Statistical analysis

Notes: The variables have the same name as the headings in each of the columns in the Data.xlsx file. Treatment is wind speed but reordered so that the still air condition is used as the contrast. Each sheet in the Data file is data from each experiment, with DataExpt1 being the data imported from the data sheet entitled ‘Experiment 1’ etc. There are two extra columns in the data sheet Experiment 1 and these are the calculations for the average maximum optic flow experienced in the lateral visual field (LOF) and ventral visual field (VOF). For details of how this was calculated, please see the Methods section of the paper.

**> mE1Speed <- lme(fixed = Ground\_speed\_mean\_mms~Treatment, random = ~1|BeeID, data = DataExpt1)**

**> summary(mE1Speed)**

Linear mixed-effects model fit by REML

Data: DataExpt1

AIC BIC logLik

1375.957 1386.866 -683.9783

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 35.7633 94.38547

Fixed effects: Ground\_speed\_mean\_mms ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 379.9453 22.924927 100 16.573459 0.0000

Treatment -11.7310 6.279254 100 -1.868222 **0.0647**

Correlation:

(Intr)

Treatment -0.806

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-1.6252088 -0.6732915 -0.1448451 0.4873853 4.5531033

Number of Observations: 115

Number of Groups: 14

**> mE1Height <- lme(fixed = Ground\_height\_mean\_mm~Treatment, random = ~1|BeeID, data = DataExpt1)**

**> summary(mE1Height)**

Linear mixed-effects model fit by REML

Data: DataExpt1

AIC BIC logLik

1141.879 1152.789 -566.9396

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 16.55243 32.90235

Fixed effects: Ground\_height\_mean\_mm ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 88.82214 8.565538 100 10.369710 0e+00

Treatment 9.30624 2.198421 100 4.233149 **1e-04**

Correlation:

(Intr)

Treatment -0.755

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-2.4981462 -0.3621031 0.1573942 0.6058252 1.8975173

Number of Observations: 115

Number of Groups: 14

**> mE2Speed <- lme(fixed = Ground\_speed\_mean\_mms~Treatment, random = ~1|BeeID, data = DataExpt2)**

**> summary(mE2Speed)**

Linear mixed-effects model fit by REML

Data: DataExpt2

AIC BIC logLik

1646.861 1657.977 -819.4304

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 49.10839 222.3901

Fixed effects: Ground\_speed\_mean\_mms ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 1549.7711 51.39893 99 30.151818 0.0000

Treatment 26.8902 14.66897 99 1.833135 **0.0698**

Correlation:

(Intr)

Treatment -0.887

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-3.49210309 -0.58185030 0.01548201 0.64898600 1.83503846

Number of Observations: 121

Number of Groups: 21

**> mE2Height <- lme(fixed = Ground\_height\_mean\_mm~Treatment, random = ~1|BeeID, data = DataExpt2)**

**> summary(mE2Height)**

Linear mixed-effects model fit by REML

Data: DataExpt2

AIC BIC logLik

1163.298 1174.415 -577.6491

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 17.39716 27.14347

Fixed effects: Ground\_height\_mean\_mm ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 54.68331 7.628706 99 7.168098 0e+00

Treatment 6.48452 1.860381 99 3.485588 **7e-04**

Correlation:

(Intr)

Treatment -0.777

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-2.68822996 -0.56490192 0.03164196 0.62457850 1.84166697

Number of Observations: 121

Number of Groups: 21

**> mE3Speed <- lme(fixed = Ground\_speed\_mean\_mms~Treatment, random = ~1|BeeID, data = DataExpt3)**

**> summary(mE3Speed)**

Linear mixed-effects model fit by REML

Data: DataExpt3

AIC BIC logLik

1245.109 1255.725 -618.5546

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 38.15774 78.52453

Fixed effects: Ground\_speed\_mean\_mms ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 350.0431 21.590183 91 16.21307 0.0000

Treatment -13.6311 5.750701 91 -2.37033 **0.0199**

Correlation:

