

Fig. S1. Absolute irradiance spectra for 380 nm, 390 nm, 400 nm and 436 nm filtered lights used for butterfly behavior training and testing. Lights measured using an Ocean Optics USB2000 spectrometer and 100 μm -diameter fiber optic cable. (A) Irradiance for training 380 nm vs. 390 nm 1:1 or testing 380 nm vs. 390 nm 1:1. (B) Irradiance for testing 390 nm (+) vs. 380 nm (-) 1:15 or 380 nm (+) vs. 390 nm (-) 15:1. (C) Irradiance for testing 390 nm (-) vs. (380 nm) (-) 15:1 or 380 nm (+) vs. 390 nm (-) 1:15. (D) Irradiance for training 400 nm vs. 436 nm or testing 400 nm vs. 436 nm 1:1. (E) Irradiance for testing 400 nm (+) vs. 436 nm (-) 1:15 or 436 nm (+) vs. 400 nm (-) 15:1. (F) Irradiance for testing 400 nm (+) vs. 436 nm (-) 15:1 or 436 nm (+) vs. 400 nm (-) 1:15.

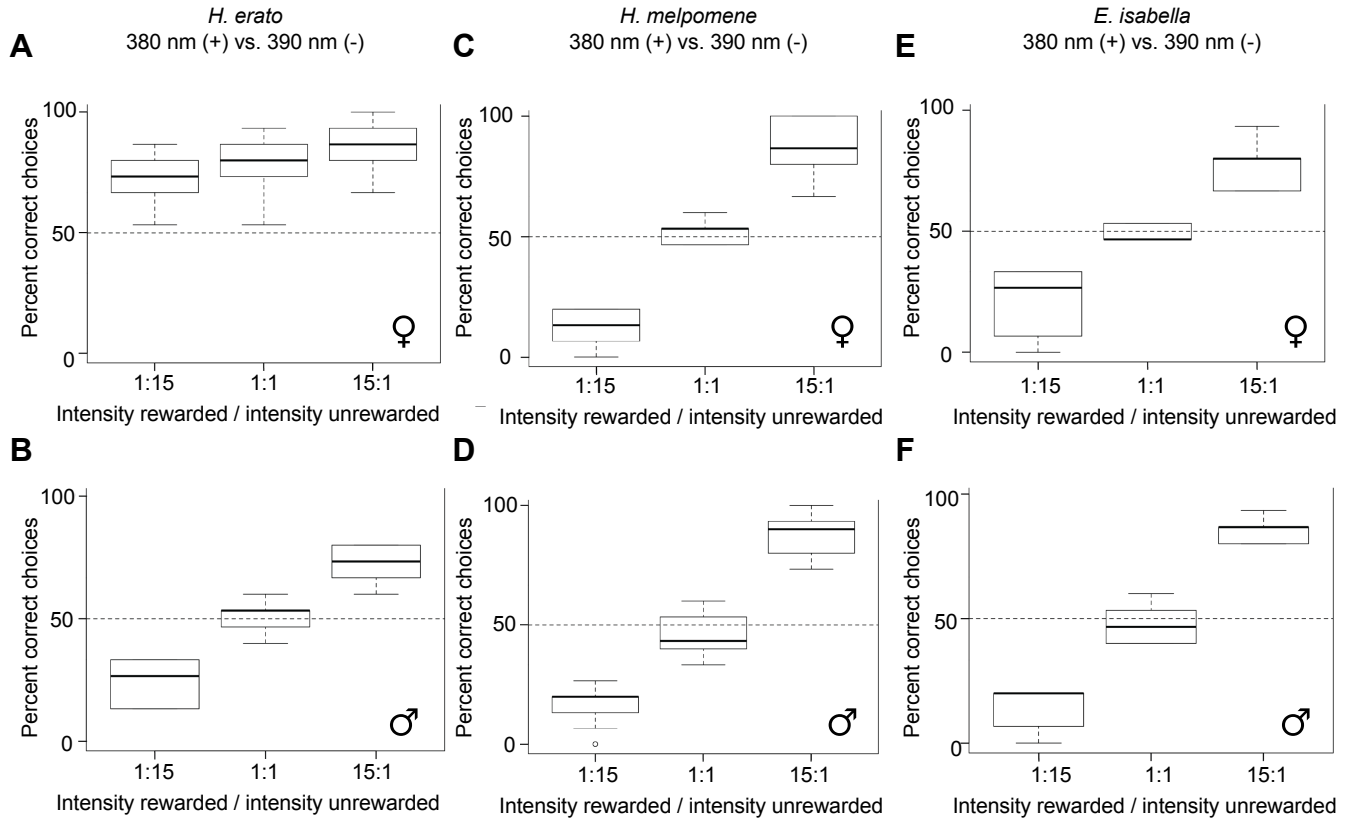


Fig. S2. Percent correct choices for the rewarded (+) wavelength of 380 nm by species and sex. *Heliconius erato* females (A) and males (B), *H. melpomene* females (C) and males (D), and *E. isabella* females (E) and males (F) when given a choice between 380 nm (+) and 390 nm (-) light under varying intensities. Spectra of the filtered lights under each of the intensity ratios are given in Fig. S1. For *H. erato* and *H. melpomene* N=10 and for *E. isabella* N=5 biological replicates per species and sex under which 15 choice trials were completed at each light intensity combination. Non-overlapping box plots indicate where P<0.01 from a general linear model calculated in R. Boxes represent upper and lower quartiles with median; whiskers indicate 25th and 75th percentiles

