In the corner of the eye: camouflaging motion in the peripheral visual field

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Smart et al. Supplementary Material

Table S1. Location error: model simplification steps, starting with a full model (five fixed effects and all possible interactions).

Step	Term removed	χ^2	df	p
1	Flash:Pattern:Screen:Duration:Speed	13.77	16	0.6161
2	Flash:Screen:Duration:Speed	3.36	8	0.9095
3	Flash:Pattern:Duration:Speed	11.05	16	0.8062
4	Flash:Pattern:Screen:Speed	4.59	8	0.8002
5	Flash:Pattern:Speed	1.68	8	0.9894
6	Flash:Pattern:Screen:Duration	7.66	8	0.4672
7	Flash:Screen:Duration	0.12	4	0.9983
8	Flash:Pattern:Screen	1.22	4	0.8749
9	Flash:Pattern:Duration	5.61	8	0.6913
10	Flash:Duration:Speed	9.62	8	0.2931
11	Flash:Duration	1.24	4	0.8723
12	Flash:Pattern	5.40	4	0.2484
13	Flash:Screen:Speed	6.30	4	0.1780
14	Flash:Screen	0.28	2	0.8697
15	Flash:Speed	2.63	4	0.6222
16	Pattern:Screen:Duration:Speed	11.53	8	0.1737
17	Pattern:Screen:Duration	0.89	4	0.9259
18	Pattern:Duration:Speed	5.16	8	0.7401
19	Screen:Duration:Speed	4.24	4	0.3746
20	Screen:Duration	1.33	2	0.5134
21	Pattern:Screen:Speed	8.85	4	0.0650
22	Screen:Speed	0.33	2	0.8489
23	Pattern:Screen	1.11	2	0.5741
24	Pattern:Speed	7.45	4	0.1139

The initial (saturated) model was ~ Flash*Pattern*Screen*Duration*Speed + (1 | Subject). Significance was assessed using likelihood ratio tests.

Analysis of response time

The final model contained a significant two-way interaction between duration and speed (χ^2 = 29.88, df = 4, p < 0.0001), and a three-way interaction between duration, pattern and the flash prior to the target moving (χ^2 = 21.74, df = 8, p = 0.0054) (Fig. S1; Table S2). To explore the nature of these interactions the data were split by duration, and models fitted with speed, pattern, flash and the two-way interaction between the latter two factors. For 100 ms movements, speed was not significant (χ^2 = 0.67, df = 2, p = 0.7150), but the pattern x flash interaction was (χ^2 = 26.14, df = 4, p < 0.0001). Analysing the flash conditions separately, with no flash, pattern was significant (χ^2 = 26.29, df = 2, p < 0.0001), with the mean luminance pattern having longer response times than black (z = 4.70, p < 0.0001) and background matching (z = 4.32, p < 0.0001), with the latter two treatments not differing (z = 0.40, p = 0.9170). However, when movement was preceded by a flash, there was no significant effect of pattern (50 ms: χ^2 = 2.75, df = 2, p = 0.2530; 80 ms: χ^2 = 0.16075, p = 0.9228).

For 200 ms movements, the pattern x flash interaction was not significant (χ^2 = 3.33, df = 4, p = 0.5039). So, removing this term and simplifying the model sequentially, neither pattern (χ^2 = 4.79, df = 2, p = 0.0914) or speed (χ^2 = 5.58, df = 2, p = 0.0613) were significant, but flash was (χ^2 = 35.03, df = 2, p < 0.0001), with response times longer for no flash than when a flash preceded movement (no flash vs 50 ms flash: z = 4.28, p < 0.0001; no flash vs 80 ms flash: z = 5.74, p < 0.0001; 50 ms vs 80 ms flash: z = 1.46, p = 0.3080).

For 400 ms movements, the pattern x flash interaction was not significant (χ^2 = 4.10, df = 4, p = 0.3927). So, removing this term and simplifying the model sequentially, neither pattern (χ^2 = 0.48, df = 2, p = 0.7865) or flash (χ^2 = 4.95, df = 2, p = 0. 0841) were significant, but speed was (χ^2 = 70.92, df = 2, p < 0.0001), with response times increasing with target speed (10 vs 20 deg/s: z = 3.565, p = 0.0011; 10 vs 35: z = 8.53, p < 0.0001; 20 vs 35: z = 4.98, p < 0.0001).

