

**Table S1. Dataset for daylight trials.** Detailed explanation of the dataset is below

Column	Description
hiveID	Hive used in the trial
colourCards	Shade of stimulus (B: black, G1: light grey, G3: dark grey)
cardSize	Size of stimulus in cm
moveDir	Orientation of stimulus motion (H: horizontal, V: vertical)
moveSec	Section of the frame where the trial was done (L: left, R: right)
bgColour	Shade of the background
trialTime	Date-time of the trial (yyyy-mm-dd HH:MM:SS)
trialID	Link to CSV file of ImageJ output
cumArea	Cumulative area of shimmering response for a trial
avgArea	Average area of shimmering response to one movement of the stimulus
Comments	

[Click here to download Table S1](#)

**Table S2. Dataset for twilight trials.** Detailed explanation of the dataset is below

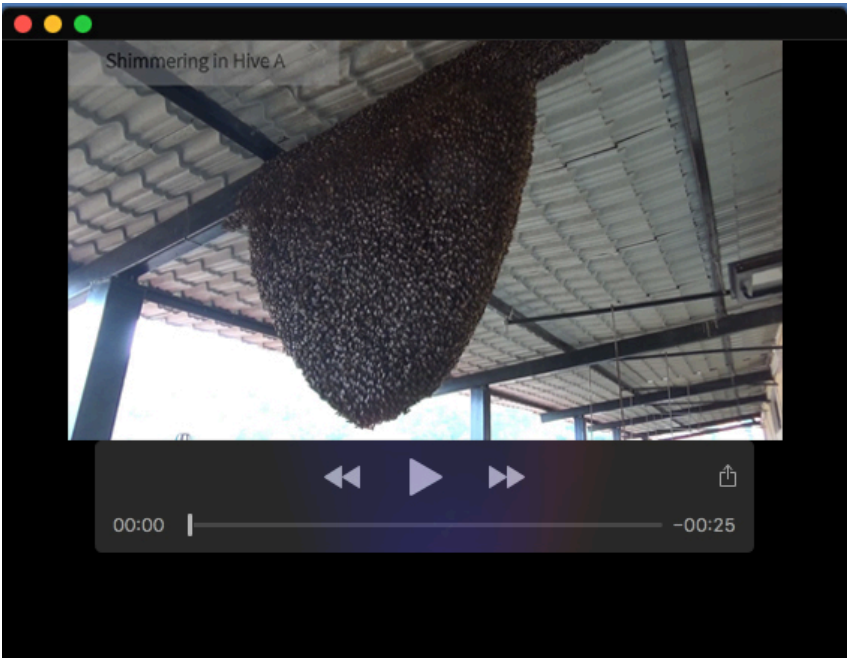
Column	Description
hiveID	Hive used in the trial
trialID	Link to CSV file of ImageJ output
cumArea	Cumulative area of shimmering response for a trial
avgArea	Average area of shimmering response to one movement of the stimulus
time	Time of the day when trial was carried out (HH:MM:SS)
date	Date when trial was conducted (yyyy-mm-dd)
category	Time period when trial was carried out
lightLevel	Illuminance (lux)

[Click here to download Table S2](#)

