Supplementary materials

Table S1

Study 1 parameter estimates for hierarchical regressions predicting behavioral performance (reaction times and accuracy) and parameter estimates of the Drift Diffusion Model (a – threshold; v – drift rate; t – non-decision time; z – bias).

Parameter	***Estimate***	***95% Credible Interval***	***Posterior probability (p<0)***
Reaction times (ms)			
Intercept	718.62	682.05, 755.69	0.00
Congruency (I-C)	39.18	28.82, 49.61	0.00
Goal (A-S)	128.25	85.36, 172.52	0.00
Block (V-F)	-12.09	-27.66, 4.04	0.93
Goal * Block	28.09	3.54, 51.41	0.01
Interval number	-7.72	-11.48, -3.92	1.00
Interval length	3.81	2.01, 5.58	0.00
Time in interval	-22.71	-24.68, -20.74	1.00
Accuracy (log odds)			
Intercept	1.66	1.35, 1.99	0.00
Congruency (I-C)	-0.25	-0.36, -0.14	1.00
Goal (A-S)	1.67	1.12, 2.22	0.00
Block (V-F)	-0.11	-0.29, 0.07	0.89
Goal * Block	0.44	0.12, 0.76	0.00
Interval number	-0.17	-0.23, -0.12	1.00
Interval length	-0.03	-0.05, 0.00	0.96
Time in interval	-0.01	-0.04, 0.02	0.80
Drift Diffusion Model Estimates			
(a) Intercept	0.94	0.87, 1.01	0.00
(a) Goal (A-S)	0.42	0.27, 0.58	0.00
(a) Block (V-F)	0.00	-0.08, 0.08	0.49
(a) Goal * Block	0.08	0.03, 0.13	0.00
(a) Time in interval	-0.07	-0.08, -0.06	0.00
(v) Intercept	2.66	2.49, 2.84	0.00
(v) Goal (A-S)	0.54	0.31, 0.77	0.00
(v) Block (V-F)	0.03	-0.16, 0.09	0.29
(v) Goal * Block	0.05	-0.12, 0.21	0.28
(v) Congruency (I-C)	-0.34	-0.41, -0.28	0.00
(t) Intercept	0.32	0.3, 0.34	0.00
(z) Congruency (I-C)	-0.02	-0.03, -0.01	0.00
Lapse rate	0.00	0.00, 0.00	0.00

Table S2

Study 1 parameter estimates for parameter estimates of the Drift Diffusion Models which include:1) effects on non-decision time, and 2) a collapsing bound (a – threshold; v – drift rate; t – non-decision time; z – bias).

Parameter	***Estimate***	***95% Credible Interval***	***Posterior probability (p<0)***
Drift Diffusion Model Estimates with Effects on non-decision time			
(a) Intercept	0.86	0.80, 0.93	0.00
(a) Goal (S-A)	0.30	0.18, 0.41	0.00
(a) Block (V-F)	0.00	-0.06, 0.06	0.44
(a) Goal * Block	0.05	0.01, 0.10	0.01
(a) Time in interval	-0.07	-0.08, -0.06	0.00
(v) Intercept	2.38	2.20, 2.56	0.00
(v) Goal (A-S)	0.51	0.30, 0.73	0.00
(v) Block (V-F)	-0.03	-0.14, 0.10	0.34
(v) Goal * Block	0.04	-0.12, 0.20	0.29
(v) Congruency (I-C)	-0.31	-0.37, -0.25	0.00
(t) Intercept	0.34	0.32, 0.37	0.00
(t) Goal (A-S)	0.04	0.02, 0.07	0.00
(t) Block (V-F)	0.00	-0.02, 0.02	0.41
(t) Goal * Block	0.01	0.00, 0.03	0.10
(z) Congruency (I-C)	-0.03	-0.04, 0.02	0.00
Lapse rate	0.00	0.00, 0.00	0.00
Drift Diffusion Model Estimates with a Collapsing Bound			
(a) Intercept	0.55	0.50, 0.60	0.00
(a) Goal (A-S)	0.20	0.12, 0.28	0.00
(a) Block (V-F)	0.00	-0.04, 0.05	0.46
(a) Goal * Block	0.04	0.01, 0.07	0.00
(v) Intercept	1.87	1.72, 2.02	0.00
(v) Goal (A-S)	0.50	0.31, 0.68	0.00
(v) Block (V-F)	-0.02	-0.11, 0.08	0.36
(v) Goal * Block	0.05	-0.07, 0.17	0.20
(v) Congruency (I-C)	-0.34	-0.39, -0.30	0.00
(t) Intercept	0.26	0.23, 0.28	0.00
(t) Goal (S-A)	-0.02	-0.03, -0.01	0.00
(theta) Intercept	0.16	-0.08, 0.34	0.12
(theta) Goal (S-A)	-0.10	-0.19, -0.01	0.01
Lapse rate	0.01	0.01, 0.01	0.00