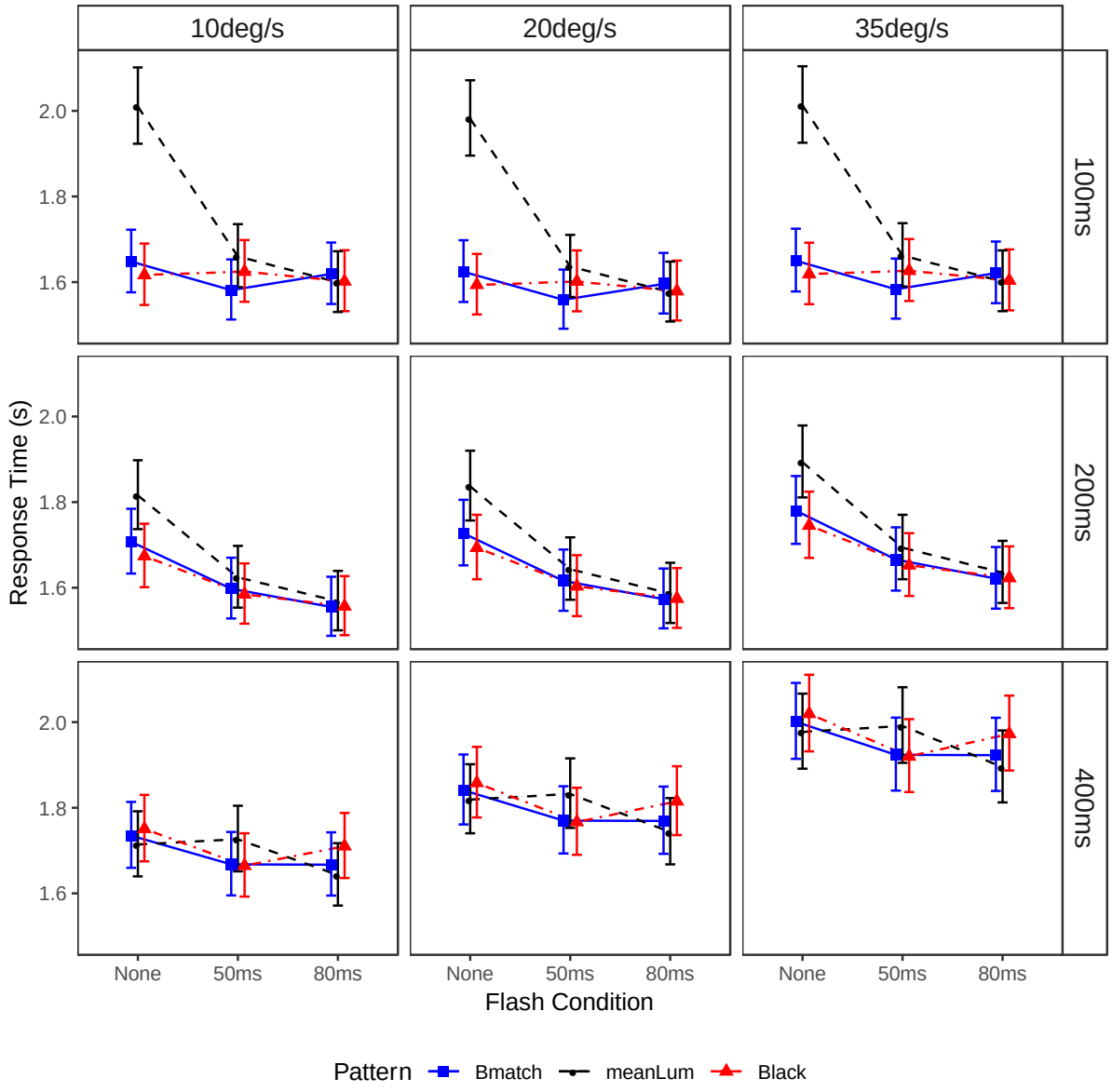

Figure S1 - The response time for participants trying to localise a moving object with different movement and patterning conditions, with 95% confidence intervals based on the fitted model (N=18 participants). Different combinations of movement and patterning conditions can be navigated via the panelling. The phenotype with the strongest effect has mean luminance, does not utilise a flash and has short and/or fast movements.

Table S2. Response time: model simplification steps, starting with a full model (five fixed effects and all possible interactions).

Step	Term removed	χ^2	df	p
1	Flash:Pattern:Screen:Duration:Speed	16.29	16	0.4333
2	Flash:Screen:Duration:Speed	2.26	8	0.9720
3	Pattern:Screen:Duration:dotShift	5.67	8	0.6846
4	Pattern:Screen:Duration	1.22	4	0.8746
5	Flash:Pattern:Duration:dotShift	13.46	8	0.6389
6	Pattern:Duration:dotShift	4.27	8	0.8321
7	Flash:Screen:Duration:dotShift	9.86	8	0.2749
8	Flash:Screen:Duration	1.21	4	0.8756
9	Screen:Duration:dotShift	3.27	8	0.5130
10	Screen:Duration	0.35	2	0.8375
11	Flash:Duration:dotShif	11.36	4	0.1821
12	Flash:Pattern:Screen:dotShift	13.94	4	0.0835
13	Flash:Pattern:Screen	2.95	4	0.5655
14	Flash:Pattern:dotShift	9.11	8	0.3331
15	Pattern:Screen:dotShift	5.75	4	0.2187
16	Pattern:Screen	1.32	2	0.5165
17	Pattern:dotShift	7.67	4	0.1046
18	Flash:Screen:dotShift	8.04	4	0.0902
19	Flash:Screen	0.21	2	0.9018
20	Screen:dotShift	3.51	2	0.1725
21	Screen	0.03	1	0.8599
22	Flash:dotShift	7.55	4	0.1096

The initial (saturated) model was ~ Flash*Pattern*Screen*Duration*Speed + (1 | Subject). Significance was assessed using likelihood ratio tests.

