SUPPLEMENTAL MATERIALS (Includes 1 table, 3 figures, and a legend for Supplementary Data File 1)

Table S1. *Haptosquilla trispinosa* individual trained choice test results. Did not participate (DNP): Individual assessed the target but made no choice. P-values are calculated with an exact binomial test ($P_0 = 0.5$, $\alpha = 0.05$, two-tailed; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$). Summed values are given for the full experiments in grey rows above each cohort of individuals.

experiment	I # sex	correct	incorrect	DNP	trials	choices	% correct	% participation	p-value	
UVA vs. UVB (Cohort 1)		**105**	**18**	**74**	**197**	**123**	**85.4**	**62.4**		
	1M	5	0	20	25	5	100.0	20.0	0.0625	
	2F	24	8	1	33	32	75.0	97.0	0.0070	**
	3F	3	0	11	14	3	100.0	21.4	0.2500	
	4F	23	0	10	33	23	100.0	69.7	2.384E-07	***
	5F	24	3	6	33	27	88.9	81.8	4.923E-05	***
	6F	20	6	7	33	26	76.9	78.8	0.0094	**
	7M	6	1	19	26	7	85.7	26.9	0.1250	
UVB vs. UVA (Cohort 2)		**34**	**18**	**141**	**193**	**52**	**65.4**	**26.9**		
	8M	1	0	11	12	1	100.0	8.3	1.000	
	9M	0	1	7	8	1	0.0	12.5	1.000	
	10F	14	11	6	31	25	56.0	80.6	0.6900	
	11M	4	4	16	24	8	50.0	33.3	1.000	
	12F	7	0	24	31	7	100.0	22.6	0.0156	*
	13F	4	1	19	24	5	80.0	20.8	0.3750	
	14M	0	1	14	15	1	0.0	6.7	1.000	
	15M	3	0	22	25	3	100.0	12.0	0.2500	
	16F	1	0	22	23	1	100.0	4.3	1.000	
UVB vs. dark (Cohort 3)		**38**	**48**	**95**	**181**	**86**	**44.2**	**47.5**		
	17F	7	14	6	27	21	33.3	77.8	0.1892	
	18M	1	2	5	8	3	33.3	37.5	1.000	
	19M	0	1	17	18	1	0.0	5.6	1.000	
	20F	7	2	10	19	9	77.8	47.4	0.1797	
	21M	5	3	21	29	8	62.5	27.6	0.7266	
	22F	8	5	10	23	13	61.5	56.5	0.5811	
	23M	2	5	22	29	7	28.6	24.1	0.4531	
	24F	8	16	4	28	24	33.3	85.7	0.1516	
Dark vs UVB (Cohort 4)		**79**	**54**	**149**	**282**	**133**	**59.4**	**47.2**		
	25M	8	6	16	30	14	57.1	46.7	0.7905	
	26F	4	6	20	30	10	40.0	33.3	0.7539	
	27M	3	5	14	22	8	37.5	36.4	0.7266	
	28F	15	1	14	30	16	93.8	53.3	5.188E-04	***
	29M	9	4	15	28	13	69.2	46.4	0.2668	
	30M	4	1	18	23	5	80.0	21.7	0.3750	
	31M	10	9	12	31	19	52.6	61.3	1.000	
	32F	15	11	5	31	26	57.7	83.9	0.5572	
	33M	3	3	24	30	6	50.0	20.0	1.000	
	34F	8	8	11	27	16	50.0	59.3	1.000	
UVA vs. UVA (Cohort 1)		**26 (L)**	**27 (R)**	**3**	**56**	**53**	**49.1**	**94.6**		
	1M	0	1	0	1	1	0.0	100.0	1.000	
	2F	3	7	0	10	10	30.0	100.0	0.3438	
	3F	5	3	2	10	8	62.5	80.0	0.7266	
	4F	2	8	0	10	10	20.0	100.0	0.1094	
	5F	9	0	1	10	9	100.0	90.0	3.906E-03	**
	6F	3	7	0	10	10	30.0	100.0	0.3438	
	24F	4	1	0	5	5	80.0	100.0	0.375	
UVA vs. UVA-351 (Cohort 1)		**113**	**61**	**72**	**246**	**174**	**64.9**	**70.7**		
	1M	20	9	3	32	29	69.0	90.6	0.0614	
	2F	24	8	0	32	32	75.0	100.0	0.0070	**
	3F	7	8	14	29	15	46.7	51.7	1.000	
	4F	12	2	18	32	14	85.7	43.8	0.0129	*
	5F	14	12	6	32	26	53.8	81.3	0.8450	
	6F	8	6	14	28	14	57.1	50.0	0.7905	
	24F	20	11	1	32	31	64.5	96.9	0.1496	
	7M	8	5	16	29	13	61.5	44.8	0.5811	

