A

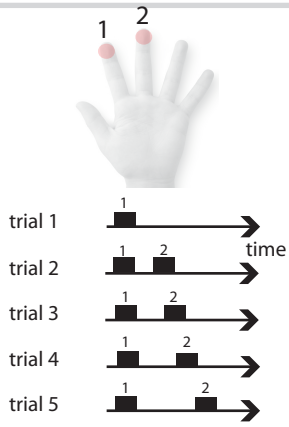
instruction

You will be presented with 2 stimuli

At first there will be no gap between them
We will then introduce an increasing gap

After each trial tell us whether you feel
one stimulius "same" or two stimuli "different"
or whether you can identify the location
of the first stimuli " index finger" or "middle finger"

stimuli



response

Verbal response

Options:
"same"
"different"
"index"
"middle"

B

Non-sensory factors

age, sex, intelligence, attention/concentration
influence of bias (predictable design), experimenter instruction (may have strong prior)
value/cost assigned to each answer (motivation, personality, whether patient or control)

Sensory encoding → **Sensory integration** → **Executive demand** → **Response output**

Sensory encoding	Sensory integration	Executive demand	Response output
somatosensory	temporal	Decision 1: same or different	speech area
visual	spatial	Decision 2: topography	motor execution
timing	detection of change		of speech

C

abnormal temporal discrimination

hypokinetic movement disorders

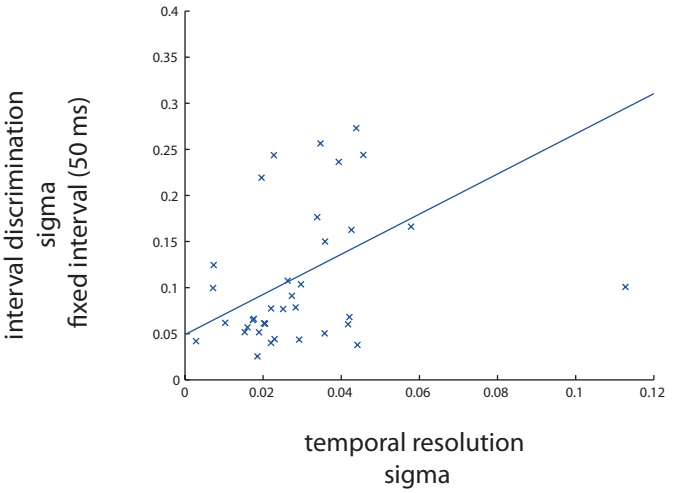
Parkinson's disease
PINK1 homo- and hetero-zygotes
MSA

functional movement disorders

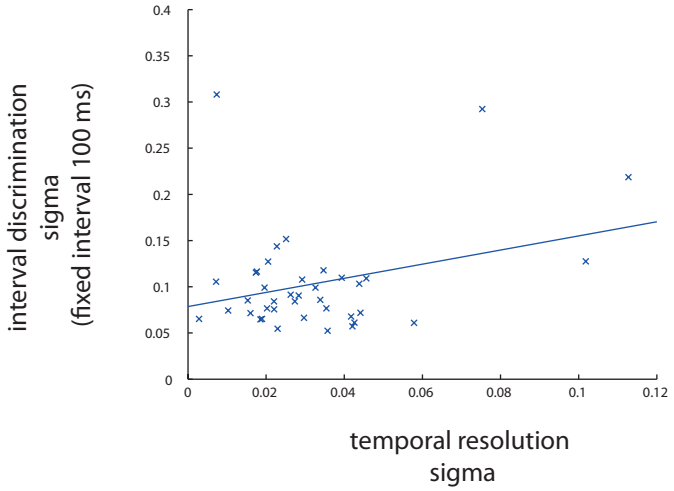
hyperkinetic movement disorders

cervical dystonia
first degree relatives of cervical dystonia
blepharospsm
spasmodic dystonia
writing dystonia, musician's dystonia
DYT1 dystonia
non-manifesting DYT1 mutation carriers
isolated head and voice tremor

