

Anamitra Roy¹, Aesha Lahiri¹, Srijaya Nandi¹, Aayush Manchalwar^{1,2}, Siddharth S^{1,3},
Abishek J V R¹, Indira Bulhan¹, Shouvanik Sengupta^{1,4}, Sandeep Kumar¹, Tushnim
Chakravarty^{1,5}, Anindita Bhadra^{1*}

Affiliations:

- 1) Department of Biological Sciences, Indian Institute of Science Education & Research (IISER) Kolkata, Mohanpur, Nadia, West Bengal, India. PIN: 741246
- 2) Indian Institute of Science Education & Research (IISER) Pune, Dr. Homi Bhabha Road, Pune, Maharashtra, India. PIN: 411008
- 3) School of Biological Sciences, National Institute of Science Education and Research (NISER) Bhubaneswar, Jatni, Khurda, Odisha, India. PIN: 752050
- 4) National Institute of Biomedical Genomics (NIBMG), Kalyani, West Bengal, India. PIN: 741251
- 5) Department of Environmental Science, University of Calcutta, Kolkata, West Bengal, India. PIN: 700019

*Corresponding author: Anindita Bhadra (abhadra@iiserkol.ac.in)

Measuring the absorbance spectra of the paints used in the experiment

Aim:

We wanted to make sure that the paints we used, especially the yellow and the blue paint, were very different in hue.

Methods:

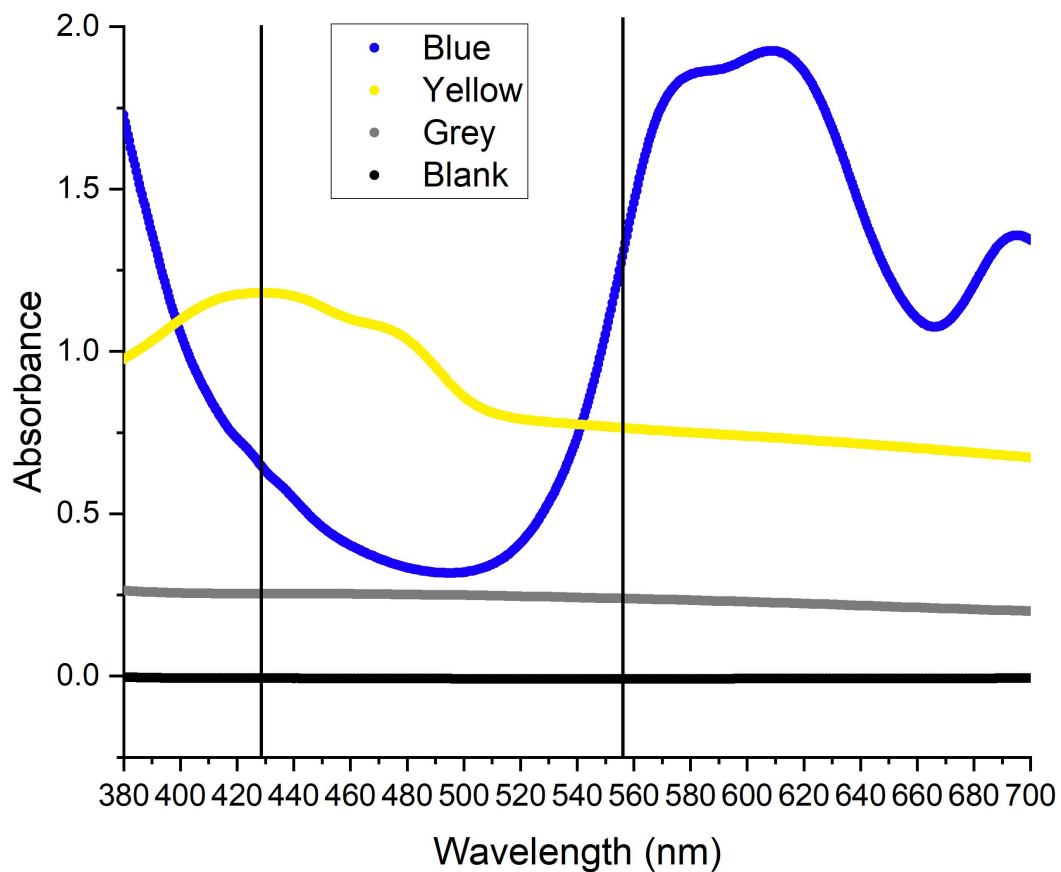
Using a micropipette, we measured 100 microliters of the paint to make a 1 ml stock solution in distilled water. We diluted this stock solution 100x and measured the absorbance spectra of the same in a UV-Vis spectrophotometer using a plastic cuvette. Before measuring any paint, we measured a blank sample of only distilled water.

Limitations:

The paints were quite viscous and stuck to the plastic pipette tips. As a result, the amount of paint in the final solution could have been different for different colors. However, such differences would only affect the absorbance values, but not the nature of the spectral curve or the location of the spectral peaks. We are not concerned with the brightness of the colors, and only hue information is enough. Thus, this limitation should not affect our inferences.

The spectra that the dogs saw from the painted bowls were reflectance spectra, but we were unable to measure that due to technical limitations. Thus, we used the absorbance spectra in aqueous medium as an indicator of the reflectance. The yellow paint should absorb more in the blue region, while the blue paint should absorb more in the yellow region.

Results:



Discussion:

The black vertical lines in the images correspond to the wavelengths of peak cone cell activity of dogs. Quite evidently the yellow absorbance peak matches near perfectly with short wavelength cone peak. The blue absorbance peak does not match with the long wavelength cone peak, but it is farther away from the short wavelength cone peak, and thus should result in high hue contrast.

Conclusion:

The chosen colors are of contrasting hues to the dogs and should allow us to test for their preference among the hues that they can see.