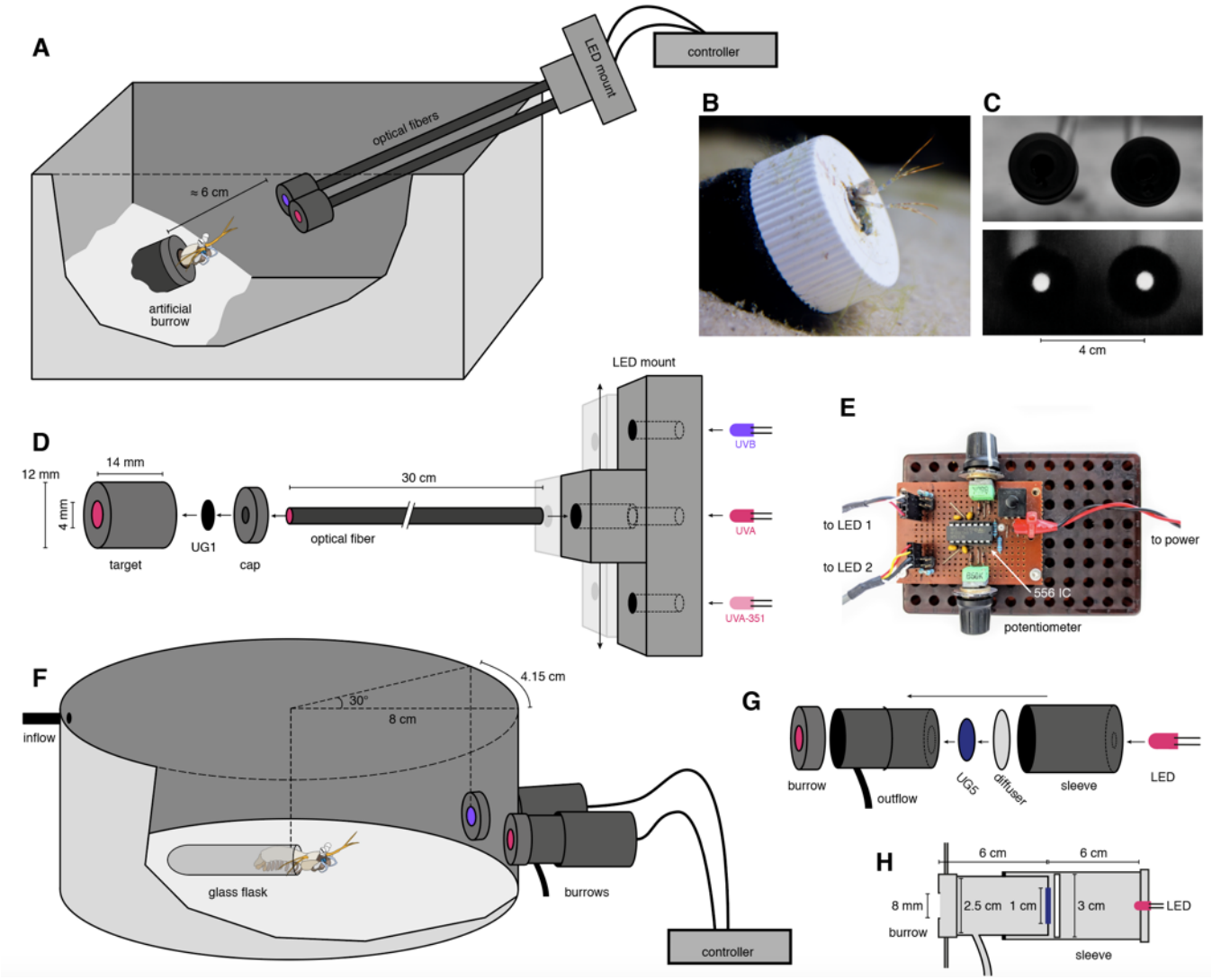

Figure S1. Experimental setup diagrams for trained choice experiments (A-D), the LED controller (E), and the burrow preference arena (F-H). (**A**) A simplified diagram of the trained choice behavioural setup. **(B)** A *Haptosquilla trispinosa* individual in its artificial burrow. This individual is extending its head and antennae from the burrow to "assess" a target. (**C**) A pair of choice targets, both emitting UVA stimuli photographed at human-visible wavelengths (top) and in the UV (bottom). (**D**) A schematic of the predatory choice training and testing apparatus. The LEDs used to generate the stimuli were: UVB (#UVTOP310-HL-TO39; Roithner LaserTechnik, Vienna, Austria), UVA (#LED380L, Thorlabs Inc, New Jersey, USA), and UVA-351 (FoxUV 350 nm LED 5mm, #FG350-R5; The Fox Group, Virginia, USA). The light from the LEDs travelled down a 30-cm-long, 3-mm-diameter optical fibre (Edmund Optics, New Jersey, USA; #53-833 Optical Grade PMMA) and passed through a UG1 (Schott AG, Mainz, Germany; 1 mm thickness) bandpass filter in the target. (**E**) The custom controller used to modulate LED intensity in both the trained choice and burrow preference experiments making use of a NE556N