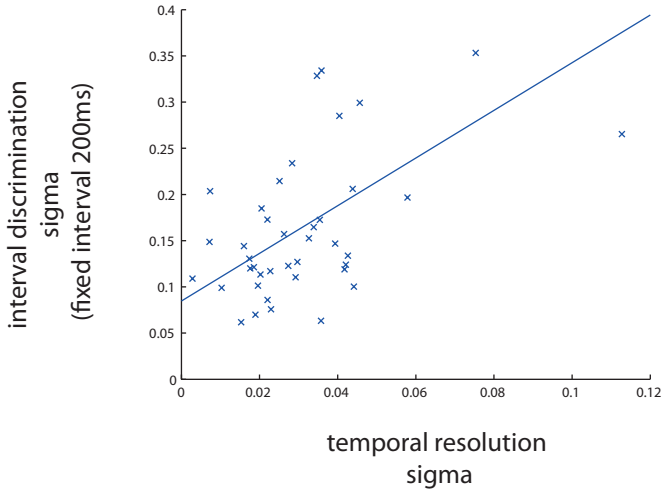
Supplementary Figure 3.



rho = 0.51
p=.0010



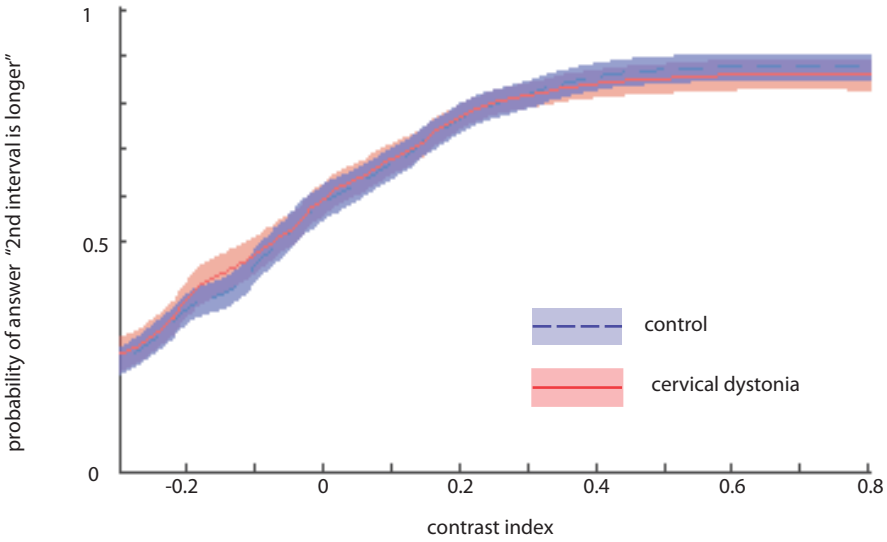
rho = 0.30
p=.0570



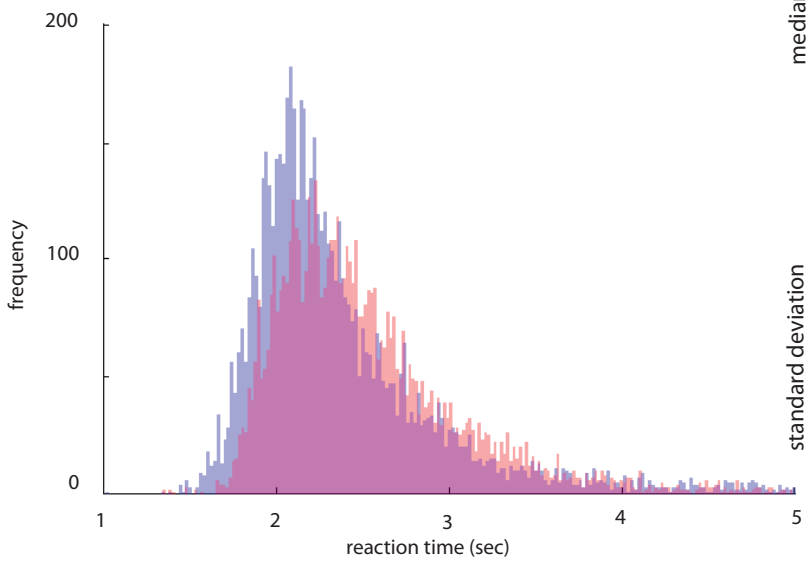
