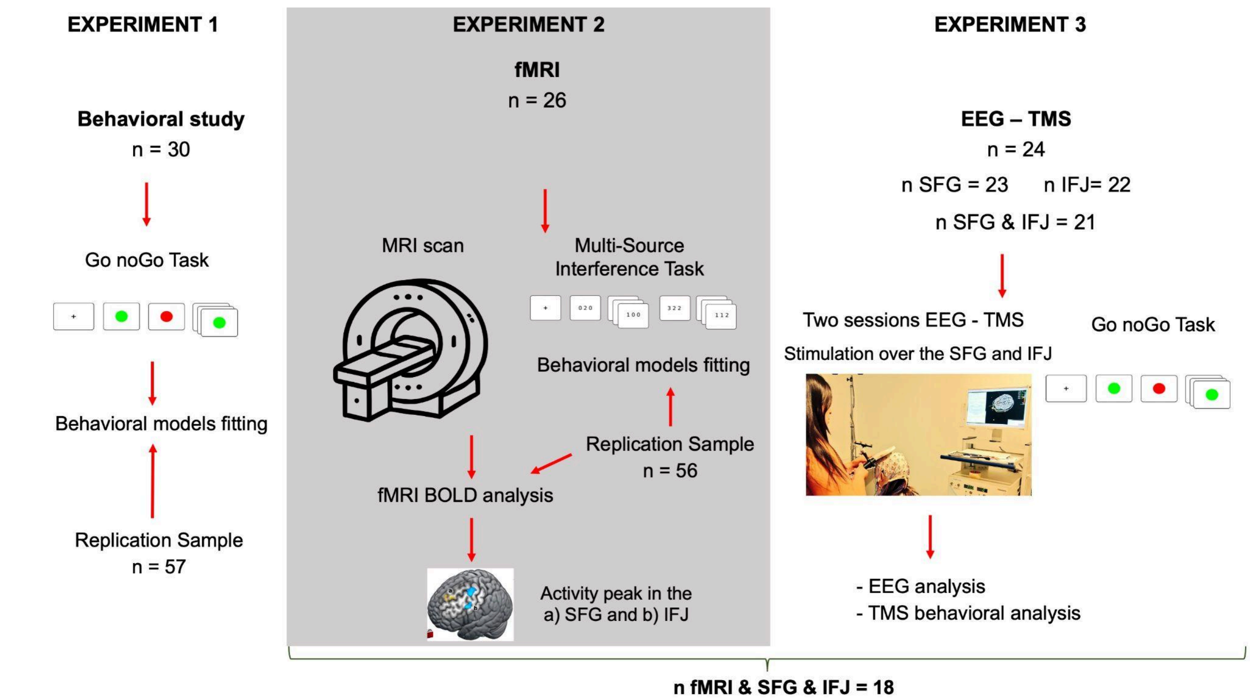
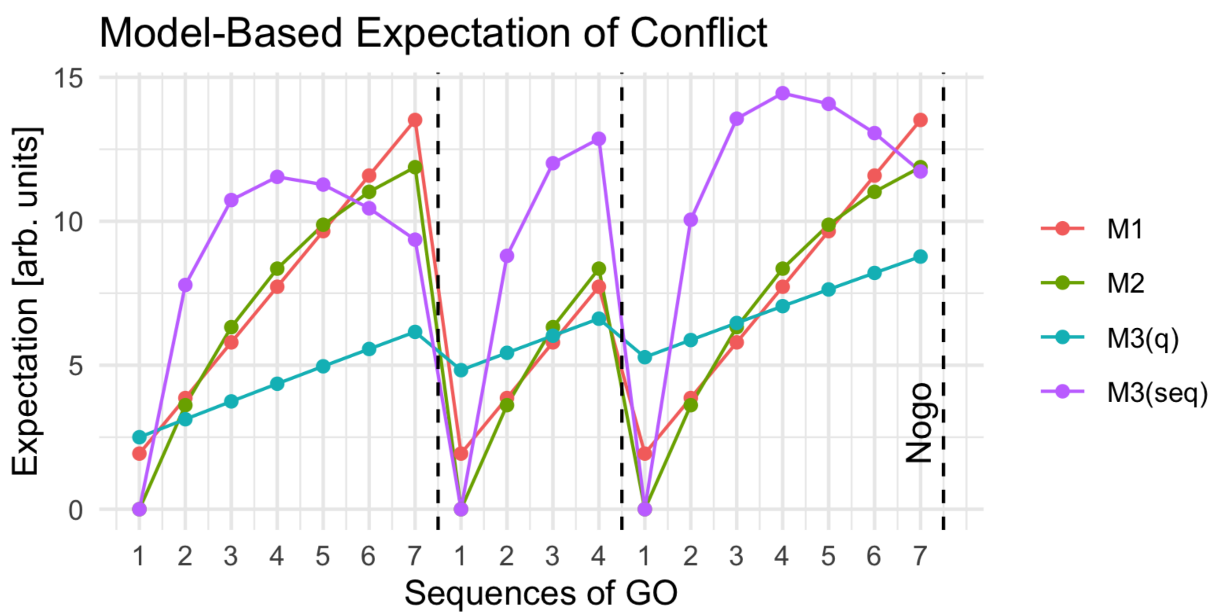
Supplementary Materials