Table S3

Study 1 – switch vs. repeat intervals analysis. Parameter estimates for hierarchical regressions predicting behavioral performance (reaction times and accuracy) and parameter estimates of the Drift Diffusion Model (a – threshold; v – drift rate; t – non-decision time; z – bias).

Parameter	***Estimate***	***95% Credible Interval***	***Posterior probability (p<0)***
Reaction times (ms)			
Intercept	724.11	685.74, 759.48	0.00
Congruency (I-C)	40.27	28.69, 51.85	0.00
Goal (A-S)	113.19	71.51, 156.99	0.00
Switch (S-R)	-4.31	-10.81, 2.19	0.91
Goal * Switch	10.97	-1.65, 23.86	0.04
Interval number	-7.25	-12.46, -2.15	1.00
Interval length	1.54	-1.04, 4.18	0.12
Time in interval	-22.67	-25.52, -19.83	1.00
Accuracy (log odds)			
Intercept	1.77	1.43, 2.11	0.00
Congruency (I-C)	-0.28	-0.42, -0.14	1.00
Goal (A-S)	1.45	0.87, 2.02	0.00
Switch (S-R)	0.08	-0.03, 0.19	0.07
Goal * Switch	0.23	0.01, 0.46	0.02
Interval number	-0.19	-0.27, -0.11	1.00
Interval length	-0.05	-0.10, -0.01	0.99
Time in interval	-0.01	-0.05, 0.03	0.73
Drift Diffusion Model Estimates			
(a) Intercept	0.94	0.86, 1.01	0.00
(a) Goal (A-S)	0.37	0.23, 0.51	0.00
(a) Block (S-R)	0.00	-0.04, 0.04	0.45
(a) Goal * Block	0.04	0.00, 0.07	0.02
(a) Time in interval	-0.14	-0.16, -0.12	0.00
(v) Intercept	2.71	2.49, 2.94	0.00
(v) Goal (A-S)	0.46	0.23, 0.69	0.00
(v) Block (S-R)	-0.01	-0.12, 0.09	0.42
(v) Goal * Block	0.00	-0.15, 0.15	0.49
(v) Congruency (I-C)	-0.34	-0.42, -0.27	0.00
(t) Intercept	0.32	0.30, 0.35	0.00
(z) Congruency (I-C)	-0.02	-0.03, -0.01	0.00
Lapse rate	0.00	0.00, 0.00	0.00

Table S4

Study 1 parameter estimates for hierarchical regressions predicting behavioral performance (reaction times and accuracy) with considering control adjustment costs across congruency levels

Parameter	***Estimate***	***95% Credible Interval***	***Posterior probability (p<0)***
Reaction times (ms)			
Intercept	717.45	684.19, 749.77	0.00
Congruency (I-C)	35.17	25.33, 45.10	0.00
Goal (A-S)	126.22	84.39, 168.50	0.00
Block (V-F)	-7.29	-21.84, 7.77	0.83
Congruency * Goal	21.14	9.42, 33.34	0.00
Congruency * Block	-2.69	-12.63, 6.80	0.70
Goal * Block	27.49	4.74, 50.55	0.01
Congruency * Goal * Block	21.16	3.14, 39.25	0.01
Interval number	-6.51	-10.25, -2.76	1.00
Interval length	3.77	1.91, 5.55	0.00
Time in interval	-22.80	-24.80, -20.73	1.00
Accuracy (log odds)			
Intercept	1.67	1.36, 2.00	0.00
Congruency (I-C)	-0.27	-0.38, -0.16	1.00
Goal (A-S)	1.70	1.14, 2.24	0.00
Block (V-F)	0.00	-0.17, 0.17	0.50
Congruency * Goal	-0.04	-0.20, 0.11	0.71
Congruency * Block	0.01	-0.14, 0.15	0.45
Goal * Block	0.46	0.15, 0.77	0.00
Congruency * Goal * Block	-0.23	-0.51, 0.05	0.96
Interval number	-0.13	-0.18, -0.07	1.00
Interval length	-0.03	-0.05, 0.00	0.96
Time in interval	-0.01	-0.04, 0.02	0.78