rho = 0.64
p<.0001

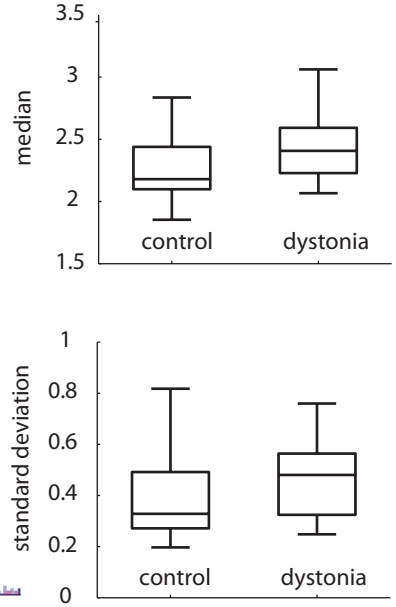
Interval discrimination

A. Psychometric analysis

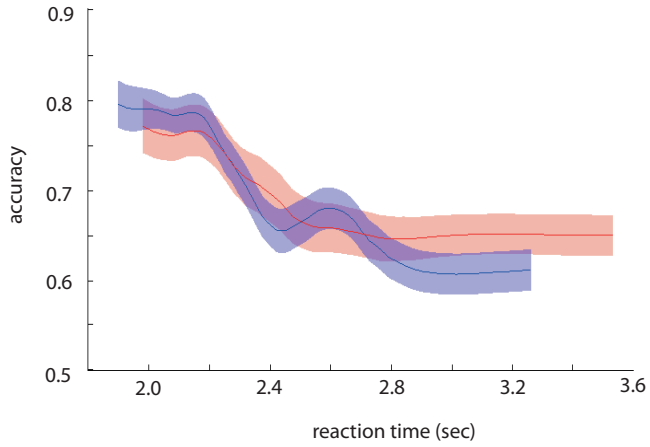