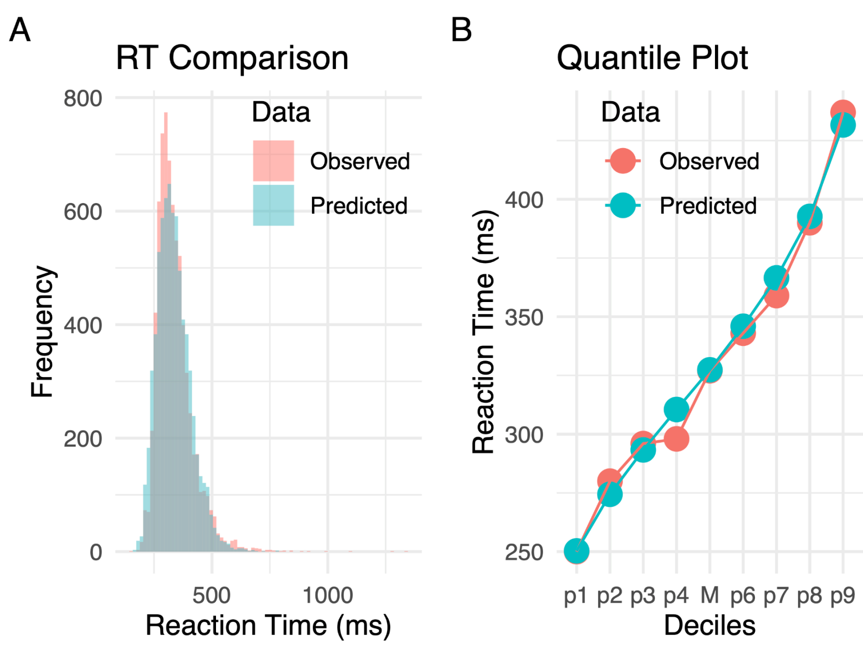
Supplementary Figures



Supplementary Fig. 1. Experimental design. Three experiments were carried out. Experiment 1: Behavioral study (n=30) with GNG task. Experiment 2: fMRI session with MSIT task (n=26). Experiment 3: Two randomized EEG-TMS sessions, one in the SFG and other in the IFJ with GNG task (n=24). In experiments 1 (n=57) and 2 (n=56), a replication of the analyses was done with other data from the laboratory, obtaining the same reported results. GNG: Go Nogo; fMRI: Functional Magnetic Resonance Imaging; SFG: Superior Frontal Gyrus; IFJ: Inferior Frontal Junction; EEG: Electroencephalography, TMS: Transcranial Magnetic Stimulation.

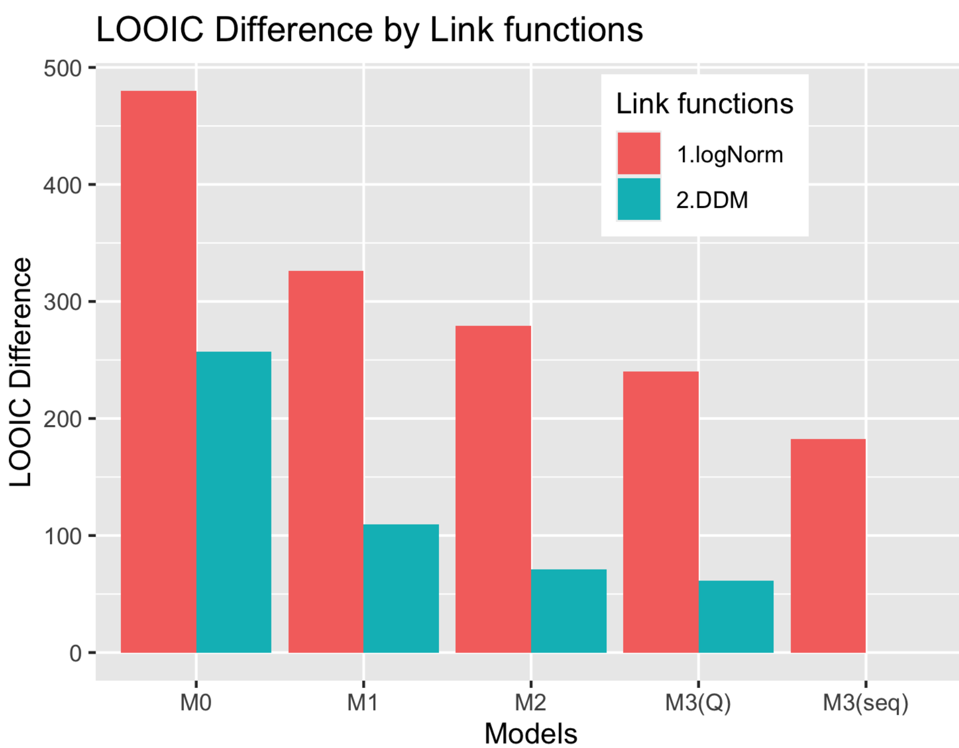


Supplementary Fig. 2. Predicted expectation of a conflicting stimulus (Nogo) for a sequence of go stimuli. Each expectation is scaled with the respective adjusted beta value. Model M3(q) was further scaled to make its variability more visible. Source data are provided as a SourceData file.

