

By now, the subjective nature of color perception is well-known. Biological, cultural, and contextual factors combine to produce [variation in our assessments, experiences, and descriptions of chromatic information](#).

Research shows that even fleeting mood variations can impact our ability to distinguish between particular colors.¹ However, there is one color whose perception has been considered remarkably stable across viewers and cultures: yellow. While humans can see red, yellow, green, and blue as discrete colors free from other hues, the specific wavelengths at which people identify unique red, green, and blue vary. The wavelength of unique yellow, however, remains particularly constant across populations. A recent attempt to better understand this phenomenon revealed a new and unexpected source of perceptual variation.

The Effect of Natural Environments on Color Perception

In order to investigate the optical properties that give yellow its cross-cultural consistency, a team of researchers from the University of York invited 67 men and women to sit in a darkened room, acclimatize to the light, and then adjust a knob on a colorimeter until it reached unique yellow.² Identical tests were performed in January and in June. When the results were examined, the researchers found that the average colorimetric setting differed depending on the season. Lead researcher Lauren Welbourne said, "This is the first time natural changes in the environment have been shown to affect our perception of color." So what is responsible for these changes? Welbourne says that the shift in color perception is a way to compensate for environmental chromatic information. "In York, you typically have grey, dull winters and then in summer you have greenery everywhere. Our vision compensates for those changes and that, surprisingly, changes what we think yellow looks like. It's a bit like changing the color balance on your TV." Although the exact mechanism by which this happens remains unknown, it is likely that the cones in the retina vary in sensitivity and activation depending on ambient colors.³

Objective Color Measurement Across Industries

This groundbreaking study adds to the growing body of work demonstrating the value of spectrophotometric color measurement. In an increasingly global marketplace, the impetus on plastics, pharmaceutical, chemical, and textile manufacturers to move away from [subjective visual inspection](#) is greater than ever. Not only is sight-based chromatic evaluation open to individual interpretation, but Welbourne's findings indicate that geographic and climate-based differences further destabilize perception. Spectrophotometers offer an objective, repeatable way to measure chromatic information independent of the subjective human gaze. By combining advanced analytical technologies with stable viewing environments free from the interference of ambient color, you can be assured of precise and accurate color measurement. When that accuracy must be replicated across multiple venues, [hitch standardization](#) allows for the harmonization of multiple spectrophotometers to ensure consistency between instruments both within and between locations, providing unprecedented color integrity throughout global supply chains.

Full article with photos available here:

<https://www.hunterlab.com/blog/color-measurement-2/evaluating-seasonal-effects-on-color-perception-and-the-implications-for-color-measurement/>