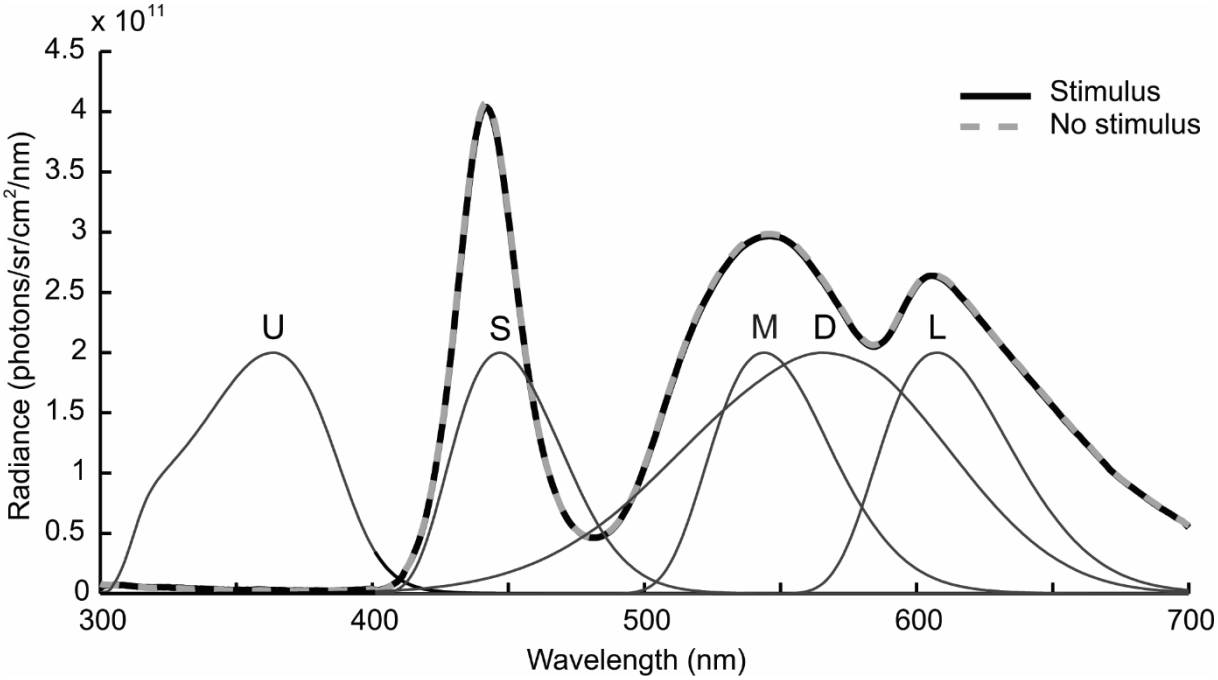

Figure S1. Spectral output of the modified LCD. The curves show the radiance between 300 nm and 700 nm. Black solid line: spectral curve from screen with a polarization stimulus displayed; grey dashed line: spectral curve from screen without polarization stimulus. Thin grey lines show the sensitivity (arbitrary units) of zebra finch cone photoreceptors (U, ultraviolet-sensitive; S, short wavelength-sensitive; M, medium wavelength-sensitive; L, long wavelength-sensitive; D, double cone). Virtually no spectral differences between the "polarization stimulus" and the "no stimulus" state of the screen were measured (the two lines show a nearly perfect overlap). Thus, no spectral secondary cues are available for the birds during the experiments with polarization stimuli. Since the values from the spectral outputs of the two modified screens used during the study were nearly identical, we present here the spectral data for only one of the screens. The sensitivity of zebra finch cone receptors was modelled using absorbance data of the visual pigment, oil droplet (Bowmaker et al., 1997), and ocular media (Lind et al., 2014) together with model templates (Govardovskii et al., 2001; Hart and Vorobyev, 2005) as described in Lind et al., (Lind et al., 2013).

Figure S2. Colour and brightness contrast stimuli (visible stimuli). The 20 different stimuli were presented to the birds in random order on the full screen (level 1) or on the lower half of the screen (levels 1.1, 2 and 3). The widest stimuli covered the entire width of the screen, creating a maximum horizontal viewing angle of about 10°. Stimuli covering the whole vertical length of the screen created a maximum vertical viewing angle of about 24°. The relative sizes of the stimuli are drawn to scale.

Supplementary references

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Table S1. Individual test statistics from the test level.

Bird	Category	N	Observed proportion	Test proportion	Exact significance (1-tailed)
699	Wrong choice	78	0.49		
	Correct choice	82	0.51	0.50	0.41
	Total	160			
766	Wrong choice	55	0.42		
	Correct choice	75	0.58	0.50	0.05
	Total	130			
772	Wrong choice	61	0.44		
	Correct choice	79	0.56	0.50	0.08
	Total	140			
865	Wrong choice	72	0.48		
	Correct choice	78	0.52	0.50	0.34
	Total	150			
869	Wrong choice	55	0.47		
	Correct choice	62	0.53	0.50	0.29
	Total	117			
896	Wrong choice	74	0.46		
	Correct choice	86	0.54	0.50	0.19
	Total	160			
965	Wrong choice	72	0.51		
	Correct choice	68	0.49	0.50	0.40
	Total	140			

For each bird, the test statistics from the test level of the binomial tests are given.