In most cases, they do not impair normal vision.

This naturally occurring form of additional sensory experience is not an illness, hallucination or association – and should not be confused with drug-induced synesthesia-type experiences. Recent years have seen increasing research into the causes of synesthesia, whereby medical imaging shows that additional areas of the brain are activated in the case of synesthesia-type experiences. >



Oile
Eule

How do we know when someone has the gift of synesthesia?

With children in the preschool or early school years in particular, it is important to identify whether they have synesthesia skills. Saying things like “the little alphabet blocks are the wrong color” and “this soup tastes purple” is a sign of synesthesia. This should be borne in mind in the case of learning difficulties. Children in particular are often either unaware of their talent, or elect not to talk about it following strange responses to their “colorful letters.” That’s where eagle-eyed parents and teachers can help.

- American Synesthesia Association
www.synesthesia.info
- Synesthesia Test: www.synesthete.org



$$6+2=11 \quad 6+2=8$$

$$9+2=11$$

However, the phenomenon still cannot be explained. From childhood, these perceptions and sensations are considered by synesthetes to be completely normal and everyday. As soon as a synesthete – with his or her individual way of seeing things – comes up against today’s learning systems, however, it is not uncommon for confusion to occur. This is demonstrated by the example of the most frequent form of synesthesia: the experiencing of synesthetic colors.

The Blue Owl

Synesthete Christiane, who prefers not to disclose her surname, describes a childhood memory: “One evening, before I could read and write, my parents pointed to a big bird with pointy ears and big eyes sitting in a tree: It was an owl. I was really impressed! First of all it was the word: It was a beautiful blue! As I now know, words whose first vowel is an ‘O’ for me evoke blue color synesthesia. And the fact is the German word for owl, ‘Eule,’ is pronounced ‘Oile.’ So when I started to attend school, I wrote the word ‘Eule’ the way it is spoken: ‘Oile.’ I was shocked to find that this nice blue word was written differently – that is, ‘Eule’ – meaning it became an orange word. It’s so weird. But I still wrote ‘Oile’ a lot, because that’s the only way it made sense for me. As a learning aid, I eventually was given the word ‘Eule’ in colorful letters with the picture of an owl,” she says of the frustrating experience. “I was completely confused. Blue – which was the right color for me – was nowhere to be seen. They were different colors, and I thought they were wrong. There wasn’t even an orange – it just didn’t make sense to me any more: How was I supposed to learn an orange word with non-orange letters! To this day, writing ‘Eule’ goes against the grain for me.”

For synesthetes like Christiane, sounds can be accompanied by certain color synesthesia from a very early age. And when they learn to read and write, these are transferred to characters. But in Christiane’s case, the “E” – which for her evokes an orange word color – did not fit the spoken “O,” which elicits a blue word color (see picture on page 15).

Personal Colors and Sounds

For teaching reasons, the use of color-based learning games is popular in schools. For example, the alphabet is represented by color letters and pictures: “S” is a yellow letter based on the word “sun,” while “M” is shown as gray for the word “mouse.” Numbers, units of time, cases and grammatical structures like parts of speech – nouns, verbs, adjectives – are also assigned colors. With music learning games, shades of different colors are often aligned with sequences of notes, for example, for the 12 scales on the piano keyboard. But some synesthetes have their “own” colors for the sounds (see pictures). For Russian composer and synesthete Nikolai A. Rimsky-Korsakov, for example, C major was white, G major brownish-gold, F major green and F sharp major gray-green. French composer and synesthete Olivier Messiaen, on the other hand, saw G major as yellow, saying the following: “I don’t love it: Surely you’ve noticed there’s not much G major in my music.” He went on: “The key of A major is the most prominent one in my music, and it’s blue.”