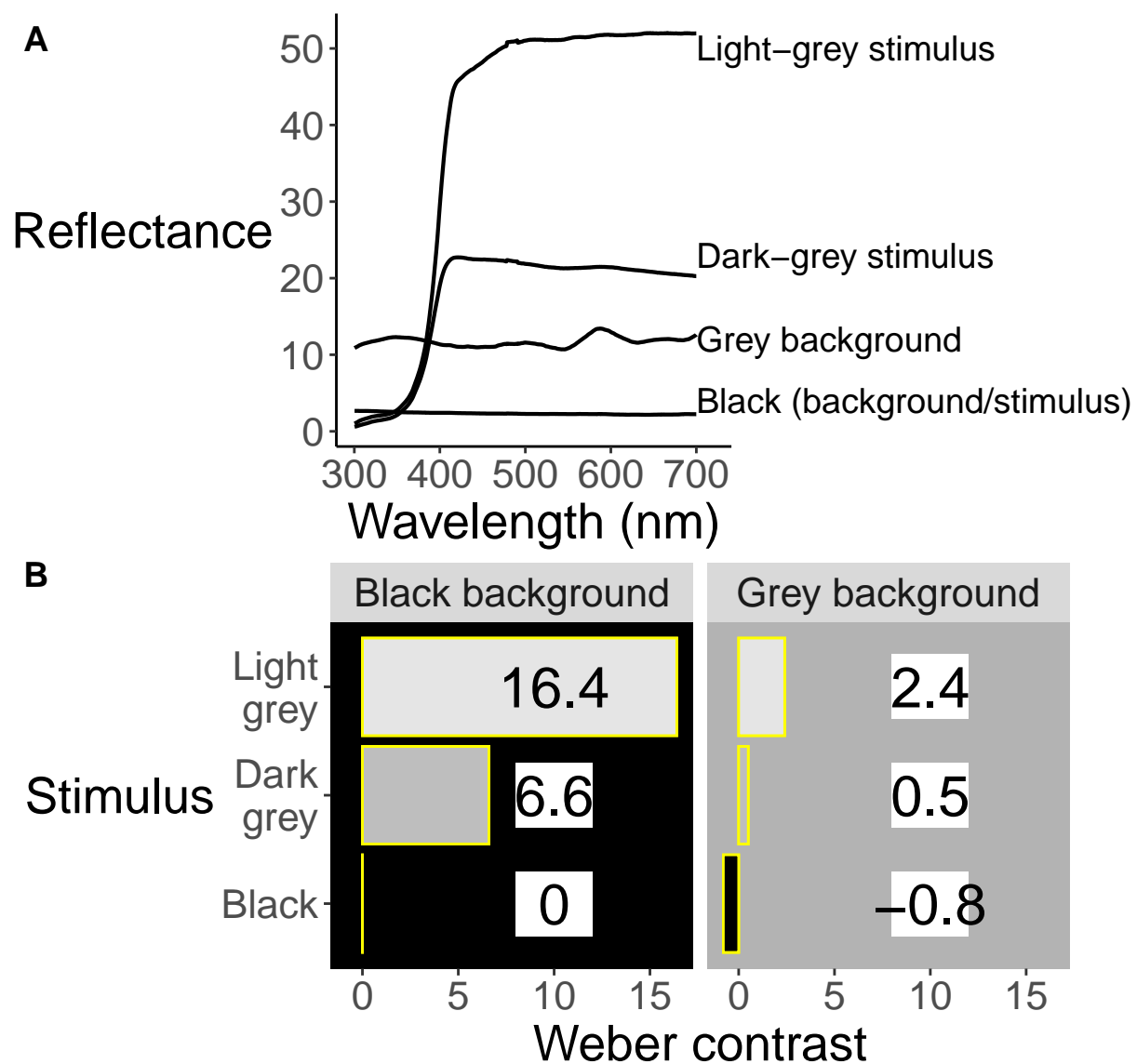
**Table S3. Dataset for reflectance spectra** Detailed explanation of the dataset is below

Column	Description
wavelength1	Wavelength at which reflectance is measured
reflectance1	Reflectance of the black stimuli and background
wavelength2	Wavelength at which reflectance is measured
reflectance2	Reflectance of the grey background
wavelength3	Wavelength at which reflectance is measured
reflectance3	Reflectance of the dark grey stimuli
wavelength4	Wavelength at which reflectance is measured
reflectance4	Reflectance of the light grey stimuli

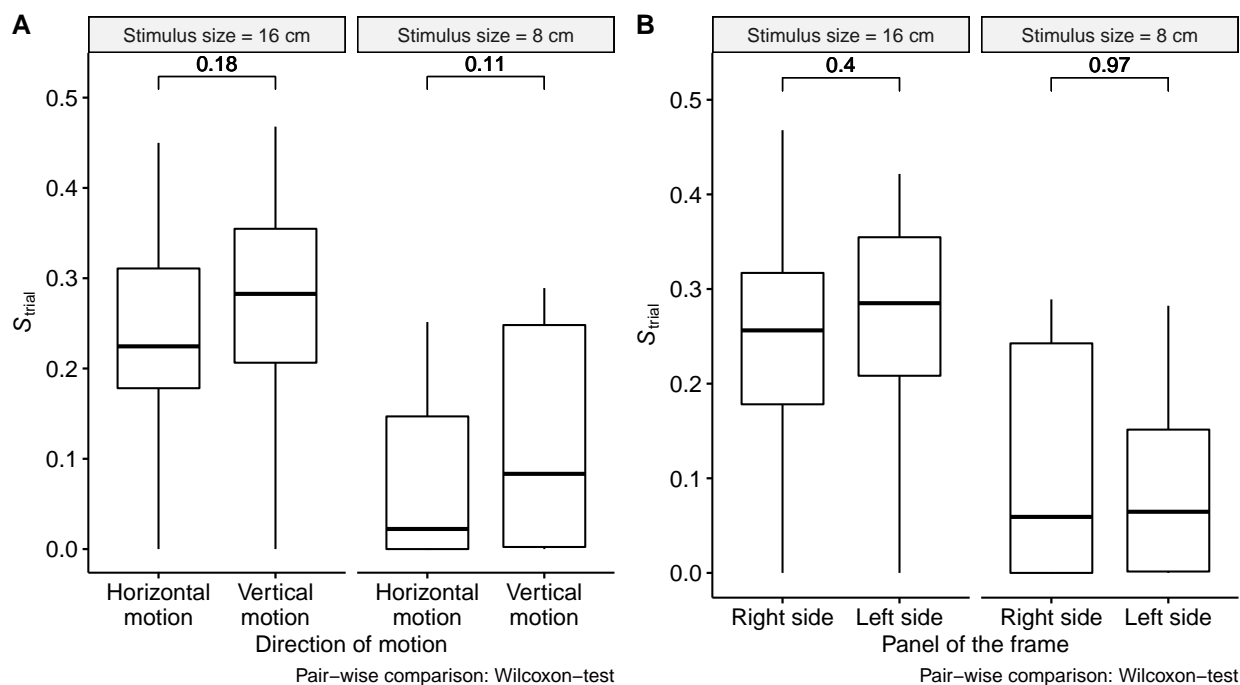
[Click here to download Table S3](#)



