Supplemental Table 1. Neurons showing a significant effect of S1 distance and stimulus features during the S1 and D1 periods (two-way ANOVA). Numbers (and percentage) of cells. Periarcuate (PA) and dorsolateral prefrontal (PFdl) cortex. For "combined" results, listed in the right three columns, we used p<0.025 for cells selective for S1 up or S1 down, tested separately, and the cells included in the table showed significance for one or the other conditions, or both. Cells with >40 trials.

Task period	Cortical region	N	S1 Distance	Features	Feature by Distance	S1 Distance	Features	Feature by Distance	S1 Distance	Features	Feature by Distance
			S1 up			S1 down			Combined		
early S1	PA	1287	101 (7.8%)	78 (6.1%)	80 (6.2%)	109 (8.5%)	95 (7.4%)	76 (5.9%)	136 (10.6%)	102 (7.9%)	92 (7.1%)
	PFdl	384	35 (9.1%)	28 (7.3%)	27 (7.0%)	23 (6.0%)	33 (8.6%)	20 (5.2%)	35 (9.1%)	35 (9.1%)	26 (6.8%)
late S1	PA	1287	104 (8.1%)	64 (5.0%)	67 (5.2%)	98 (7.6%)	91 (7.1%)	89 (6.9%)	121 (9.4%)	85 (6.6%)	86 (6.7%)
	PFdl	384	44 (11.5%)	29 (7.6%)	28 (7.3%)	31 (8.1%)	19 (4.9%)	25 (6.5%)	46 (12.0%)	29 (7.6%)	32 (8.3%)
D1	PA	1287	106 (8.2%)	76 (5.9%)	70 (5.4%)	105 (8.1%)	89 (6.9%)	86 (6.7%)	135 (10.5%)	97 (7.5%)	99 (7.7%)
	PFdl	384	37 (9.6%)	29 (7.6%)	35 (9.1%)	29 (7.6%)	33 (8.6%)	33 (8.6%)	43 (11.2%)	33 (8.6%)	38 (9.9%)

Supplemental Table 2. Polynomial contrasts for encoding of S1 distance during the early and late S1 period and D1 period. Numbers (and percentage) of cells. Periarcuate (PA) and dorsolateral prefrontal (PFdl) cortex.   For "combined" results, listed in the right three columns, we used $p<0.025$ for cells selective for S1 up or S1 down, tested separately, and the cells included in the table showed significance for one or the other conditions, or both. Cells with >40 trials.

Task period	Cortical region	N [a]	linear[b]	quadratic[b]	cubic[b]	linear[b]	quadratic[b]	cubic[b]	linear[b]	quadratic[b]	cubic[b]
				S1 up			S2 down			Combined	
early S1	PA	1287	22 (22.0%)	12 (12.0%)	19 (19.0%)	28 (26.2%)	19 (17.8%)	17 (15.9%)	38 (38.4%)	21 (21.2%)	15 (15.1%)
	PFdl	384	6 (18.2%)	7 (21.2%)	5 (15.1%)	6 (26.1%)	5 (21.8%)	5 (21.7%)	6 (21.4%)	8 (28.6%)	8 (28.6%)
late S1	PA	1287	24 (21.6%)	21 (19.0%)	26 (23.4%)	21 (21.9%)	22 (23.0%)	15 (15.6%)	32 (29.7%)	31 (28.7%)	18 (16.7%)
	PFdl	384	9 (20.4%)	9 (20.4%)	11 (25.0%)	7 (21.9%)	6 (18.4%)	11 (34.4%)	11 (29.0%)	13 (34.2%)	6 (15.8%)
D1	PA	1287	29 (27.1%)	19 (17.8%)	18 (16.8%)	18 (17.5%)	19 (18.4%)	24 (23.3%)	36 (32.1%)	26 (23.2%)	23 (20.5%)
	PFdl	384	14 (38.9%)	1 (2.8%)	4 (11.1%)	3 (10.3%)	10 (34.5%)	4 (13.8%)	12 (36.4%)	6 (18.2%)	6 (18.2%)

[a] Total sample size
[b] % of cells with significant effects by ANOVA.

Supplemental Table 3. Results of ANOVA divided by up and down stimuli. For the S2 period, trials with all D2 periods were used, including those with a D2 of 0 ms (i.e., no D2 period). For the D2 and Choice and Action periods, the trials with no D2 were excluded. Cells with >40 trials.