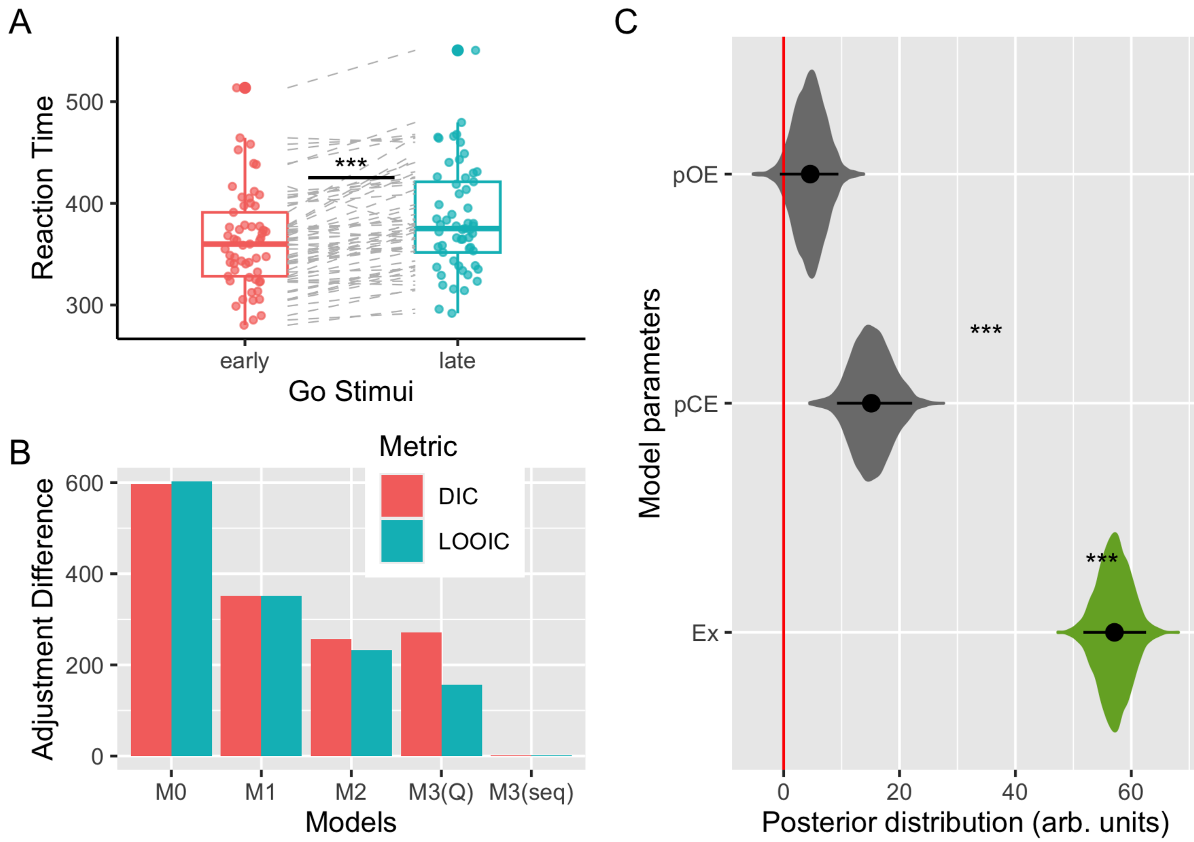


Supplementary Fig. 3. A. Histogram of the observed reaction time in the Go/No-Go (GNG) behavioral experiment and the predicted reaction time derived from the M3(seq) model. **B.**

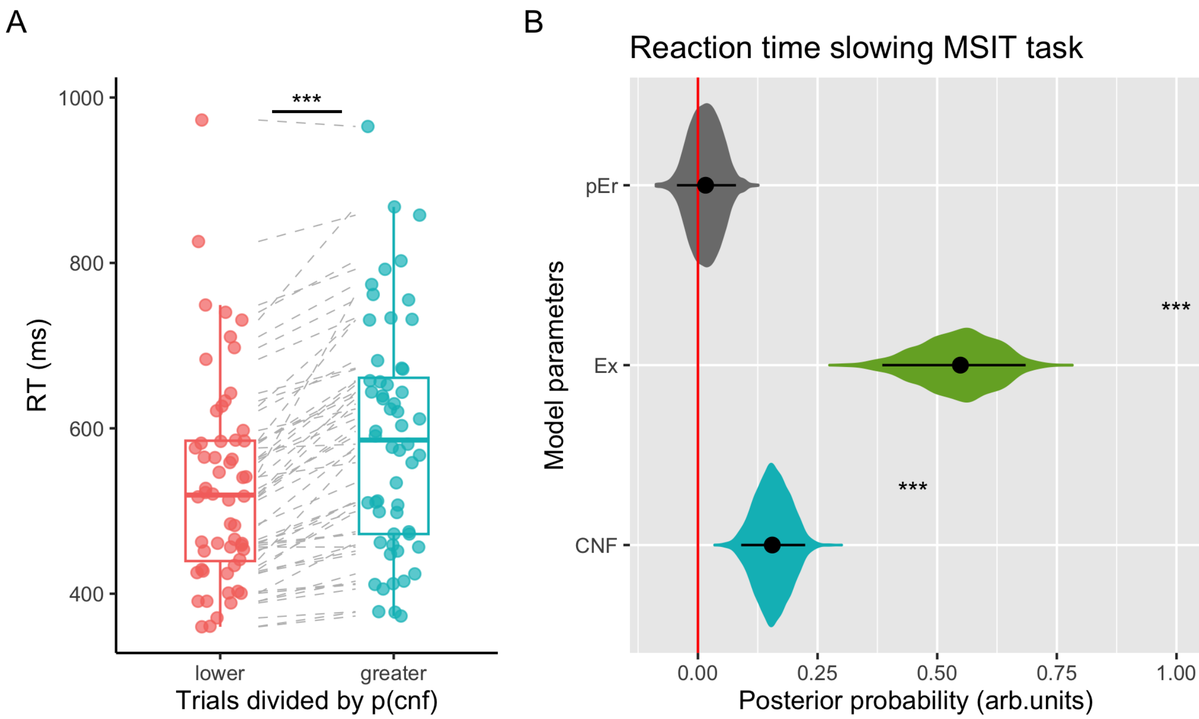
Quantile plot comparing the mean reaction time per decile from observed and predicted reaction times. **A-B**. Red represents observed data, and blue represents predicted data. (n = 23 Participants). Source data are provided as a SourceData file.



Supplementary Fig. 4. Comparison of the fit for all models using either the Drift Diffusion Model (affecting the boundary or threshold of the Wiener process) or the Lognormal distribution as the link function. Source data are provided as a SourceData file.



Supplementary Fig. 5. GNG replication sample. Behavioral analysis of GNG Task replication sample. A. Reaction time comparison between the first Go trials (early) and the last Go trial (late) of a sequence (n=57 participants, Wilcoxon test, two-sided, p = 7e-11). B. Models comparison. C. Posterior distribution of model parameters (Bayesian hypothesis test using p_{MCMC}, two-sided, p<0.001). Black dots represent the mean of the distribution, and black lines represent the 95% high-density intervals. The colored areas represent the complete posterior distribution. * indicates p<0.05, ** p<0.01,***p<0.001.CE: Commission Error. DIC: Deviance. Information Criteria. Ex: Conflict Expectation. OE: Omission Error. pCE: Previous Commission Error. pOE: Previous Omission Error. RT: Reaction Time. Source data are provided as a SourceData file.



