

AnalyseData

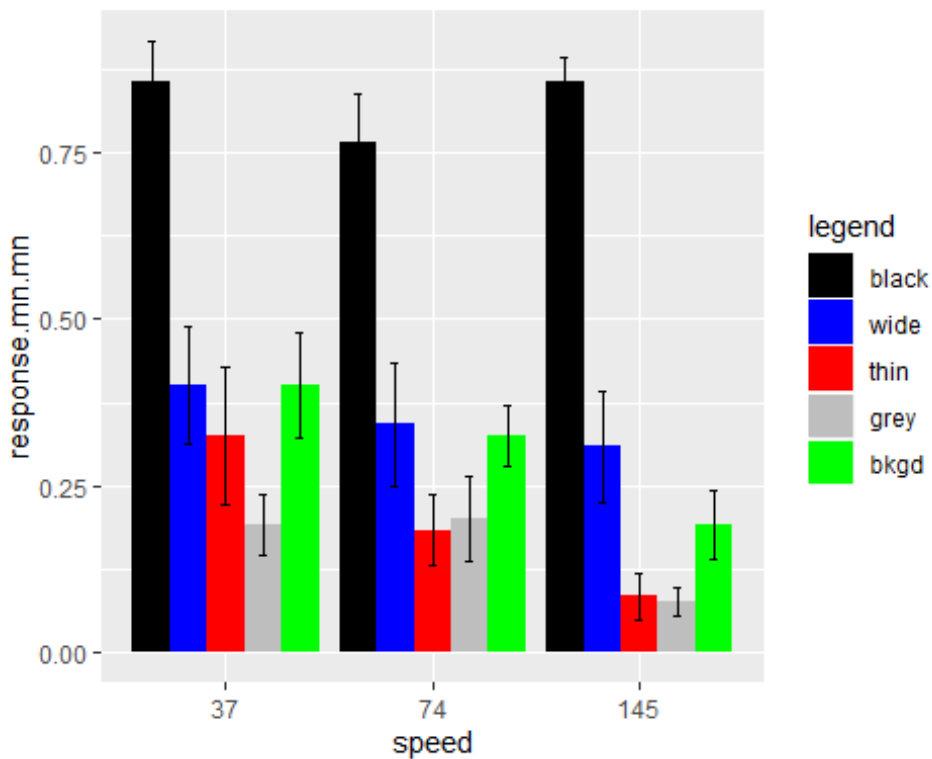
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Statistical analysis - using 12 sessions

This version uses live-coded responses only, including “saccades”, “tracks” and “strikes” but not “peering”.

```
datafile = "CodedData3.xlsx"
```



Analysing all data together with categorical speed

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
## Approximation) [glmerMod]
## Family: binomial ( logit )
## Formula: response ~ bug * speed + (1 | individual)
## Data: alldata
## Control: glmerControl(optimizer = "bobyqa")
##
##      AIC      BIC  logLik deviance df.resid
## 1645.9 1733.9  -807.0  1613.9    1784
##
```

```

## Scaled residuals:
##      Min       1Q   Median       3Q      Max
## -6.1426 -0.5071 -0.2501  0.5260  7.5569
##
## Random effects:
## Groups      Name                Variance Std.Dev.
## individual (Intercept) 1.146      1.07
## Number of obs: 1800, groups: individual, 12
##
## Fixed effects:
##              Estimate Std. Error z value Pr(>|z|)
## (Intercept)    2.167e+00  4.184e-01   5.181 2.21e-07 ***
## bugwide        -2.662e+00  3.535e-01  -7.532 5.00e-14 ***
## bugthin        -3.070e+00  3.602e-01  -8.524 < 2e-16 ***
## buggrey        -3.932e+00  3.855e-01 -10.200 < 2e-16 ***
## bugbkgd        -2.662e+00  3.535e-01  -7.532 5.00e-14 ***
## speed74        -7.021e-01  3.638e-01  -1.930 0.053591 .
## speed145       -9.976e-06  3.930e-01   0.000 0.999980
## bugwide:speed74  3.880e-01  4.712e-01   0.823 0.410323
## bugthin:speed74 -2.248e-01  4.952e-01  -0.454 0.649778
## buggrey:speed74  7.649e-01  5.075e-01   1.507 0.131787
## bugbkgd:speed74  2.943e-01  4.723e-01   0.623 0.533146
## bugwide:speed145 -5.036e-01  4.965e-01  -1.014 0.310482
## bugthin:speed145 -1.950e+00  5.675e-01  -3.436 0.000591 ***
## buggrey:speed145 -1.212e+00  5.900e-01  -2.054 0.040010 *
## bugbkgd:speed145 -1.270e+00  5.124e-01  -2.479 0.013172 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

##
## Correlation matrix not shown by default, as p = 15 > 12.
## Use print(x, correlation=TRUE) or
##      vcov(x)          if you need it

```

Initially, we fit all 15 conditions together with a generalized linear mixed model with a logistic link function. This had one random effect (the individual mantis) and two categorical fixed effects: one with five levels indicating bug type (black, wide-striped, narrow-striped, grey or background-matching) and one with three levels indicating speed (slow, medium, fast). This indicated a significant interaction of speed and pattern (df=8, chisq=26.3120857, p=0.0009286).

We then fitted a similar model for each bug-type individually. This indicated that speed had no significant effect for black (df=2, chisq=5.546, p=0.06248) or wide-striped bugs (df=2, chisq=3.322, p= 0.19). However, speed had a significant effect on grey (df=2, chisq=10.65, p=0.004877) and background-matching (df=2, chisq=14.87, p=0.000591) bugs, and a highly significant effect on thin-striped bugs (df=2, chisq=29.72, p=3.516e-07).

Pairwise comparisons between thin and wide striped bugs at each speed

We did pairwise comparisons between thin and wide striped bugs at each speed (logistic regression with one fixed-effect predictor, a categorical variable describing whether stripes are wide or narrow, plus individual as a random effect).

At the slow speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	251.8954	2.269577	0.1319359

At the medium speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	242.2305	10.49215	0.0011988

At the fast speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	221.0257	24.49381	7e-07

Pairwise comparisons between thin-striped and background-matching bugs at each speed

At the slow speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	259.1762	2.162395	0.1414241

At the medium speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	269.2598	6.954634	0.0083602

At the fast speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	186.3788	6.761664	0.0093137

Comparing narrow-striped and grey

At the slow speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	250.2329	7.006113	0.0081232

At the medium speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	220.0118	0.1268327	0.7217388

At the fast speed:

	Df	AIC	LRT	Pr(Chi)
bug	1	134.0318	0.0597492	0.8068928