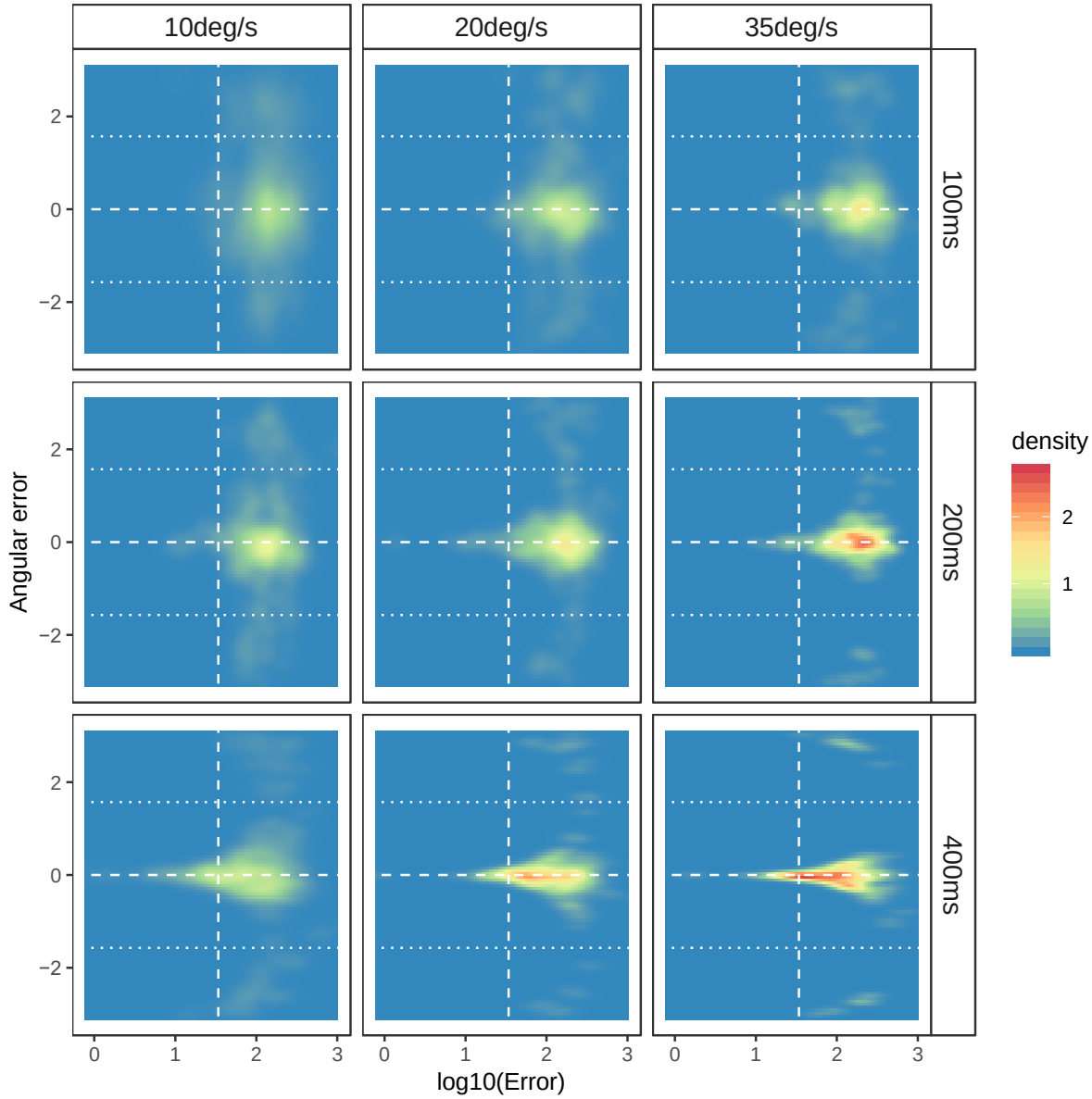

Figure S2 – Angular error (relative to the target's trajectory) plotted against the log-transformed localisation error (distance from target) in pixels for participants trying to localise a moving object with different movement and patterning conditions (N=18 participants). Different combinations of movement and patterning conditions can be navigated via the panelling.