Supplementary Fig.6. MSIT replication sample. A. Comparison of reaction times between trials with predicted lower and higher conflict expectations per sequence. Each point represents the mean of a subject (n=56 participants, Wilcoxon test, two-sided, 1e-10). **B.** Posterior distribution of model parameters (n=56 participants, Bayesian hypothesis test using p_{MCMC}, two-sided, p<0.001). Black dots represent the mean of the distribution, and black lines represent the 95% high-density intervals. The colored areas represent the complete posterior distribution. * indicates p<0.05, ** p<0.01,***p<0.001.CNF: Conflict trial. Ex: Conflict Expectation. MSIT: Multiple Source Interference Task. pEr: Error in the prior trial. p(cnf): Predicted probability of conflict. RT: Reaction Time. Source data are provided as a SourceData file.

Supplementary Tables

Supplementary Table 1: Comparison of Models for Go-Nogo Task

Model	Linking function	Free parameters	DIC	LOOIC
M0 null	lognormal	4 (3 betas [mean] , sigma)	427.1	480.1
	Wiener	5 (3 betas [boundary], drift, tau)	233	257.5
M1 linear	lognormal	5 (4 betas [mean], sigma)	286.7	326.4
	Wiener	6 (4 betas[boundary], drift, tau)	102.1	109.6
M2 Exp	lognormal	5 (4 betas [mean], sigma)	243.6	279.5
	Wiener	6 (4 betas [boundary], drift, tau)	71.7	71.3
M3(seq) Exp+LR	lognormal	6 (4 betas [mean], alpha, sigma)	161.5	24.1
	Wiener	7 (4 betas [boundary], alpha, drift, tau)	0 (reference)	0 (reference)
M4 Exp=Q LR	lognormal	6 (4 betas [mean], alpha, sigma)	198.5	240.1
	Wiener	7 (4 betas [boundary], alpha, drift, tau)	63.3	61.6

Supplementary Table 2

Model 0

CC = β2 pCE + β3 pOE

mu = β0 + CCt **RT~ logNorm(mu, sigma)**

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	5.7487	5.7907	5.8369	5.791	0.022717	5.7884	0.00041476	1.8	3000	0.017153	1.0018
β2	-0.012284	0.064664	0.13348	0.065169	0.037191	0.058885	0.0029138	7.8	163	0.29481	1.0172
β3	-0.076289	-0.01059	0.059446	-0.0095915	0.035482	-0.014664	0.0027381	7.7	168	0.31975	1.0239
deviance	79627	79648	79671	79649	11.296	79647	0.21972	1.9	2643	0.015313	1.0004

Model 1

CC = β1 Exp + β2 pCE + β3 pOE

mu = β0 + CCt **RT~ logNorm(mu, sigma)**
Exp = nSeq

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	5.7119	5.7568	5.8037	5.7564	0.023201	5.7589	0.00042359	1.8	3000	0.010382	1.0007
β1	0.0065017	0.010902	0.015719	0.010901	0.0023537	0.010906	0.000053031	2.3	1970	-0.018757	1.0006
β2	0.021893	0.090543	0.15962	0.090438	0.03556	0.092098	0.0030207	8.5	139	0.42594	1.0026
β3	-0.078877	-0.011565	0.058933	-0.011276	0.035513	-0.013352	0.0027599	7.8	166	0.35676	1.0026
deviance	79665	79690	79721	79691	14.235	79688	0.33827	2.4	1771	-0.015021	1.0001

Supplementary Table 2 (continuation)

Model 2

CC = β1 Exp + β2 pCE + β3 pOE

mu = β0 + CCt **RT~ logNorm(mu, sigma)**

Exp = 1-(1-Q)(nSeq-1)

Q = 0.25

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	5.7104	5.7579	5.8026	5.7583	0.02344	5.7572	0.00041643	1.8	3169	0.025818	1.0007
β1	0.047908	0.08184	0.11536	0.081954	0.016741	0.081223	0.00033525	2	2494	-0.017657	1.0041
β2	0.016394	0.097085	0.16254	0.09622	0.037069	0.094963	0.0027907	7.5	176	0.38122	1.0328
β3	-0.081288	-0.0096138	0.059571	-0.0081926	0.036143	-0.011248	0.0027902	7.7	168	0.33559	1.0428
deviance	79632	79657	79687	79658	14.089	79656	0.31443	2.2	2008	0.0027658	1

Model 3 (seq)

CC = β1 Exp + β2 pCE + β3 pOE

mu = β0 + CCt **RT~ logNorm(mu, sigma)**

Exp = 1-(1-Q)(nSeq-1)

Q(t) = Q(t-1) + α(C(t-1) - Q(t-1))

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.100	psrf
β0	5.6865	5.7342	5.7778	5.7344	0.023353	--	0.00042803	1.8	2977	0.006777	1.0013
β1	0.23348	0.31979	0.39791	0.31967	0.04161	--	0.0010493	2.5	1573	-0.0055577	1.0005
β2	0.068537	0.14894	0.22105	0.14805	0.039332	--	0.0024182	6.1	265	0.20859	1.0069
β3	-0.11267	-0.035924	0.034941	-0.035031	0.037187	--	0.0022325	6	277	0.18473	1.0038
deviance	79281	79311	79347	79312	17.072	--	0.41488	2.4	1693	-0.00065032	1.0016

Supplementary Table 2 (continuation)

Model 0 DDM

CC = β2 pCE + β3 pOE

bounder = β0 + CCt RT ~ wiener(tau, bounder, bias,driff) bias=0.5

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
beta0	110.88	115.19	119.06	115.14	2.0892	115.38	0.053402	2.6	1530	-0.000070746	1.0036
beta2	-0.78077	8.637	17.872	8.7319	4.8335	9.8363	0.42595	8.8	129	0.43611	1.0375
beta3	-10.213	-1.2318	7.919	-1.1513	4.6577	-1.0043	0.41664	8.9	125	0.4485	1.0382
drift	0.24004	0.24467	0.24894	0.24464	0.0022639	0.24475	0.000093646	4.1	584	0.049931	1.0039
tau	98.957	99.751	100	99.644	0.34041	99.888	0.0073897	2.2	2122	-0.0039295	1.0087
deviance	79420	79442	79468	79443	12.298	79440	0.30588	2.5	1616	0.020625	0.9999