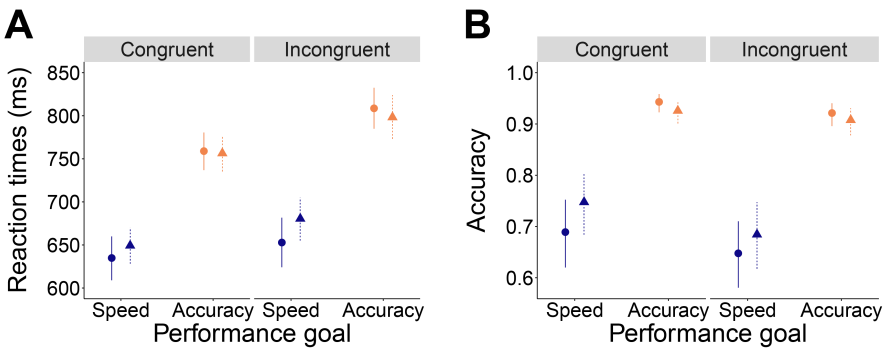

Figure S1. Control adjustment costs in congruent and incongruent trials in Study 1. A. While control adjustment costs are present in both congruent and incongruent trials when analyzing reaction times, they are more pronounced in incongruent trials. **B.** When analyzing accuracy, control adjustment costs are present in both congruent and incongruent trials, but are more pronounced in congruent trials.

Table S5

Study 2 parameter estimates for hierarchical regressions predicting behavioral performance (reaction times and accuracy) and parameter estimates of the Drift Diffusion Model (a – threshold; v – drift rate; t – non-decision time; z – bias).

Parameter	***Estimate***	***95% Credible Interval***	***Posterior probability (p<0)***
Reaction times (ms)			
Intercept	669.25	641.01, 697.21	0.00
Congruency (I-C)	39.30	31.53, 47.01	0.00
Goal (A-S)	143.32	95.18, 190.48	0.00
Goal (A-S/A)	-52.74	-79.10, -25.10	1.00
Block (V-F)	-3.17	-17.84, 11.35	0.67
Goal (A-S) * Block	30.30	-3.83, 64.80	0.04
Goal (A-S/A) * Block	-8.43	-35.40, 17.49	0.74
Interval number	-9.20	-12.91, -5.50	1.00
Interval length	1.91	0.18, 3.65	0.02
Time in interval	-21.74	-23.71, -19.81	1.00
Accuracy (log odds)			
Intercept	1.83	1.45, 2.21	0.00
Congruency (I-C)	-0.32	-0.50, -0.14	1.00
Goal (S-A)	2.01	1.50, 2.52	0.00
Goal (A-S/A)	-0.69	-0.94, -0.45	1.00
Block (V-F)	-0.06	-0.23, 0.12	0.75
Goal (A-S) * Block	0.75	0.31, 1.20	0.00
Goal (A-S/A) * Block	-0.27	-0.64, 0.10	0.92
Interval number	0.01	-0.04, 0.07	0.33
Interval length	-0.02	-0.05, 0.01	0.92
Time in interval	-0.06	-0.09, -0.03	1.00
Drift Diffusion Model Estimates			
(a) Intercept	0.89	0.82, 0.97	0.00
(a) Goal (A-S)	0.48	0.38, 0.58	0.00
(a) Goal (A-S/A)	0.20	0.10, 0.31	0.00
(a) Block (V-F)	0.00	-0.06, 0.06	0.51
(a) Goal (A-S) * Block	0.11	0.04, 0.18	0.00
(a) Goal (A-S/A) * Block	0.04	-0.03, 0.11	0.17
(a) Time in interval	-0.07	-0.08, -0.05	0.00
(v) Intercept	3.20	2.91, 3.49	0.00
(v) Goal (A-S)	0.66	0.47, 0.86	0.00
(v) Goal (A-S/A)	0.27	0.09, 0.46	0.01
(v) Block (V-F)	0.07	-0.06, 0.20	0.18
(v) Goal (A-S) * Block	0.36	0.16, 0.55	0.00
(v) Goal (A-S/A) * Block	0.09	-0.09, 0.27	0.21
(v) Congruency (I-C)	-0.41	-0.50, -0.33	0.00
(t) Intercept	0.33	0.31, 0.36	0.00
(z) Congruency (I-C)	-0.02	-0.03, -0.02	0.00
Lapse rate	0.00	0.00, 0.00	0.00