Cortical region	Task period	N	main effect: S1 or S2 farther				main effect: red or blue farther			
			S2 up	S2 down	And	Or	Blue up	Blue down	And	Or
PA	early S2	1287	344	293	138	402	231	211	64	378
	late S2	1287	407	354	208	456	345	318	165	498
	D2	1287	224	166	66	242	256	280	148	388
	C&A	1287	123	104	16	132	246	233	132	347
PFdl	early S2	384	93	65	29	103	37	51	12	76
	late S2	384	89	96	41	113	97	85	43	139
	D2	384	52	45	13	65	61	56	20	97
	C&A	384	25	24	2	28	70	69	32	107

Supplemental Table 4. Cells in the lower left and upper right of the scatter plots. Cells with >40 trials.

Periarcuate		Prefrontal	
Feature-distance index			
EarlyS2 47/64 (73.4%)	Late S2 152/165 (92.1%)	Early S2 9/12 (75%)	Late S2 40/43 (93%)
D2 132/148 (89.8%)	C&A 130/132 (98.5%)	D2 17/20 (85%)	C&A 32/32 (100%)
Order-distance index			
Early S2 120/138 (87.0%)	Late S2 203/208 (97.6%)	Early S2 27/29 (93.1%)	Late S2 35/41 (85.4%)
D2 57/66 (86.4%)	C&A 11/16 (68.8%)	D2 11/13 (84.6%)	C&A 2/2 (100%)

Supplemental Table 5. Results of stepwise regression for relative distance coding based on order. Cells with >40 trials. For the S2 period, trials with all D2 periods were used, including those with a D2 of 0 ms (i.e., no D2 period). For the D2 and Choice and Action periods, the trials with no D2 period were excluded.
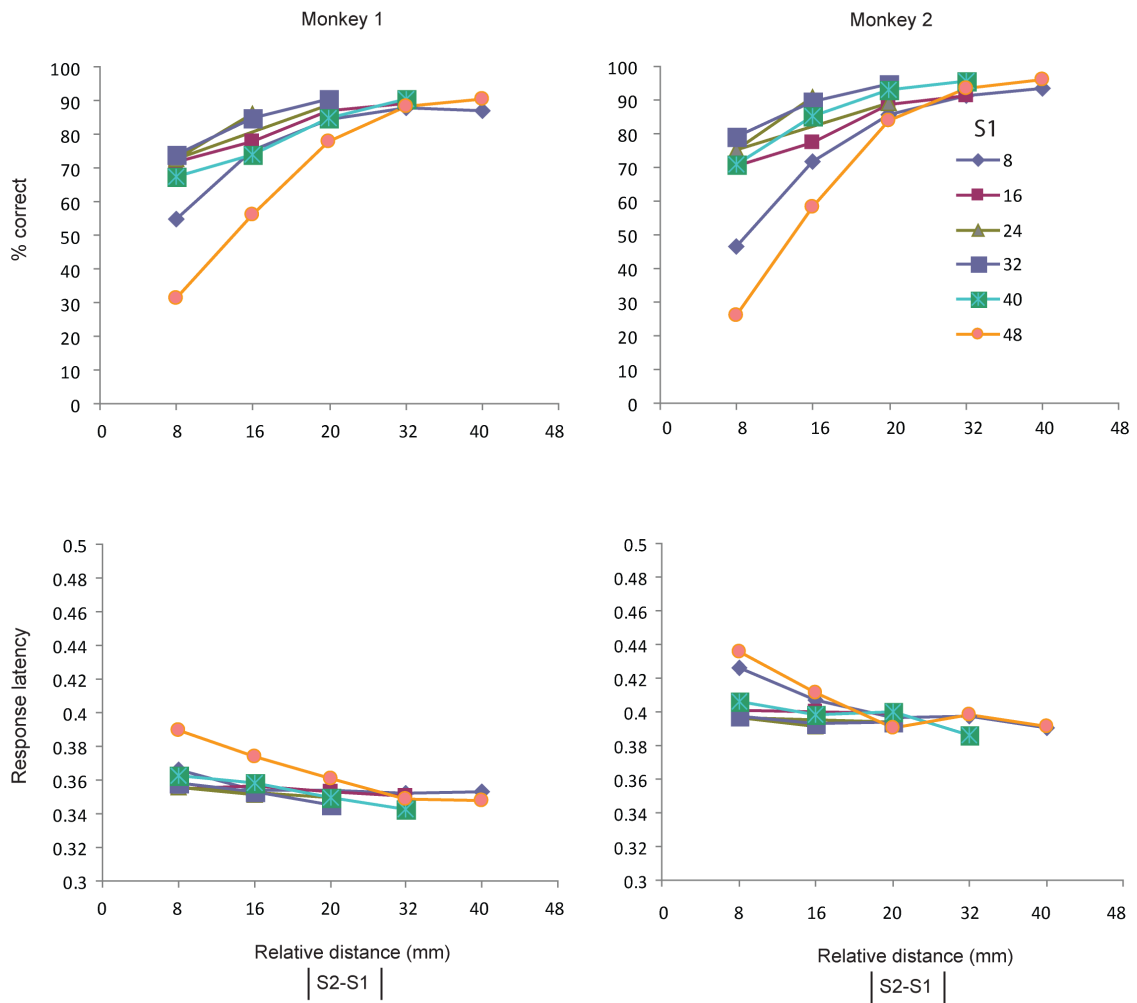
Cortical region	Task period	N	S1 distance				S2 distance				S2-S1 difference				S2-S1 farther			
			S2 up	S2 down	And	Or	S2 up	S2 down	And	Or	S2 up	S2 down	And	Or	S2 up	S2 down	And	Or
PA	early S2	1287	64	57	5	72	130	149	39	189	107	100	12	165	167	142	36	226
	late S2	1287	69	72	3	90	134	128	18	187	90	94	12	135	225	208	81	299
	D2	1287	50	40	1	60	92	77	9	112	70	51	4	79	111	102	14	147
	C&A	1287	42	51	2	54	62	42	2	64	49	32	0	48	64	65	5	79
PFdl	early S2	384	20	24	2	31	41	45	9	58	35	18	2	33	50	29	5	62
	late S2	384	9	20	0	20	33	43	5	51	20	23	3	35	58	47	11	76
	D2	384	10	12	0	13	26	21	2	30	17	12	0	15	31	30	7	37
	C&A	384	10	16	0	16	11	14	0	14	13	7	0	17	18	16	3	20