Model 1 DDM

CC = β1 Exp + β2 pCE + β3 pOE

bounder = β0 + CCt RT ~ wiener(tau, bounder, bias,driff) bias=0.5
Exp = nSeq

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	107.49	111.59	115.64	111.61	2.1223	--	0.05393	2.5	1549	0.032355	1.0002
β1	1.1036	1.8412	2.5735	1.8399	0.38119	--	0.0077948	2	2391	0.037559	1.0005
β2	0.80773	11.371	20.521	11.327	5.1341	--	0.47333	9.2	118	0.43799	1.0314
β3	-9.202	-0.10349	10.115	0.034197	5.0107	--	0.40397	8.1	154	0.39991	1.0265
tau	98.922	99.729	100	99.628	0.35346	--	0.0076481	2.2	2136	-0.010491	1.0002
drift	0.24557	0.24958	0.25412	0.24961	0.0021966	--	0.000082889	3.8	702	0.027769	1.0009
deviance	79464	79491	79522	79491	14.814	--	0.37326	2.5	1575	0.012128	1.0006

Supplementary Table 2 (continuation)

Model 2 DDM

CC = β1 Exp + β2 pCE + β3 pOE

bounder = β0 + CCt RT ~ wiener(tau, bounder, bias,driff) bias=0.5

Exp = 1-(1-Q)(nSeq-1)

Q = 0.25

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	108.49	112.3	116.51	112.36	2.0449	112.5	0.057695	2.8	1256	0.029216	1.001
β1	8.8483	13.002	16.819	13.009	2.058	13.026	0.060367	2.9	1162	0.0068498	1.0019
β2	1.9206	12.676	23.113	12.235	5.1688	13.129	0.77837	15.1	44	0.72708	1.0682
β3	-8.9767	0.01759	10.628	0.28555	4.8776	-0.0058811	0.65503	13.4	55	0.67546	1.0564
driff	0.24558	0.24984	0.25424	0.24982	0.0022198	0.24973	0.000091275	4.1	591	0.033752	1.0045
tau	98.849	99.741	100	99.622	0.3795	99.885	0.0085855	2.3	1954	0.044638	1.0012
deviance	79434	79463	79494	79463	15.108	79461	0.49904	3.3	917	0.028125	1.0115

Model 3 (seq) DDM

CC = β1 Exp + β2 pCE + β3 pOE

bounder = β0 + CCt RT ~ wiener(tau, bounder, bias,driff) bias=0.5

Exp = 1-(1-Q)(nSeq-1)

Q(t) = Q(t-1) + α(C(t-1) - Q(t-1))

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.100	psrf
β0	105.07	109.12	113.44	109.18	2.1212	108.79	0.045557	2.1	2168	-0.017036	1.0001
β1	35.373	44.712	54.816	44.943	4.9862	44.702	0.21527	4.3	537	0.023479	1.0024
β2	8.383	19.33	29.317	19.33	5.3567	19.649	0.34063	6.4	247	0.23457	1.023
β3	-13.439	-3.5667	6.1289	-3.6201	5.0743	-3.2295	0.33143	6.5	234	0.21069	1.0162
drift	0.24558	0.24964	0.2544	0.24967	0.0022518	0.24969	0.00006426	2.9	1228	-0.020859	1.0008
tau	98.932	99.763	100	99.653	0.34021	99.894	0.0065344	1.9	2711	0.013149	0.99968
α	0.22097	0.29383	0.37773	0.29664	0.040599	0.28388	0.0011995	3	1146	0.0023465	1.0004
deviance	79129	79160	79192	79160	15.829	79158	0.36334	2.3	1898	0.020377	1.0008

Supplementary Table 2 (continuation)

Model 3 (Q) DDM

CC = β1 Exp + β2 pCE + β3 pOE

bounder = β0 + CCt RT ~ wiener(tau, bounder, bias,driff)

Exp = Q

Q(t) = Q(t-1) + α(C(t-1) - Q(t-1))

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.100	psrf
β0	122.35	127.23	132.58	127.31	2.66	126.94	0.15	5.60	318.00	0.21	1.13
β1	-99.19	-78.96	-61.85	-79.60	9.18	-78.41	1.15	12.50	64.00	0.59	1.04
β2	2.23	13.63	24.28	13.86	5.62	12.68	0.37	6.50	233.00	0.28	1.05
β3	-11.30	-0.80	9.48	-0.86	5.41	-0.65	0.35	6.50	239.00	0.28	1.04
drift	0.24	0.25	0.25	0.25	0.00	0.25	0.00	3.30	893.00	0.06	1.00
tau	98.91	99.77	100.00	99.65	0.37	99.90	0.01	2.10	2325.00	-0.02	1.00
α	0.001	0.244	0.489	0.25	0.14	0.25	0.01	7.10	200.00	0.28	1.15
deviance	79192.50	79221.50	79254.40	79222.20	16.03	79222.24	0.85	5.30	356.00	0.14	1.06

Moldel 4 DDM

CC = β1 Exp + β2 pCE + β3 pOE

bounder = β0 + CCt RT ~ wiener(tau, bounder, bias,driff) bias=0.5

Exp = 1-(1-Q)(nSeq-1) ; if A=1

Exp = Q ; if A=0

Q(t) = Q(t-1) + α(C(t-1) - Q(t-1))

A ~ Bernulli(θ)

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.100	psrf
β0	104.79	108.84	113.25	108.84	2.1324	109.03	0.045934	2.2	2155	-0.02079	1.0004
β1	21.638	26.99	32.803	27.063	2.9008	27.073	0.076933	2.7	1422	-0.018101	1.0013
β2	9.3619	18.902	29.034	18.986	5.1416	18.524	0.32407	6.3	252	0.22966	1.0041
β3	-12.931	-3.2582	6.177	-3.1488	4.8471	-3.1391	0.29997	6.2	261	0.23383	1.0063
drift	0.24529	0.24999	0.2544	0.24997	0.00231	0.24981	0.000061993	2.7	1389	-0.051199	1.004
tau	98.947	99.759	100	99.648	0.35101	99.894	0.0064086	1.8	3000	-0.030778	1.0016
α	0.14246	0.2331	0.331	0.23514	0.049122	0.22856	0.0014615	3	1130	-0.044625	1.0021
θ	0.52597	0.78022	0.99975	0.76724	0.13688	0.80394	0.0046743	3.4	857	0.019356	1.0049
deviance	79115	79147	79178	79147	16.383	79145	0.33939	2.1	2330	-0.0058932	1.0006