integrated circuit (Texas Instruments, Texas, USA). (**F**) A diagram of the burrow preference experimental arena. (**G-H**) Schematic diagrams of the artificial burrows and the stimuli generating LEDs and optics. The stimuli were generated using the same UVTOP310-HL and LED380L LEDs from above to produce the UVA and UVB stimuli. The light from the LEDs passed through a diffuser (Thorlabs, New Jersey, USA; #DGUV10-1500 UVFS Ground Glass Diffuser, Ø1.0", 1500 GRIT) and UG5 bandpass filter (Schott AG, Mainz, Germany; 1 mm thickness) before emerging from the burrows.

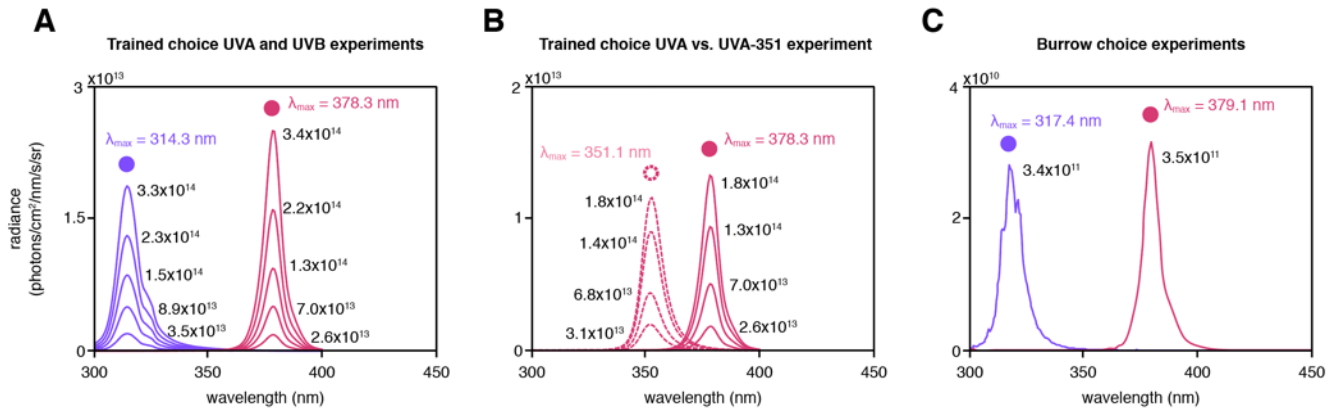

Figure S2. Intensity in photon radiance for each stimulus used in the trained choice (A, B) and innate burrow preference (C) behavioural experiments. The wavelength of maximum emission (λ_{max}) is indicated for each stimulus type, and the peak of each curve is labelled indicating that stimuli's total photon radiance. The radiance for the stimuli in the trained choice experiments (A, B) were measured at a distance of 6 cm from the target, and the radiance of the innate burrow preference stimuli (C) were measured at the burrow entrance. See Figure S1 for details regarding the LEDs and optics used to generate each stimulus.