Supplemental Table 6. Results of stepwise regression for relative duration coding based on stimulus features. Cells with >40 trials. For the S2 period, trials with all D2 periods were used, including those with a D2 of 0 ms (i.e., no D2 period). For the D2 and Choice and Action periods, the trials with no D2 were excluded. For cells selective for S1 up or S1 down, we used p < 0.025.
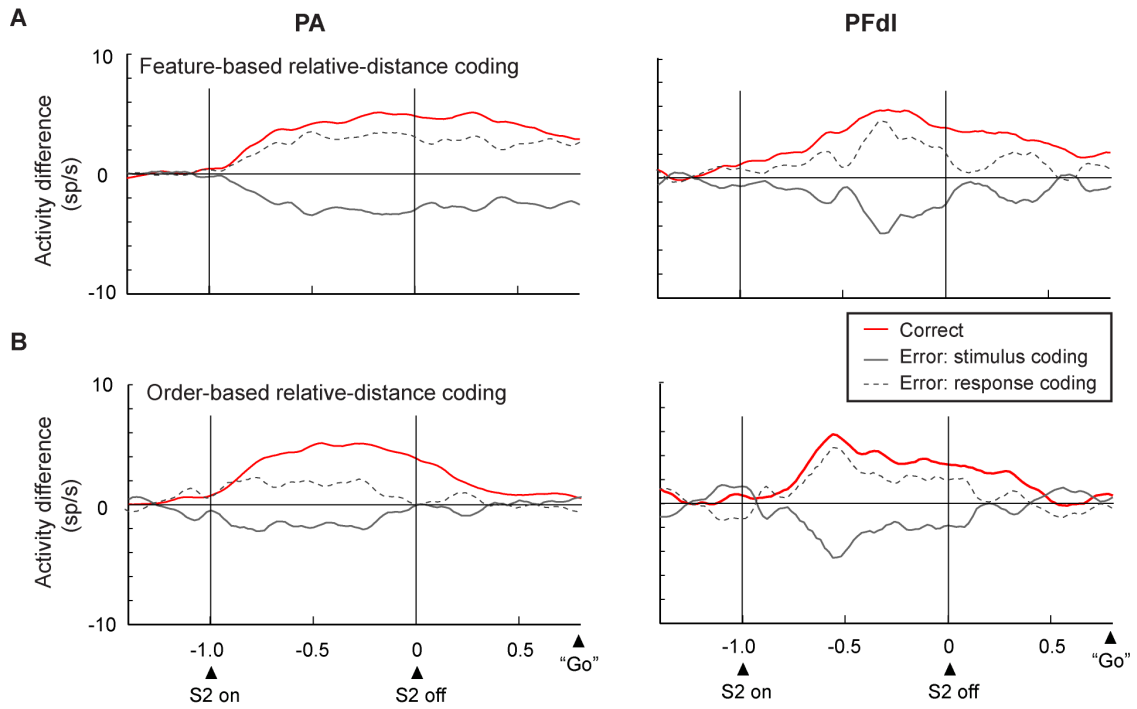
Cortical region	Task period	N	Blue distance				Red distance				Blue-Red difference				Blue or Red farther			
			S2 up	S2 down	And	Or	S2 up	S2 down	And	Or	S2 up	S2 down	And	Or	S2 up	S2 down	And	Or
PA	early S2	1287	84	82	5	88	88	90	10	118	50	69	2	74	114	107	22	148
	late S2	1287	102	91	13	133	84	80	8	111	84	77	8	112	223	183	95	267
	D2	1287	87	54	5	97	54	74	6	85	84	60	7	112	179	143	67	209
	C&A	1287	55	58	3	53	72	66	7	83	51	51	1	70	179	171	82	214
PFdl	early S2	384	31	31	5	31	29	22	3	34	19	8	2	19	21	24	7	28
	late S2	384	20	26	1	35	20	24	4	32	16	21	1	30	68	58	23	82
	D2	384	20	17	2	24	28	26	4	31	19	17	0	21	36	35	10	49
	C&A	384	22	22	1	28	19	13	0	22	22	21	3	25	33	43	14	30