B. Reaction time

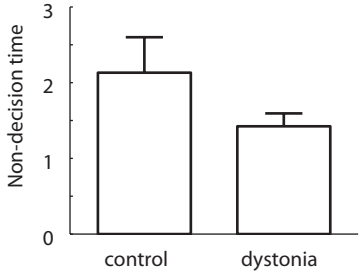


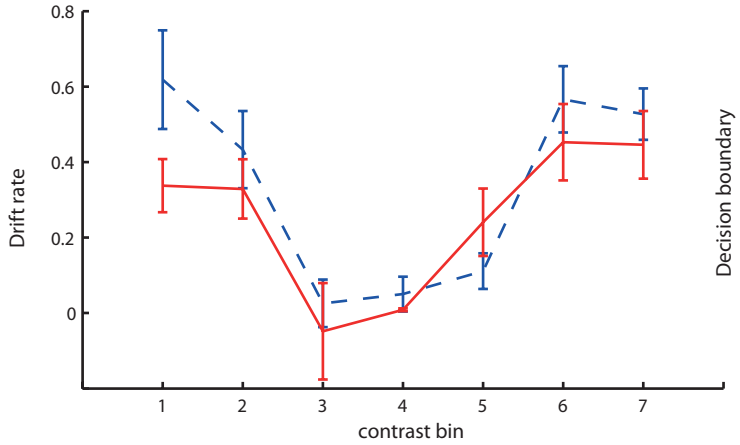


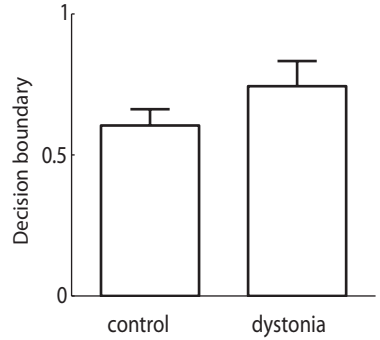
C. Accuracy vs reaction time