Table S6

Study 3 parameter estimates for hierarchical regressions predicting behavioral performance (reaction times and accuracy) and parameter estimates of the Drift Diffusion Model (a – threshold; v – drift rate; t – non-decision time; z – bias).

Parameter	***Estimate***	***95% Credible Interval***	***Posterior probability (p<0)***
Reaction times (ms)			
Intercept	746.21	706.34, 785.06	0.00
Congruency (I-C)	43.8	37.32, 50.49	0.00
SOA (1000-250)	2.35	-8.05, 12.57	0.32
Goal (A-S)	50.66	29.08, 71.58	0.00
Block (V-F)	-2.09	-14.41, 9.56	0.63
SOA * Goal	-12.65	-24.03, -1.33	0.99
SOA * Block	-2.24	-17.46, 13.09	0.62
Goal * Block	14.37	-1.68, 29.37	0.04
SOA * Goal * Block	-19.55	-51.10, 11.65	0.90
Interval number	-7.83	-12.43, -3.07	1.00
Interval length	4.18	2.48, 5.90	0.00
Time in interval	-33.45	-35.38, -31.58	1.00
Accuracy (log odds)			
Intercept	2.32	2.02, 2.62	0.00
Congruency (I-C)	-0.37	-0.49, -0.26	1.00
SOA (1000-250)	0.04	-0.14, 0.22	0.31
Goal (A-S)	0.88	0.57, 1.20	0.00
Block (V-F)	0.13	-0.04, 0.31	0.07
SOA * Goal	-0.02	-0.24, 0.19	0.59
SOA * Block	0.01	-0.24, 0.26	0.46
Goal * Block	0.62	0.36, 0.87	0.00
SOA * Goal * Block	-0.20	-0.61, 0.19	0.84
Interval number	-0.08	-0.16, -0.01	0.98
Interval length	-0.01	-0.04, 0.03	0.69
Time in interval	-0.05	-0.09, -0.02	1.00
Drift Diffusion Model Estimates			
(a) Intercept	0.91	0.83, 1.00	0.00
(a) SOA (1000-250)	-0.01	-0.03, 0.02	0.28
(a) Goal (A-S)	0.18	0.12, 0.24	0.00
(a) Block (V-F)	0	-0.03, 0.03	0.42
(a) Goal (A-S) * SOA	-0.03	-0.07, 0.01	0.06
(a) Block * SOA	-0.02	-0.06, 0.03	0.24
(a) Goal (A-S) * Block	0.07	0.03, 0.11	0.00
(a) Goal (A-S) * Block * SOA	0.07	0.00, 0.15	0.03
(a) Time in interval	-0.10	-0.12, -0.09	0.00
(v) Intercept	3.02	2.74, 3.29	0.00
(v) SOA (1000-250)	-0.08	-0.19, 0.03	0.07
(v) Goal (A-S)	0.14	0.06, 0.23	0.00
(v) Block (V-F)	-0.07	-0.17, 0.02	0.06
(v) Goal (A-S) * SOA	0.02	-0.13, 0.17	0.41
(v) Block * SOA	-0.03	-0.18, 0.11	0.32
(v) Goal (A-S) * Block	0.03	-0.09, 0.16	0.34
(v) Goal (A-S) * Block * SOA	-0.09	-0.36, 0.17	0.26
(v) Congruency (I-C)	-0.34	-0.42, -0.26	0.00
(t) Intercept	0.39	0.37, 0.41	0.00
(z) Congruency (I-C)	-0.03	-0.04, -0.02	0.00
Lapse rate	0.00	0.00, 0.00	0.00

Table S7

Study 4 parameter estimates for hierarchical regressions predicting behavioral performance (reaction times and accuracy) and parameter estimates of the Drift Diffusion Model (a – threshold; v – drift rate; t – non-decision time; z – bias).

