**High resolution of colour vision, but low contrast sensitivity in a diurnal raptor**

**Supplementary material**

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**Supplementary Figure S2.** All psychometric functions of the birds in experiment 1

**Supplementary Table S1.** Michelson contrasts between the red and green bars of the chromatic gratings used in experiment 2

**Please see the Excel file Potier\_et\_al\_** **spatial\_vision Harris\_ supp\_mat for all spectral reflectance curves**



**Supplementary Figure S1.** Transmittance of ocular media and oil droplets (A), absorbance of visual pigments (B), sensitivity of cones (C) used for modelling, and the spectra of the green and red bars of the colour gratings (D). The relative sensitivity of cones (C, violet -VS, blue - SWS, green - MWS, red - LWS and dashed black - double cones) is a function of the transmittance of the ocular media (A, black solid line) and oil droplets (A, blue – oil droplet in SWS cones, green - MWS, red - LWS, dashed black – double cones (P)) and the absorbance of the respective visual pigments (B, violet - sws1, blue - sws2, green - rh2, red - lws). Note that we used a wide range of potential oil droplet absorbance for the P droplet present in the double cone, because it is unknown whether raptors potentially have paler P droplets in parts of the retina. For the entire range, the achromatic contrast between the red and green colour used in the gratings is below the achromatic contrast threshold of the Harris’s hawk. Data used in A-C from Lind et al. (2013).



**Supplementary Figure S2.** Psychometric functions from the contrast threshold experiment of Harris’s hawks A and B with all spatial frequencies. Each circle represents 40 choices made by one bird. Vertical lines are threshold values interpolated from logistic functions that were fitted to the data.

**Supplementary Table S1.** Michelson contrasts for all cone types (single cones VS, SWS, MWS and LWS; double cones DC, minimum and maximum model assumption; see main text for details), between the red and green bars of the chromatic gratings used in experiment 2. Michelson contrast is calculated as the ratio between the difference and the sum of the two stimulus colours. The slight differences between the two screens are not disturbing the experiment as the stimulus position was chosen in a pseudo-random order.

|  |  |  |
| --- | --- | --- |
|  | Contrast between red and green bar | |
|  | Screen 1 | Screen 2 |
| VS | 0.020 | 0.096 |
| SWS | 0.645 | 0.680 |
| MWS | 0.745 | 0.749 |
| LWS | 0.706 | 0.725 |
| DC min | 0.030 | 0.027 |
| DC max | 0.086 | 0.084 |

**Supplementary Reference**

Lind O., Mitkus M., Olsson P., Kelber A. 2013 Ultraviolet sensitivity and colour vision in raptor foraging. *J Exp Biol* **216**(10), 1819-1826.