Supplemental Table 7. Results of 12-factor stepwise regression for relative distance coding based on order, features, and position during the early S2, late S2, D2, and C&A periods. Cells with >40 trials. Abbreviation: diff, difference.

Area	Task period	N	Order				Features				Position			
			S1	S2	S2-S1 diff	S1 or S2 farther	Blue	Red	Red-Blue diff	Red or Blue farther	Up	Down	Down-Up diff	Down or Up farther
PA	early S2	384	21 5.5%	39 10.2%	42 10.9%	41 10.7%	13 3.4%	20 5.2%	14 3.6%	32 8.3%	16 4.2%	9 2.3%	20 5.2%	30 7.8%
	late S2	384	10 2.6%	36 9.4%	35 9.1%	67 17.4%	13 3.4%	17 4.4%	25 6.5%	81 21.1%	14 3.6%	8 2.1%	20 5.2%	38 9.9%
	D2	384	9 2.3%	22 5.7%	27 7%	33 8.6%	23 6%	19 4.9%	25 6.5%	43 11.25%	14 3.6%	13 3.4%	16 4.2%	19 4.9%
	C&A	384	11 2.9%	12 3.1%	11 2.9%	15 3.9%	16 4.2%	17 4.4%	24 6.3%	57 14.8%	10 2.6%	9 2.3%	8 2.1%	18 4.7%
PFdl	early S2	1287	66 5.1%	120 9.3%	122 9.5%	210 16.3%	46 3.6%	69 5.4%	55 4.3%	165 12.8%	66 5.1%	66 5.1%	88 6.8%	108 8.4%
	late S2	1287	56 4.4%	115 8.9%	121 9.4	292 22.7	69 5.4%	54 4.2%	85 6.6%	269 20.9%	50 3.9%	55 4.3%	62 4.8%	112 8.7%
	D2	1287	45 3.5%	68 5.3%	79 6.1%	146 11.3%	41 3.2%	43 3.3%	83 6.4%	212 16.5%	40 3.1%	39 3.0%	31 2.4%	85 6.6%
	C&A	1287	33 2.6%	51 4.0%	54 4.2%	94 7.3%	38 3.0%	49 3.8%	57 4.4%	253 19.7%	41 3.2%	30 2.3%	31 2.4%	46 3.6%

Supplementary Figure 1. Percent correct (top) and response latency (bottom) for first stimuli (S1) at various distances from the central reference point (color code, in mm from the reference), as a function of the relative distance between the first and second (S2) stimulus.

Supplemental Figure 2. Population difference plots. Difference in activity between preferred and anti-preferred stimulus-distance combinations for correct and error trials. (**A**) Feature-based distance coding. (**B**) Order-based distance coding. For errors, the difference is for which stimulus was farther (solid lines) and for which stimulus the monkey (incorrectly) chose as being farther (dashed lines).