Supplementary Table 2 (continuation)

Supplementary Table 2: Posterior distribution and convergence statistics for parameters of all models tested in the Go-Nogo behavioral experiments. The table includes the following statistics: Lower95 and Upper95 indicate the bounds of the 95% credible interval, while Median, Mean, and Mode represent the central tendency of the posterior distribution. SD reflects the uncertainty in the estimate, and MCerr indicates the Monte Carlo error. MC%ofSD shows the Monte Carlo error as a percentage of the standard deviation. SSeff represents the effective sample size, accounting for autocorrelation, AC.50 provides the autocorrelation at lag 50 to assess sample independence. AC.100 provides the autocorrelation at lag 100 to assess sample independence. The psrf (Potential Scale Reduction Factor) indicates convergence, with values close to 1 signifying good convergence.

Supplementary Table 3

Model MSIT

M0 DIC =3436.141 LOOIC = 3407.7

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	1.4873	1.5878	1.7018	1.5889	0.055402	--	0.0028172	5.1	387	0.13566	1.0071
β2	0.12379	0.17876	0.23379	0.17954	0.029958	--	0.002278	7.6	173	0.33312	1.0212
β3	-0.019659	0.073637	0.169	0.0733	0.047628	--	0.0024521	5.1	377	0.13778	1.0064
β4	0.11636	0.20961	0.31525	0.21098	0.05042	--	0.0014515	2.9	1207	0.022959	1.0013
tau	0.14502	0.14571	0.14637	0.14569	0.00034905	--	6.51E-06	1.9	2872	-0.012405	1.0008
driff	1.5373	1.58	1.619	1.5801	0.021075	--	0.00040096	1.9	2763	-0.032298	0.99955
deviance	3344.1	3366	3390.2	3366.6	11.792	--	0.26432	2.2	1990	0.018775	1.0017

M1 DIC = 3431.99 LOOIC = 3399.5

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	1.5203	1.6373	1.7433	1.6371	0.056396	1.6339	0.002573	4.6	480	0.080336	1.0019
β1	-0.026182	-0.015309	-0.0052058	-0.015365	0.005239	-0.014774	0.00027586	5.3	361	0.12959	1.0037
β2	0.1209	0.18504	0.23869	0.18432	0.030273	0.18779	0.0020944	6.9	209	0.28079	1.0026
β3	-0.0051313	0.079797	0.17658	0.079755	0.046381	0.082908	0.001843	4	633	0.051871	1.0031
β4	0.11345	0.20529	0.29892	0.2055	0.048349	0.20453	0.0013404	2.8	1301	-0.019471	1.0024
tau	0.14505	0.14573	0.14639	0.14572	0.00034774	0.14579	6.49E-06	1.9	2869	0.021617	1.0017
driff	1.5373	1.5793	1.6177	1.5793	0.020839	1.5772	0.00040745	2	2616	-0.0039639	0.99984
deviance	3336.1	3359.3	3382.2	3359.7	11.801	3358.5	0.24858	2.1	2254	0.044652	1.0009

M2 DIC = 3506.518 LOOIC = 3490.0

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	1.5818	1.6935	1.8056	1.6935	0.058514	1.694	0.0025218	4.3	538	0.076274	1.0012
β1	-0.19092	-0.13287	-0.069877	-0.13395	0.030548	-0.13059	0.0017429	5.7	307	0.17911	1.0055
β2	0.24792	0.31448	0.38429	0.31505	0.034459	0.31468	0.00087443	2.5	1553	0.0078788	1.0004
β3	-0.0059881	0.08914	0.18319	0.089763	0.048413	0.089811	0.0020046	4.1	583	0.078679	1.001
β4	0.0034368	0.49122	0.94642	0.49294	0.29086	0.2456	0.0052908	1.8	3022	0.0076436	1.0018
tau	0.14493	0.14568	0.14636	0.14566	0.00036606	0.1457	6.93E-06	1.9	2794	0.0082595	1.001
driff	1.5436	1.5822	1.6231	1.5819	0.020475	1.5812	0.00037814	1.8	2932	-0.026121	0.99992
deviance	3419.8	3441.4	3464.8	3442	11.325	3441.8	0.2401	2.1	2225	0.0057917	0.9997

Supplementary Table 3 (continuation)

M3(q) DIC = 3430.313 LOOIC = 3407

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	1.4532	1.5582	1.6771	1.5597	0.058051	1.5549	0.002803	4.8	429	0.096832	1.0034
β1	0.13926	0.22568	0.31861	0.22622	0.048695	0.22828	0.0040402	8.3	145	0.42086	1.0123
β2	0.14841	0.24628	0.34559	0.24568	0.050328	0.24349	0.0013485	2.7	1393	0.037257	1.0019
β3	-0.025857	0.063328	0.15641	0.062271	0.046485	0.063847	0.0018147	3.9	656	0.027202	1.0046
β4	0.25554	0.53268	0.89124	0.54654	0.16583	0.53144	0.011336	6.8	214	0.29242	1.0089
tau	0.14491	0.14566	0.14629	0.14564	0.00035552	0.14568	5.47E-06	1.5	4229	-0.0090938	1.0013
driff	1.5372	1.5814	1.6213	1.5811	0.021121	1.5846	0.00039215	1.9	2901	-0.0078448	1.0031
deviance	3340.8	3361.5	3385.1	3362.3	11.662	3360.3	0.23571	2	2448	0.029415	1.0002

M3(seq)