**Movie 1.** Representative instances of shimmering reponse in Hive A and Hive B.



**Fig. S1. Reflectance spectra and contrasts of stimuli.** A) The reflectance spectra of the stimuli and backgrounds were recorded using an Ocean Insight Ocean-HDX-UV-VIS spectrophotometer connected to an Ocean Optics PX-2 pulsed Xenon light-source. The spectra were captured to a PC (Acer One 110-ICT) running the Ocean View software and saved as a spreadsheet. B) The Weber contrasts of the stimuli against the grey or black backgrounds were calculated using the formula provided in the main text, adapted from O'Carroll & Wiederman 2014. The contrast values are written inside/beside the corresponding bars.



**Fig. S2. Effect of orientation of motion and side of the trial on shimmering response.** Pairwise comparison of shimmering responses between direction of motion (**A**)

and side of the panel (**B**).  $S_{\text{trial}}$  refers to the shimmering strength of each trial (refer to main text). The *numbers in boldface* correspond to the p-value of the comparison. There was no effect of direction of motion or side of panel for all stimuli sizes. Hence these two variables were excluded from the final model.

**Beta-regression modelling and comparison between models**

**Table S4. Comparison of the beta-regression models quantifying the shimmering response of black stimuli against grey background during bright light conditions**

	dAIC	Degrees of freedom	Model description
glm.4	0.000	29	Hierarchical, variable precision (stimulus size)
glm.5	1584.676	28	Hierarchical, variable precision (stimulus shade)
glm.2	2124.989	49	Hive identity as fixed effect
glm.1	2136.250	25	Pooled-data, single precision
glm.3	2138.109	26	Hierarchical, single precision
glm.0	2591.786	2	Pooled-data null model
glm.01	2593.786	3	Hierarchical null model

**Table S5. Beta-regression models comparing the shimmering response during daylight to that occurring in twilight**

	dAIC	Degrees of freedom	Model description
glm.6	0.00000	3	Pooled-data model
glm.7	2.00000	4	Hierarchical model
glm.02	88.15653	2	Pooled-data null model
glm.03	89.86991	3	Hierarchical null model

## Supplementary Materials and Methods

*This document was generated from the Supplementary Materials and Methods file. The details of the session and the packages used to generate this file are printed below*

### Session and packages info

```
## setting value
## version R version 4.1.3 (2022-03-10)
## os Fedora Linux 35 (Workstation Edition)
## system x86_64, linux-gnu
## ui X11
## language en_GB
## collate en_IN.UTF-8
## ctype en_IN.UTF-8
## tz Asia/Kolkata
## date 2022-07-28
## pandoc 2.14.0.3 @ /usr/libexec/rstudio/bin/pandoc/ (via rmarkdown)

## package ondiskversion
## bbmle bbmle 1.0.25
## boot boot 1.3.28
## cowplot cowplot 1.1.1
## dplyr dplyr 1.0.7
## emmeans emmeans 1.7.1.1
## EnvStats EnvStats 2.7.0
## ggpattern ggpattern 0.4.3.3
## ggplot2 ggplot2 3.3.6
## ggpubr ggpubr 0.4.0
## glmmTMB glmmTMB 1.1.2.3
## latex2exp latex2exp 0.5.0
## lsmeans lsmeans 2.30.0
## lubridate lubridate 1.8.0
## stringr stringr 1.4.0
## tidyr tidyr 1.1.4
##
## source
## bbmle CRAN (R 4.1.3)
## boot CRAN (R 4.1.3)
## cowplot CRAN (R 4.1.2)
## dplyr CRAN (R 4.1.1)
## emmeans CRAN (R 4.1.2)
## EnvStats CRAN (R 4.1.3)
## ggpattern Github (coolbutuseless/ggpattern@1f46c8bc0c547cdbc3cc051e81e94625a1e0f1a6)
## ggplot2 CRAN (R 4.1.3)
## ggpubr CRAN (R 4.1.2)
## glmmTMB CRAN (R 4.1.2)
## latex2exp CRAN (R 4.1.2)
## lsmeans CRAN (R 4.1.3)
## lubridate CRAN (R 4.1.2)
## stringr CRAN (R 4.1.2)
## tidyr CRAN (R 4.1.1)
```

*The last section of the Supplementary Materials and Methods (sajesh\_etal\_2022\_rev\_ESM.Rmd) contains the code for Figs. 2-4 in the main text. The plots can be generated by changing the value of the `include` argument in the corresponding code-chunk to `TRUE`*