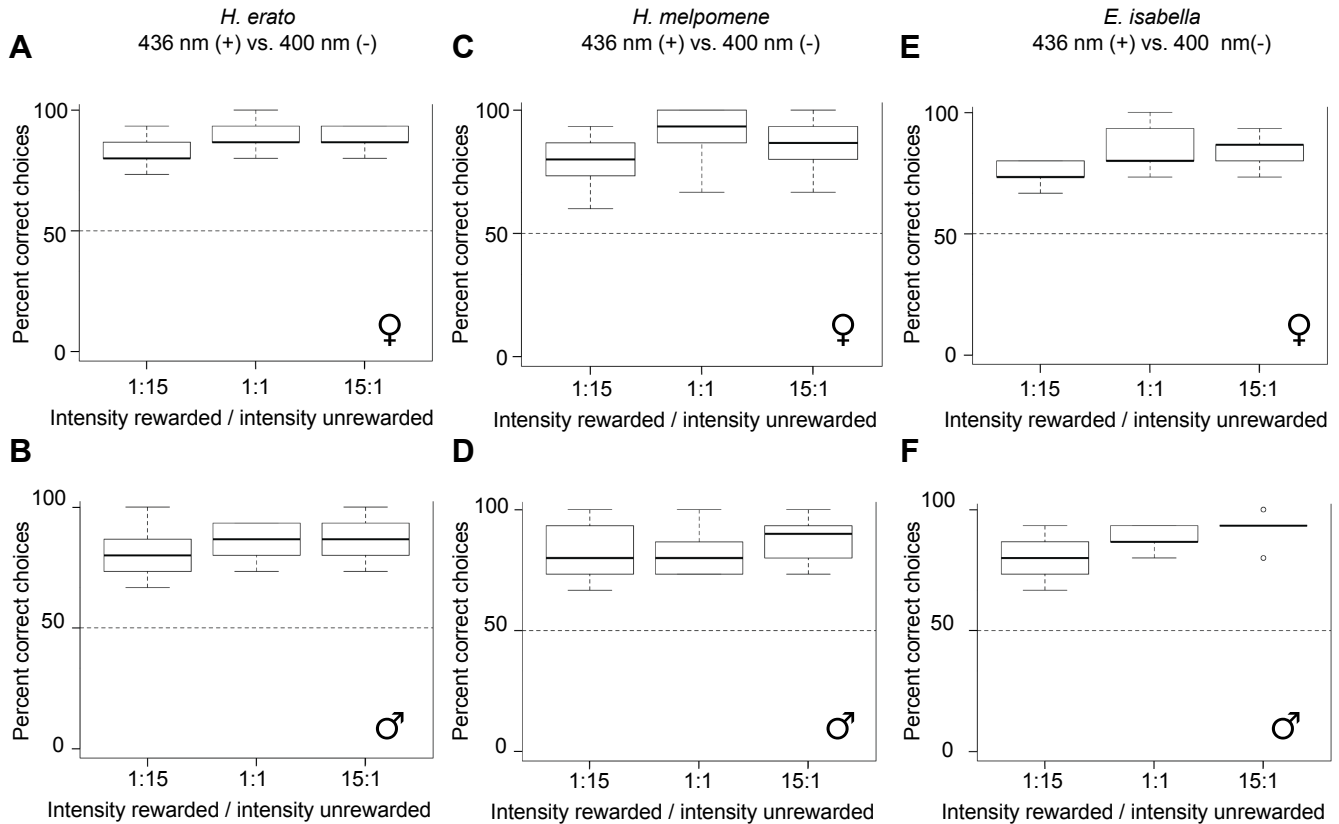
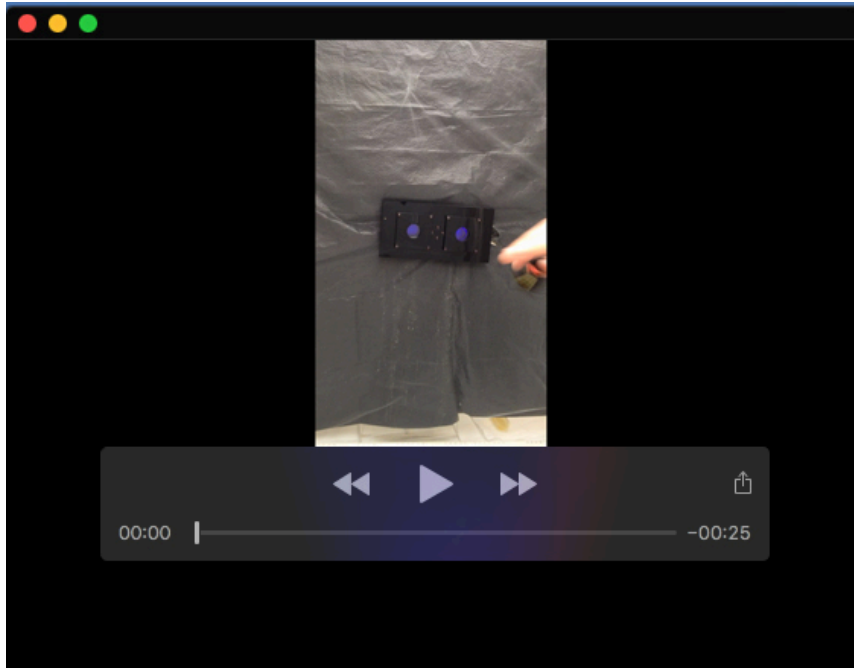


Fig. S3. Percent correct choices for the rewarded (+) wavelength of 436 nm by species and sex. *H. erato* females (A) and males (B), *H. melpomene* females (C) and males (D), and *Eueides isabella* females (E) and males (F) when given a choice between 436 nm (+) and 400 nm (-) light under varying intensities. Spectra of the filtered lights under each of the intensity ratios are given in Fig. S1. For *H. erato* and *H. melpomene* N=10 and for *E. isabella* N=5 biological replicates per species and sex under which 15 choice trials were completed at each light intensity combination. Non-overlapping box plots indicate where $P < 0.01$ from a general linear model calculated in R. Boxes represent upper and lower quartiles with median; whiskers indicate 25th and 75th percentiles.



Movie 1. Apparatus for training and experiments based on a design described in Zaccardi et al. (2006). It consists of two 2.5 cm diameter stimuli presented side-by-side, separated by 6 cm on two black platforms set on a larger black plate, measuring 20x10 cm.