

Notes from the vivid world of synesthesia

My friend Charles won't admit he has synesthesia. When I bring it up, he says very firmly that he doesn't want to discuss it.

Once I tricked him. We were listening to some music, and I said casually, "I love that French horn; the sound is completely pink."

Without thinking, he replied, "It's not. It's golden brown."

I pounced. "Aha!" I said, "You see, you do have synesthesia!" But he got angry and refused to talk about it.

Synesthesia, you remember, is the condition in which a person who is experiencing a sensation from one of the senses automatically experiences a sensation based in another sense. This capability is enjoyed by perhaps one in 25,000 people. It is a permanent enrichment of the senses — different senses for different synesthetes.

For my friend Charles, the unique sounds of different musical instruments come both to his ear and to his eye, giving each musical experience a double whammy. He experiences a French horn all the more vividly because he sees that warm color before his eyes at the same time he hears the sound. Now imagine: If the sound of a single French horn is golden brown, how does Charles experience a symphony? Perhaps it is like a rich tapestry that changes continually.

Dr. Richard Cytowic of Washington, D.C., is the world's expert on synesthesia. His two books, the scholarly "Synesthesia" and the popular "The Man Who Tasted Shapes," explain clearly what is known and what is unknown about this unusual condition.

Cytowic says that, in the brain, synesthesia is a "cross-modal association" (modes are experiences like hearing, seeing, smelling, and sensing the movements of one's body). Perhaps babies are total synesthetes, but as they grow older they separate some sensory modes into the traditional five senses. A lucky few, however, continue to have simultaneous experiences of sensory modes that most of us think of as separate.

Different synesthetes experience different combinations of sensory modes. Novelist Vladimir Nabokov wrote: "I present a fine case of colored

hearing. Perhaps 'hearing' is not quite accurate, since the color sensation seems to be produced by the very act of my orally forming a given letter while I imagine its outline. The long *a* of the English alphabet . . . has for me the tint of weathered wood, but a French *a* evokes polished ebony."

In fact, cross-modal associations, of which synesthesia is one type, are very common. We describe these associations as synesthesia if they are unusual but we hardly notice them if they are ordinary. Think of the eye-body coordination needed to ride a bicycle. Separate analyses of sight and physical control cannot explain riding a bicycle. The most useful approach is to treat sight and physical control as aspects of a single nervous-system activity. In some respects, we are all cross-modal associators.

Vivid memories

Synesthetes have very good memories. The reason seems to be that experiences are more vivid when reinforced by a second sense. As you know, you can help yourself remember a thing by concentrating on the context and the feeling you had when you first encountered it. For synesthetes, a whole second dimension of a memory adds richness and brightness to the recall.

A. R. Luria studied a man he called "S," whose synesthesia included all senses and who had nearly perfect recall. Mr. S said, "I recognize a word not only by the images it evokes but by a whole complex of feelings that image arouses. It's hard to express . . . it's not a matter of vision or hearing but some over-all sense I get. Usually I experience a word's taste and weight, and I don't have to make an effort to remember it — the word seems to recall itself. But it's difficult to describe. What I sense is something oily slipping through my hand . . . or I'm aware of a slight tickling in my left hand caused by a mass of tiny, lightweight points. When that happens, I simply remember, without having to make the attempt."

Brain scientists like Cytowic cannot yet explain how the brain connects up different senses to produce simultaneous experiences. Perhaps cross-modal association is a single brain process, or perhaps there are parallel processes that are interconnected in some complex way. However the brain does it, the subjective

feeling is of a single experience, vivid and memorable.

Is synesthesia like language?

I said before that eye-body coordination is a cross-modal association that all normal people have. The next question — no doubt you saw it coming — is whether language processing is another cross-modal association that all people have. I think it is, and I think a comparison of language processing with synesthesia is a valuable exercise.

In a previous column (March 6) I described language processing as the simultaneous occurrence of meaning and speech in the mind/brain. I used the word “syndesis” to emphasize that the processing is a binding together of the two aspects of language. Now let us consider the ways in which language processing is similar to and different from synesthesia.

In both synesthesia and the mental processing of one’s first language, different modalities are processed together as a single experience. Both synesthesia and language ability are ordained at birth and, except for unusual changes to the brain, cannot be learned or forgotten. In both, the simultaneous experiences are largely automatic and strike the possessor as real and valid. In both, the experiences are memorable, although the memory of synesthetic experiences is generally more vivid than that for language.

Differences between synesthesia and language processing have to do with the range of experiences and with learnability.

Synesthetic experiences are relatively few, simple, and invariant — and pack a wallop because of their vividness. Language experiences can be like that, but they can also be more varied, detailed, and consciously manipulated. So-called “higher” areas of the brain such as the left cortical hemisphere appear to be involved in language more than they are in synesthesia, although the difference is one of degree, not of category.

Synesthetes say that synesthesia is not learned at all, nor forgotten, either: it is simply there from the time of their earliest memory. Language is learnable, but in different degrees depending on age. Babies and young children learn languages very quickly. Their language experiences may be as vivid as synesthetic ones, and are imprinted rapidly on their memories. In the brain, the growth of neuronal connections is 1,000 times

faster in infants than in adults.

Gradually, as children become teenagers, they lose the ability to learn languages as readily as before. Facing new languages, they can no longer form vivid and automatic associations of sound and meaning. Their first languages become almost as automatic as synesthetic experiences, and crowd into consciousness, blocking other processing, as synesthetic images sometimes do. A new language strikes them as unnatural and frustrating.

I think it is instructive to study synesthesia for the insights it can give us into language processing. Of course synesthesia is not the same as language processing, but to the extent it is similar, studying it will help us rethink some of our basic assumptions about first- and second-language learning.

This series of columns is an attempt to reconcile the views of language teachers, theorists, and bureaucrats. Readers are invited to send letters to The Daily Yomiuri or e-mail to (mrchilds@tokai.or.jp).

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