Parameter	***Estimate***	***95% Credible Interval***	***Posterior probability (p<0)***
Reaction times (ms)			
Intercept	728.8	683.41, 772.02	0.00
Congruency (I-C)	40.04	32.34, 47.86	0.00
Goal (A-S)	54.14	37.96, 70.30	0.00
Switch frequency (linear effect)	-3.01	-16.15, 9.71	0.67
Switch frequency (quadratic effect)	-6.73	-17.44, 4.39	0.90
Switch frequency (cubic effect)	4.39	-3.51, 11.95	0.12
Switch frequency (linear effect) *Goal	25.20	8.50, 42.58	0.00
Switch frequency (quadratic effect) *Goal	20.98	8.22, 33.39	0.00
Switch frequency (cubic effect) *Goal	3.03	-8.45, 14.90	0.31
Interval number	-12.89	-17.33, -8.62	1.00
Interval length	2.94	1.72, 4.18	0.00
Time in interval	-13.76	-15.03, -12.47	1.00
Accuracy (log odds)			
Intercept	2.49	2.25, 2.70	0.00
Congruency (I-C)	-0.25	-0.35, -0.15	1.00
Goal (A-S)	0.80	0.58, 1.04	0.00
Switch frequency (linear effect)	-0.24	-0.39, -0.10	1.00
Switch frequency (quadratic effect)	-0.20	-0.35, -0.07	1.00
Switch frequency (cubic effect)	0.01	-0.06, 0.09	0.35
Switch frequency (linear effect) * Goal	0.06	0.00, 0.12	0.03
Switch frequency (quadratic effect) * Goal	-0.03	-0.06, 0.00	0.96
Switch frequency (cubic effect) * Goal	-0.09	-0.12, -0.07	1.00
Interval number	0.48	0.25, 0.74	0.00
Interval length	0.21	0.00, 0.42	0.03
Time in interval	0.09	-0.09, 0.27	0.15
Drift Diffusion Model Estimates			
(a) Intercept	0.96	0.89, 1.03	0.00
(a) Goal (A-S)	0.23	0.17, 0.30	0.00
(a) Switch frequency (linear effect)	-0.05	-0.08, -0.02	0.00
(a) Switch frequency (quadratic effect)	-0.06	-0.09, -0.03	0.00
(a) Switch frequency (cubic effect)	0.00	-0.03, 0.02	0.47
(a) Switch frequency (linear effect) * Goal	-0.12	-0.21, -0.04	0.00
(a) Switch frequency (quadratic effect) * Goal	-0.02	-0.04, 0.00	0.06
(a) Switch frequency (cubic effect) * Goal	0.00	-0.02, 0.02	0.47
(a) Time in interval	-0.05	-0.06, -0.04	0.00
(v) Intercept	3.38	3.18, 3.57	0.00
(v) Goal (A-S)	0.30	0.17, 0.44	0.00
(v) Switch frequency (linear effect)	0.01	-0.08, 0.10	0.41
(v) Switch frequency (quadratic effect)	-0.08	-0.16, 0.00	0.02
(v) Switch frequency (cubic effect)	-0.01	-0.08, 0.05	0.34
(v) Switch frequency (linear effect) * Goal	-0.20	-0.43, 0.05	0.05
(v) Switch frequency (quadratic effect) * Goal	0.01	-0.05, 0.07	0.39
(v) Switch frequency (cubic effect) * Goal	0.05	-0.01, 0.11	0.06
(v) Congruency (I-C)	-0.38	-0.45, -0.32	0.00
(t) Intercept	0.38	0.36, 0.41	0.00
(z) Congruency (I-C)	-0.02	-0.03, -0.01	0.00
Lapse rate	0.00	0.00, 0.00	0.00