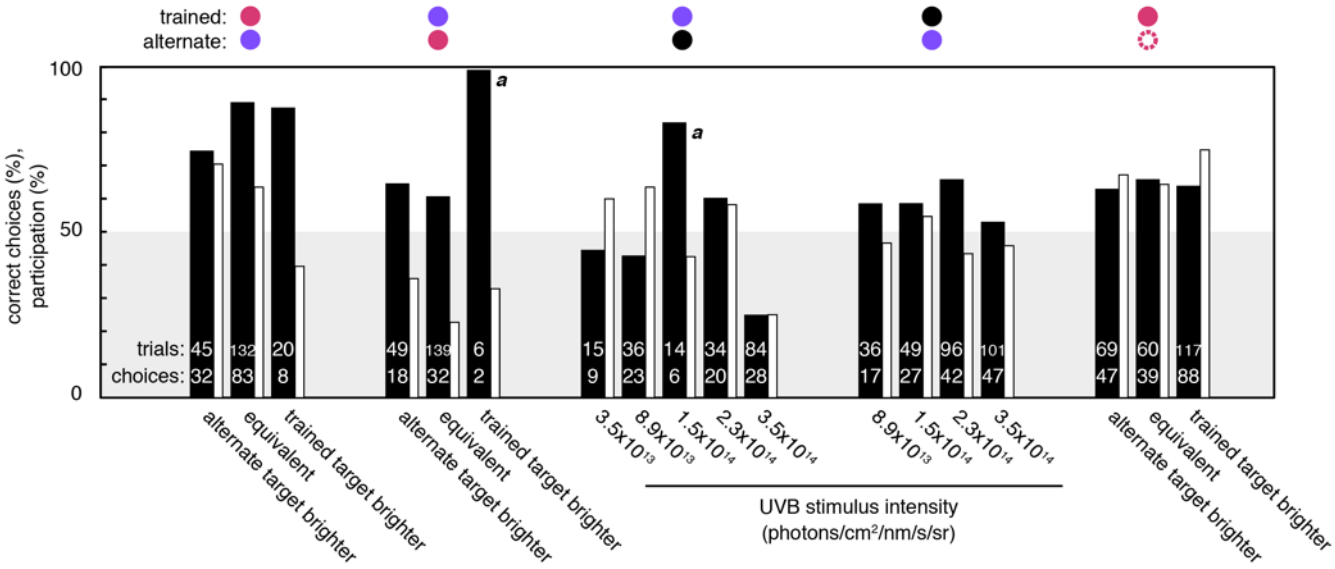

Figure S3. Brightness controls for each trained choice experiment shown in Figure 1F. Percent correct choices (black bars) and percent participation (white bars) are shown for each experiment, and numbers of trials and choice are overlaid with each black bar. In experiments where there were only the UVB stimulus was shown versus a dark target, the figure indicates various total photon radiance. No trends relating to intensity cues were apparent. Two outliers are labelled (*a*) and are the result of low numbers of choice made under the respective brightness condition. Symbols for choices are as in Figure S2A, B.

Supplementary Data File 1 (GLMMdata). The .TXT data file is a tab delimited text file containing the responses and stimulus conditions for all choices made in the trained choice tests. This data set was used to assess the effect of brightness on individual choices in each of the experiments using generalized linear mixed model (GLMM). Column 1 (ans.): 1, correct choice; 0, incorrect choice. Column 2 (ind#): The number designation of each individual used in the experiments. See Table S1. Column 3 (exp.) designates the experiment: 1, UVA vs. UVB; 2, UVB vs. UVA; 3, UVB vs. dark; 4, dark vs. UVB 5, UVA vs. UVA-351; 6, UVA vs. UVA control. Column 4 (bright) designates the relative brightness of the correct stimulus. For experiments 1, 2, 5, and 6: 1, alternate stimulus brighter; 2, correct and alternate stimulus equivalent; 3, correct stimulus brighter. For experiments 3 and 4, where only the correct stimulus was illuminated, the data references the intensity of the correct stimulus, with 5 being the maximum brightness setting.