Spectrophotometers help people and entities communicate color information around the world. Image Source: Unsplash user Andrew Neel

Distinguishing colors is perhaps one of the most fundamental human activities. We use color to organize, understand, and describe objects every day of our lives in both conscious and subconscious ways. The greyed meat warns us of spoilage. The orange pill tells us to take it in the daytime. The red leaves tell us fall has arrived. The green light tells us it's safe to go. We wear our teams' color to show our allegiance, we tell visitors that our house is the white one on the left, we dress ourselves in black to demonstrate our mourning.

But while colors are often regarded as facts – red is red, right? – the way we come to name and differentiate between colors is in fact a deeply cultural process. This variability of color identification across languages and cultures presents considerable difficulties in an increasingly globalized economy in which color information must be communicated throughout global supply chains. As such, industries are increasingly turning to numerical color classification systems based on instrumental color analysis to facilitate color communication.

The Invention of Color

The language of color can at first glance appear to a process of *description* rather than *invention*; we are simply assigning names to pre-existing hues. Paul Kay, a researcher at the University of California, Berkeley, believes differently; he suggests that language itself impacts the way we perceive color. His research reveals that babies in pre-verbal stages use the right hemisphere of their brains to process color. As language is introduced, this processing switches to the right side of the brain, which also processes language. "The obvious conclusion is that language is constraining color perception," he says.[1]

In order to better understand how the brain is activated to distinguish between colors, he then turned to brain imaging technology. "When easily named colors appeared (red, blue, green), the areas of subject brains dedicated to word retrieval were shown to be more active than when they were shown more complicated colors (pinkish-purple, greenish-blue)."[2] In other words, our perception of color is deeply tied to the availability of language for that color. Of course, this is not the first time this has been suggested; the impact of language on color perception has been the subject of fascinating research for years; Jules Davidoff's experiment with the Himba tribe in particular confirmed that "without a word for a color, without a way of identifying it as different, it is much harder to notice what is unique about it."[3] Other research has demonstrated the learning color terms increases both color memory and divergence perception, reiterating that color categorization is a social process that invents how colors are seen and understood.[4]

People struggle to describe cool colors efficiently while they have an easier time with warm colors. Image Source: Pexels user Alexander Tiupa

The Impetus for Language-Building

While each language of color, and thus its perception, varies across cultures, the development of color languages share a remarkably similar pattern. In a study published earlier this year, researchers Ted Gibson and Bevil R. Conway found that in every language "people can convey the warm colors—reds, oranges and yellows—more efficiently than the cool colors—blues and greens."[5] So what accounts for this phenomenon? Gibson and Conway believe that the answer lies in the fact that objects tend to be warm-colored while backgrounds tend to be cool-colored and we focus language-building on things we want to talk about.

When you think about it, this doesn't seem to be surprising. Backgrounds are sky, water, grass, tress: all cool-colored. The objects that we want to talk about are warm-colored: people, animals, berries, fruits and so on.

This theory also helps explain why industrialization spurs the development of color language; with more objects of interest, we need more terms to precisely describe those objects. In other words, the assignation of language to color becomes more useful.

Spectrophotometers provide a universal language for communicating color across global supply chains. Image Source: Unsplash user Štefan Štefančík

Spectrophotometers Allow for Universality

In many ways, color language is inherently unstable, **driven by cultural norms** and evolving needs. As such, human color perception can never be objective, as each person's experience of color may be different depending on cultural and linguistic as well as environmental and biological factors. Additionally, color language is by nature limited; it would be impossible to create a standardized language system that would allow us to describe the millions of colors visible to the human eye. Unless, of course, you use a spectrophotometer.

Spectrophotometers are essential tools across industries and are employed in the production of everything from pharmaceuticals to cars, building materials to edible goods. Designed after the human eye but removed from the subjective forces that impact human color perception, spectrophotometers allow you to distill color information to objective numerical data. This color data can be used to communicate across languages, countries, and cultures, translate chromatic information into established industry-specific indices, and establish color standards to guide production around the world. While this is vital for ensuring color accuracy and consistency in any type of production, it becomes particularly so when color must be communicated and reproduced within increasingly complex global supply chains. The instant communication and continuous monitoring made possible by spectrophotometers mean that you can be assured of accurate, consistent color regardless of manufacturing location.

HunterLab Innovation

HunterLab has been a leader in spectrophotometric technologies for over 60 years. Today, we offer a comprehensive line-up of portable, benchtop, and in-line spectrophotometers designed to meet the diverse needs of our customers. Combined with our customizable software packages, our instruments allow you to gain the highest level of insight into color behavior while easily communicating and monitoring color data across the globe. Contact us to learn more about how HunterLab spectrophotometers can help you bring your production to the next level.

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