Learning games undoubtedly make it easier for many children to understand; indeed some have won awards in the education sphere. But as Christiane’s example shows, these learning aids are unsuitable and confusing for some synesthetes. It can lead to a situation in which the learning effect fails to materialize because



1 Sounds can be accompanied by colors for synesthetes. The German word for owl, “Eule” is orange for synesthete Christiane. The way it is pronounced, “Oile,” is blue. 2 Color synesthesia of synesthete Sabine Heinze (excerpt). 3 Color mapping of a musical learning game. 4 If 9 (burgundy) + 2 (yellow) equal an orange 11, 6 (bright red) + 2 (yellow) must also equal something orange – and not a blue 8.

the default represents the synesthesia. Conversely, the question arises as to whether synesthetic colors come from learning games because in a number of examples the synesthetic colors of letters actually bear resemblance to the strikingly colorful letters found in childhood. Scientists finally examined the question systematically (Cognition 98, 2005) by comparing the letter/color combinations of Australian alphabet school books from the year 1900 until 1989 to the synesthetic letter colors of 150 synesthetes born between 1914 and 1986. Regrettably, the results do not provide any clear evidence of a connection.

German Is Green

For many synesthetes, their additional sensory experiences flow into the learning process. This can make learning more difficult, but can also make it easier. Thus learning by heart and orthography are easy for many people with color synesthesia. They use their additional perceptions and sensations as aids to learning and memory, memorizing the correct way to write words using the color pattern of the letters.

But if synesthesia can occur in response to sounds that you hear, learning foreign languages may be difficult if the same sound has different ways of being written. One example is the “o” sound in French, which can be written as “au,” “eau,” and also “ot.” On the other hand, learning foreign languages can sometimes be easier, if languages have certain dominant colors – spoken German, for example, is green – that synesthetes can intuitively identify with. Using color focal points, they notice where terms do not agree, or identify more easily with the intonation because they only need to get the shade right. Synesthesia can also be advantageous for Latin lessons: If the same endings invoke the same colors, they are easy to group, thus facilitating the understanding of sentences.

But difficulties sometimes occur when it comes to performing mathematical calculations. This may be due to the fact that synesthetes “count by color”: If 9 (burgundy) + 2 (yellow) result in an orange 11, 6 (bright red) + 2 (yellow) must also make something orange – and not a bright blue 8. Algebra can be difficult, because numbers are combined with letters. Mix-ups may arise if letters and numbers invoke similar color synesthesia. However, some synesthetes also use their individual colors as an additional memory key, enabling them to memorize complex formulas and numeric series more easily. For example, Richard Feynman, the American Nobel Prize winner for physics, reveals: “I always see the letters in equations as colors – why, I don’t know. During my treatises, vague images of

the Bessel functions ... with a yellow-brown ‘j,’ light blueish/purple ‘n,’ and dark brown ‘x,’ dance in front of my eyes, – and I ask myself how the hell they might appear to students.” Synesthesia is additional attributes, and may be helpful because these offer further opportunities for orientation and assist learning. Since people generally grasp the visual more easily and quickly, visual synesthesia is often especially helpful. But disadvantages occur if synesthetic attributes conflict with non-synesthetic ones, or no longer fit with new meanings.

Apart from that, there are some synesthetes whose additional sensory experiences do not interplay with the learning process. Learning systems that enable children to assign colors to the learning content themselves, instead of fixed color parameters, would be desirable. Children gifted with synesthesia could use their “own” colors, and possible learning barriers due to “incorrect” colors could be avoided. Looking further afield, learning patterns should in general offer the opportunity for children to play an active role in shaping them. The fact is, other forms of synesthesia can also conflict with learning systems. <



Synesthesia: A Common Thread Through Life? (Synesthesia. Roter Faden durchs Leben?)

by Alexandra Dittmar, Die Blaue Eule, Essen 2007. ISBN 978-3-89924-197-6

Alexandra Dittmar (born in 1961) studied ethnology, philosophy and social psychology, gaining a doctorate in ethnology. She is co-founder of the German Synesthesia Society. In her book, she

begins by summarizing the most recent findings about synesthesia. After an introduction to the subject of orientation, she sets out the core theme: For many synesthetes, synesthesia is about orientation. This concept is illustrated by quotes and 21 documents. For example, synesthesia constitutes the “common thread” in relation to decisions, but also in terms of gauging one’s own state of health. The book develops awareness of the orientating potential afforded by synesthesia, which can be at once a strength and a weakness. Currently, the book is only available in German, however, an English version is in preparation.