DIC = 3438.606 LOOIC = 3395

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	1.4442	1.5606	1.6704	1.5601	0.057638	1.5588	0.0025979	4.5	492	0.083716	1.0101
β1	0.13746	0.222	0.31166	0.2263	0.046356	0.21557	0.0037602	8.1	152	0.3015	1.0252
β2	0.14178	0.24393	0.33863	0.24418	0.049562	0.23981	0.0012836	2.6	1491	-0.01123	1.0006
β3	-0.031112	0.062576	0.15301	0.062954	0.046988	0.061079	0.0018897	4	618	0.047258	1.0051
β4	0.25833	0.53928	0.8859	0.5493	0.15935	0.51723	0.011008	6.9	210	0.24249	1.0181
tau	0.14492	0.14566	0.14631	0.14564	0.00035792	0.14568	6.85E-06	1.9	2729	0.0030336	1.0002
driff	1.5427	1.5821	1.6233	1.5815	0.020392	1.5844	0.00039323	1.9	2689	0.0091465	0.99961
deviance	3337.4	3360.9	3383.8	3361.6	11.963	3359.5	0.25356	2.1	2226	-0.0077456	1.002

Control model

M4

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	0.7768	1.0651	1.3293	1.0677	0.1347	1.0575	0.015269	11.3	78	0.58734	1.1173
β1	0.46769	0.80263	1.1715	0.79964	0.17169	0.81004	0.018122	10.6	90	0.5605	1.1142
β2	0.22844	0.31594	0.41114	0.31637	0.047372	0.31586	0.00085215	1.8	3090	0.0046944	0.99995
β3	-0.080609	0.0098223	0.094342	0.0098692	0.045486	0.0053255	0.0013376	2.9	1156	0.027894	1.0027
β4	0.267	0.519	0.8974	0.545	0.1638	0.5375	0.012098	5.5	220	0.2257	1.045
tau	0.14492	0.14564	0.14633	0.14563	0.00036285	0.14565	6.62E-06	1.8	3000	-0.02359	1.0003
driff	1.536	1.5763	1.6188	1.5763	0.021291	1.578	0.00037906	1.8	3155	0.00082978	0.99964
deviance	3362.3	3385.3	3409.8	3385.9	12.084	3383.7	0.26493	2.2	2080	0.0032008	1.0002
theta	0.00023029	0.075957	0.31883	0.10923	0.10529	0.033844	0.0043408	4.1	588	0.074819	1.0088

Supplementary Table 3 (continuation)

Supplementary Table 3: Posterior distribution and convergence statistics for parameters of all models tested in the Multi-Source Interference Task (MSIT) behavioral experiments. The table includes the following statistics: Lower95 and Upper95 indicate the bounds of the 95% credible interval, while Median, Mean, and Mode represent the central tendency of the posterior distribution. SD reflects the uncertainty in the estimate, and MCerr indicates the Monte Carlo error. MC%ofSD shows the Monte Carlo error as a percentage of the standard deviation. SSeff represents the effective sample size, accounting for autocorrelation, AC.50 provides the autocorrelation at lag 50 to assess sample independence. AC.100 provides the autocorrelation at lag 100 to assess sample independence. The psrf (Potential Scale Reduction Factor) indicates convergence, with values close to 1 signifying good convergence.

Supplementary Table 4

fMRI MSIT Model

Regressor: I>C

Cluster Index	Voxels	P	-log10(P)	Z-MAX	Z-MAX X (mm)	Z-MAX Y (mm)	Z-MAX Z (mm)	Z-COG X (mm)	Z-COG Y (mm)	Z-COG Z (mm)	COPE-MAX	COPE-MAX X (mm)	COPE-MAX Y (mm)	COPE-MAX Z (mm)	COPE-MEAN
8	4058	2.28e-21	20.6	4.77	-46	2	30	-26.6	6.07	38	35.1	-32	-2	70	12.9
7	2186	4.92e-14	13.3	4.92	-26	-54	42	-34.6	-45.7	41.2	31.6	-24	-70	46	13.6
6	997	5.96e-08	7.22	4.64	36	-52	42	34.1	-49.8	42.4	24.3	28	-66	52	12.7
5	882	1.79e-07	6.75	4.22	42	0	58	31	-0.361	59.8	34.6	36	0	68	15.9
4	708	1.91e-06	5.72	4.66	44	18	2	39.3	20	1.68	21.5	50	18	-4	9.74
3	661	3.87e-06	5.41	4.35	10	-54	-12	15.6	-51.7	-19.8	9.68	26	-58	-20	6.03
2	430	0.000158	3.8	4.23	42	10	30	46	14.9	29.7	22.5	56	12	36	11.2
1	289	0.00214	2.67	4.22	-20	-54	-20	-27.1	-50.8	-24.7	12.7	-34	-60	-22	6.67

Supplementary Table 4 (continuation)

fMRI MSIT Model

Regressor: Q

Cluster Index	Voxels	P	-log10(P)	Z-MAX	Z-MAX X (mm)	Z-MAX Y (mm)	Z-MAX Z (mm)	Z-COG X (mm)	Z-COG Y (mm)	Z-COG Z (mm)	COPE-MAX	COPE-MAX X (mm)	COPE-MAX Y (mm)	COPE-MAX Z (mm)	COPE-MEAN
3	294	0.000819	3.09	3.62	6	-46	28	2.9	-51.1	30.2	2.59	4	-50	28	2.13
2	250	0.00221	2.65	3.85	-18	34	44	-17.2	37.8	45.1	4.38	-16	42	50	2.85
1	142	0.0337	1.47	3.73	16	46	42	19.1	41.1	43.8	3.68	28	36	50	2.67

Supplementary Table 4: fMRI results for each model regressor. This table presents the following parameters: Cluster Index indicates the identifier for each cluster detected. Voxels shows the number of voxels within each cluster. P represents the corrected p-value for the cluster, while -log10(P) is the negative logarithm of the p-value, facilitating easier interpretation of significance. Z-MAX is the maximum Z-score within the cluster, with Z-MAX X (mm), Z-MAX Y (mm), and Z-MAX Z (mm) indicating the coordinates of the maximum Z-score in millimeters. Z-COG X (mm), Z-COG Y (mm), and Z-COG Z (mm) represent the coordinates of the center of mass of the cluster. COPE-MAX is the maximum Contrast of Parameter Estimates (COPE) value within the cluster, while COPE-MAX X (mm), COPE-MAX Y (mm), and COPE-MAX Z (mm) provide the coordinates of the maximum COPE value in millimeters. Finally, COPE-MEAN indicates the mean COPE value across all voxels in the cluster.