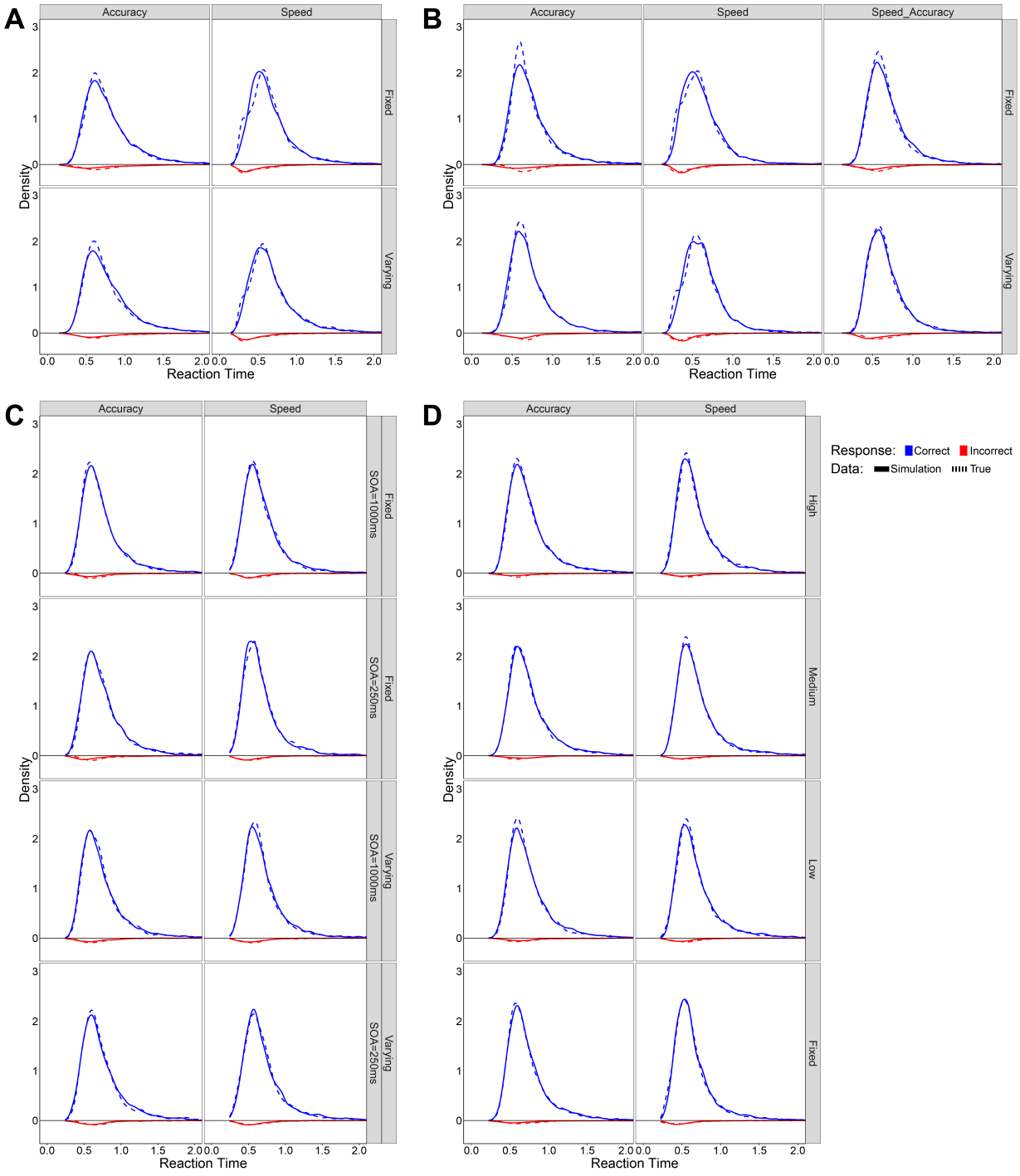

Figure S2. Posterior predictive checks for the fitted Drift Diffusion models. Distributions of simulated reaction times from posterior predictive checks (solid lines) match the empirical reaction time distributions (dashed lines) for both correct and incorrect responses. This is true for Study 1 (**A**), Study 2 (**B**), Study 3 (**C**), and Study 4 (**D**).