(Intr)

Treatment -0.801

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-1.6235222 -0.6640669 -0.1186796 0.4364867 3.2943624

Number of Observations: 107

Number of Groups: 15

**> mE3Height <- lme(fixed = Ground\_height\_mean\_mm~Treatment, random = ~1|BeeID, data = DataExpt3)**

**> summary(mE3Height)**

Linear mixed-effects model fit by REML

Data: DataExpt3

AIC BIC logLik

1050.773 1061.388 -521.3863

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 32.84065 28.5949

Fixed effects: Ground\_height\_mean\_mm ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 88.54156 11.145775 91 7.943957 0.0000

Treatment 5.71144 2.159362 91 2.644966 **0.0096**

Correlation:

(Intr)

Treatment -0.578

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-2.43344614 -0.47462865 0.05248549 0.66059233 2.21634393

Number of Observations: 107

Number of Groups: 15

**> mE4Speed <- lme(fixed = Ground\_speed\_mean\_mms~Treatment, random = ~1|BeeID, data = DataExpt4)**

**> summary(mE4Speed)**

Linear mixed-effects model fit by REML

Data: DataExpt4

AIC BIC logLik

1773.35 1784.727 -882.6752

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 109.6361 226.5375

Fixed effects: Ground\_speed\_mean\_mms ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 335.7879 54.58717 105 6.151408 0

Treatment 166.0753 14.64187 105 11.342494 **0**

Correlation:

(Intr)

Treatment -0.814

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-2.50384461 -0.54875768 0.04718909 0.73687095 1.76173333

Number of Observations: 129

Number of Groups: 23

**> mE4Height <- lme(fixed = Ground\_height\_mean\_mm~Treatment, random = ~1|BeeID, data = DataExpt4)**

**> summary(mE4Height)**

Linear mixed-effects model fit by REML

Data: DataExpt4

AIC BIC logLik

1308.012 1319.389 -650.0061

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 17.10807 36.35545

Fixed effects: Ground\_height\_mean\_mm ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 65.28546 8.709622 105 7.495786 0.0000

Treatment 1.79495 2.347279 105 0.764692 **0.4462**

Correlation:

(Intr)

Treatment -0.818

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-1.91206210 -0.81566004 -0.05558901 0.77871840 2.12336637

Number of Observations: 129

Number of Groups: 23

**> mE1LOF <- lme(fixed = Lateral\_OF\_degs~Treatment, random = ~1|BeeID, data = DataExpt1)**

**> summary(mE1LOF)**

Linear mixed-effects model fit by REML

Data: DataExpt1

AIC BIC logLik

1239.061 1249.97 -615.5304

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 19.5151 51.5037

Fixed effects: Lateral\_OF\_degs ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 207.32633 12.509539 100 16.573459 0.0000

Treatment -6.40132 3.426426 100 -1.868222 **0.0647**

Correlation:

(Intr)

Treatment -0.806

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-1.6252088 -0.6732915 -0.1448451 0.4873853 4.5531033

Number of Observations: 115

Number of Groups: 14

**> mE1VOF <- lme(fixed = Ventral\_OF\_degs~Treatment, random = ~1|BeeID, data = DataExpt1)**

**> summary(mE1VOF)**

Linear mixed-effects model fit by REML

Data: DataExpt1

AIC BIC logLik

1620.121 1631.031 -806.0606

Random effects:

Formula: ~1 | BeeID

(Intercept) Residual

StdDev: 94.05557 279.826

Fixed effects: Ventral\_OF\_degs ~ Treatment

Value Std.Error DF t-value p-value

(Intercept) 350.2743 66.47646 100 5.269147 0.0000

Treatment -40.2582 18.58077 100 -2.166660 **0.0326**

Correlation:

(Intr)

Treatment -0.823

Standardized Within-Group Residuals:

Min Q1 Med Q3 Max

-1.22242991 -0.41326890 -0.12063340 0.06942226 7.56624361

Number of Observations: 115

Number of Groups: 14