

## Unique hues in the near peripheral retina; matching vs naming.

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### ABSTRACT

It is known that there is a distortion of hue and saturation in the peripheral visual field. However, some hues appear to be unchanged with eccentricity. When an asymmetric matching paradigm was used, four hues in the blue, red, yellow and green regions of colour space were unchanged and these were referred to as invariant (Parry *et al*, 2006, JOSA, 23, 7, 1586-97). Three of these invariant hues were similar to unique blue, red and yellow. However, for most observers there was a marked difference between unique and invariant green. To investigate this, we have measured unique hues using a range of eccentricities and saturations.

An asymmetric matching and a 4AFC paradigm were used to establish invariant and unique hues, respectively. The task for the first procedure was to match in colour a peripheral spot with a para-foveal spot, for 24 different hues at 3 saturation levels and two eccentricities (18° and 10°). In the 4AFC paradigm, 21 hues were presented 20 times at three saturations and three eccentricities (18°, 10° and 1°). The observer had to name the hues as red, blue, green or yellow.

All invariant and unique hues were found to be constant with eccentricity and saturation. The unique green and yellow, established with 4AFC, was found to differ from the invariant green and yellow, determined using the matching task. However, red and blue invariant hues correspond well with unique hues. The data suggest that different mechanisms mediate the matching of green and yellow compared with the identification of unique hues. This is similar to the difference between detection and discrimination of spectral stimuli: the detection process is dominated by the cone opponent mechanisms and is most sensitive, whereas discrimination is influenced by more central processes (Mullen K. & Kulikowski J.J, 1990, JOSA, 7, 4, 733-42).