Supplementary Table 5

fMRI MSIT Model

CC = β1 Exp + β2 pCE + β3 pOE + β4 Exp*TMS + β5 Exp*TMStheta+ β6Exp*TMSsfg + β7Exp*TMSsfg*theta

RT ~ β0 + CCt + β8 TMS + β9 TMStheta + β10 TMSsfg + β11 TMStheta*sfg

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	121.1	125.1	129.0	125.1	2.0	124.9	0.12	6.0	280.0	0.198	1.040
β1	11.1	15.0	18.7	15.1	1.9	15.2	0.07	3.7	747.0	0.049	1.002
β2	-2.1	1.8	6.1	1.8	2.1	1.9	0.09	4.2	565.0	0.077	1.001
β3	-10.2	-6.5	-2.8	-6.5	1.9	-6.4	0.07	3.7	714.0	0.084	1.001
β4	-4.2	0.1	5.2	0.2	2.4	-0.1	0.17	7.0	206.0	0.279	1.009
β5	-7.2	-2.7	1.8	-2.7	2.3	-2.6	0.13	5.6	324.0	0.203	1.006
β6	-6.8	-1.3	4.6	-1.3	2.9	-1.3	0.23	8.1	151.0	0.398	1.056
β7	1.9	7.9	13.8	8.0	3.0	7.6	0.24	8.1	154.0	0.374	1.009
β8	-1.9	-0.1	1.6	-0.1	0.9	0.0	0.03	3.9	650.0	0.092	1.004
β9	-2.9	-0.8	1.3	-0.8	1.1	-0.9	0.04	3.3	893.0	0.016	1.001
β10	-5.8	-0.8	4.3	-0.8	2.6	-0.7	0.17	6.5	233.0	0.294	1.046
β11	-5.0	-0.9	3.0	-1.0	2.1	-0.7	0.08	3.9	644	0.082	1.005
tau	1.000	1.011	1.044	1.015	0.015	1.005	0.000	1.9	2845.0	0.003	1.000
deviance	462009	462065	462114	462066	27	462067	0.89	3.3	945.0	0.046	1.003

Supplementary Table 5 (continuation)

Model TMS RT + Accuracy

CC = β1 Exp + β2 pCE + β3 pOE + β4 Exp*TMS + β5 Exp*TMStheta+ β6Exp*TMSsfg + β7Exp*TMSsfg*theta

RT ~ β0 + CCt + β8 TMS + β9 TMStheta + β10 TMSsfg + β11 TMStheta*sfg

Acu ~ βa0 + βa1 CCt-1 + βa2 TMS + βa3 TMStheta + βa4 TMSsfg + βa5 TMStheta*sfg

	Lower95	Median	Upper95	Mean	SD	Mode	MCerr	MC%ofSD	SSeff	AC.50	psrf
β0	120.1	124.1	128.1	124.1	2.1	123.9	0.04	2.0	2404	-0.002	1.000
β1	10.6	14.8	18.8	14.8	2.1	14.7	0.06	2.8	1280	0.019	1.000
β2	-4.6	0.2	4.8	0.3	2.4	0.4	0.06	2.5	1625	0.016	1.002
β3	-9.5	-5.3	-0.9	-5.3	2.2	-5.2	0.06	2.5	1592	0.007	1.003
β4	-3.6	1.2	5.6	1.1	2.4	1.2	0.10	4.0	619	0.057	1.005
β5	-8.6	-3.9	0.7	-3.9	2.4	-4.2	0.10	4.2	568	0.077	1.003
β6	-9.1	-3.0	2.3	-3.0	2.9	-3.1	0.11	3.8	710	0.080	1.010
β7	1.2	7.6	13.6	7.5	3.2	7.6	0.18	5.6	320	0.132	1.002
β8	-2.1	0.4	3.3	0.4	1.4	0.3	0.04	3.2	955	0.046	1.001
β9	-2.6	0.3	3.2	0.3	1.5	0.4	0.05	3.2	966	0.055	1.001
β10	-5.5	-0.9	3.0	-0.9	2.2	-0.9	0.05	2.5	1586	0.034	1.001
β11	-4.5	-0.4	3.1	-0.4	1.9	-0.3	0.07	3.4	873	0.094	1.001
βa0	-1.6	-1.2	-0.8	-1.2	0.2	-1.2	0.00	1.9	2691	0.004	1.000
tau	1.000	1.011	1.047	1.015	0.015	1.005	0.000	2.1	2364	-0.004	1.000
βa1	-0.1	0.0	0.0	0.0	0.0	0.0	0.00	2.2	2135	-0.021	1.003
βa2	-0.3	-0.1	0.2	-0.1	0.1	-0.1	0.00	4.3	531	0.085	1.015
βa3	-0.2	0.0	0.2	0.0	0.1	0.0	0.01	6.2	257	0.222	1.025
βa4	-0.1	0.2	0.5	0.2	0.2	0.2	0.01	3.5	822	0.026	1.009
βa5	-0.4	-0.1	0.2	-0.1	0.2	-0.1	0.01	5.8	298	0.167	1.011
deviance	472044	472095	472157	472096	29	472094	0.81	2.8	1299	0.038	1.000

Supplementary Table 5: Posterior distribution and convergence statistics for parameters of all models tested in the Go-Nogo TMS experiments. The table includes the following statistics: Lower95 and Upper95 indicate the bounds of the 95% credible interval, while Median, Mean, and Mode represent the central tendency of the posterior distribution. SD reflects the uncertainty in the estimate, and MCerr indicates the Monte Carlo error. MC%ofSD shows the Monte Carlo error as a percentage of the standard deviation. SSeff represents the effective sample size, accounting for autocorrelation, AC.50 provides the autocorrelation at lag 50 to assess sample independence. AC.100 provides the autocorrelation at lag 100 to assess sample independence. The psrf (Potential Scale Reduction Factor) indicates convergence, with values close to 1 signifying good convergence.