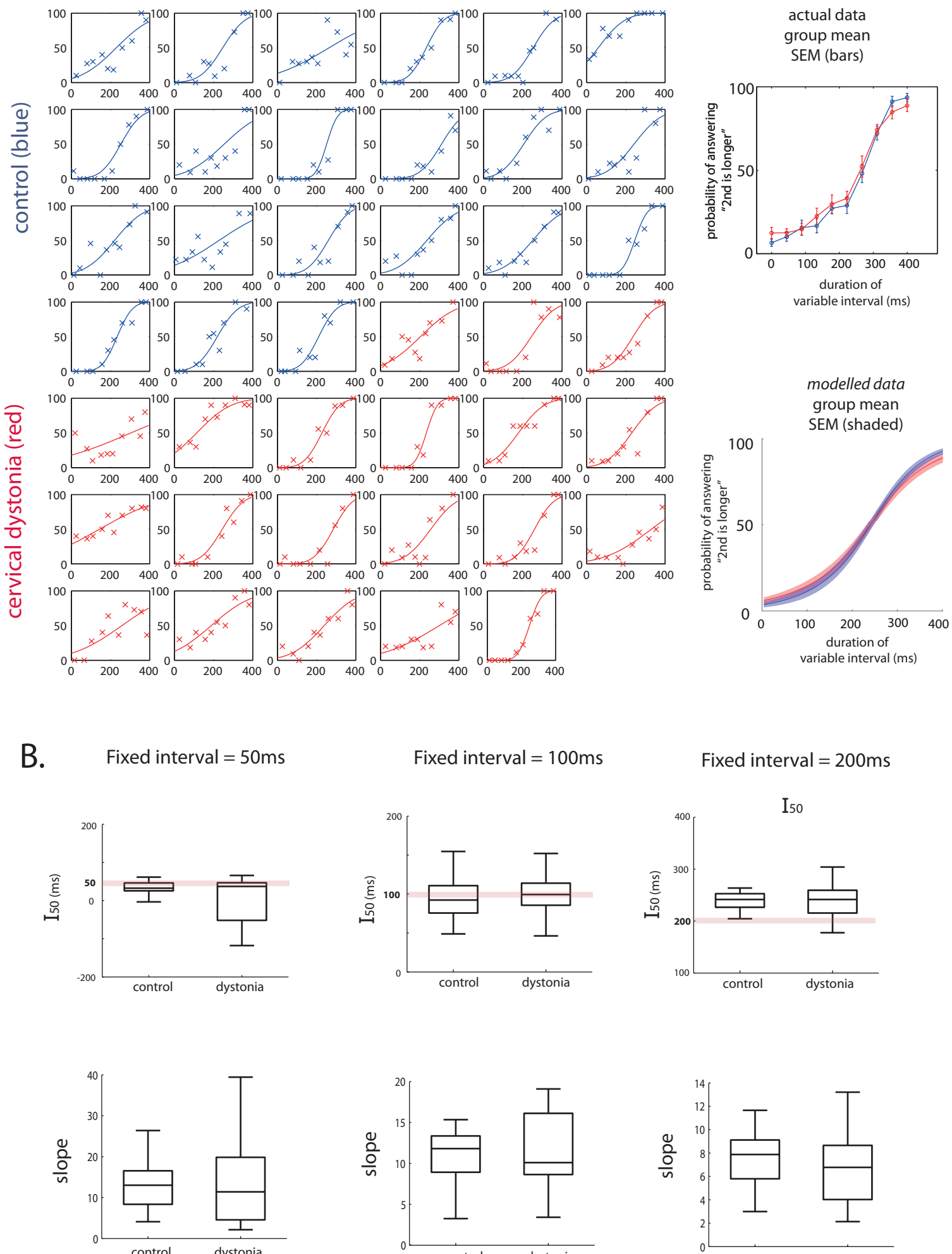
D. Drift diffusion model



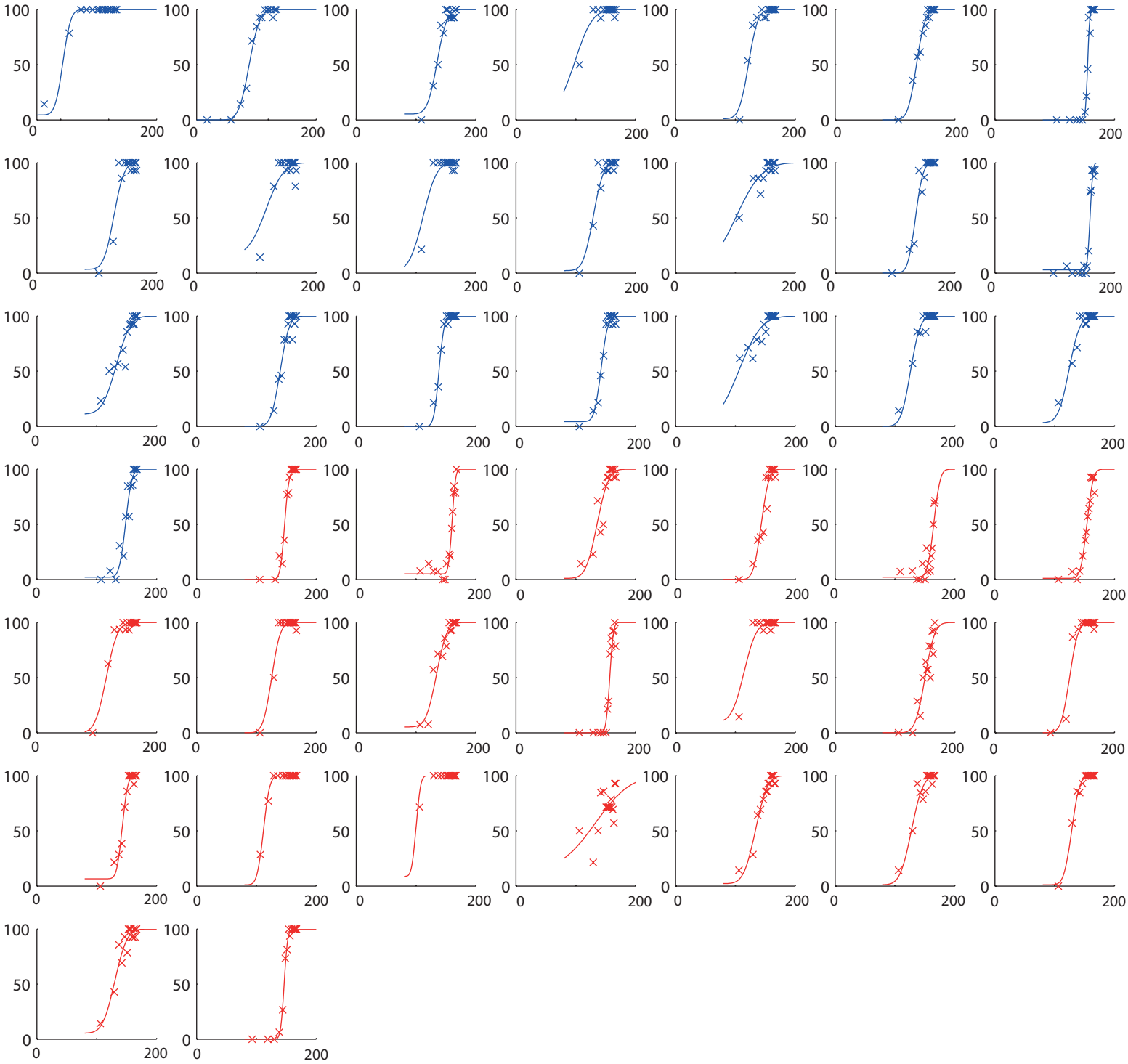


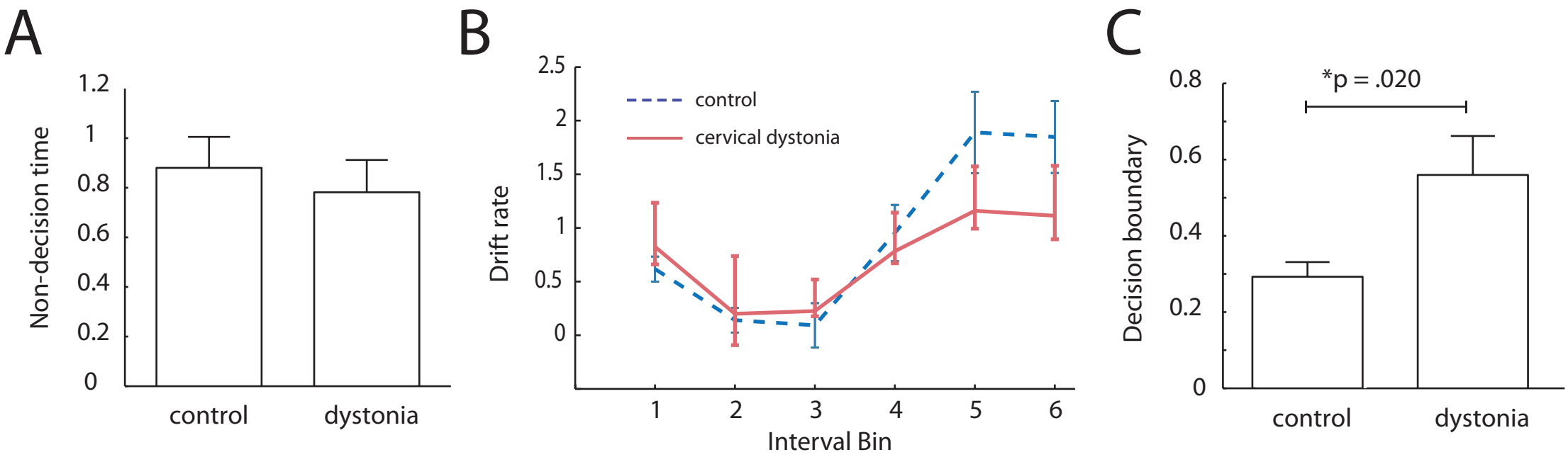


Supplementary Figure 2.

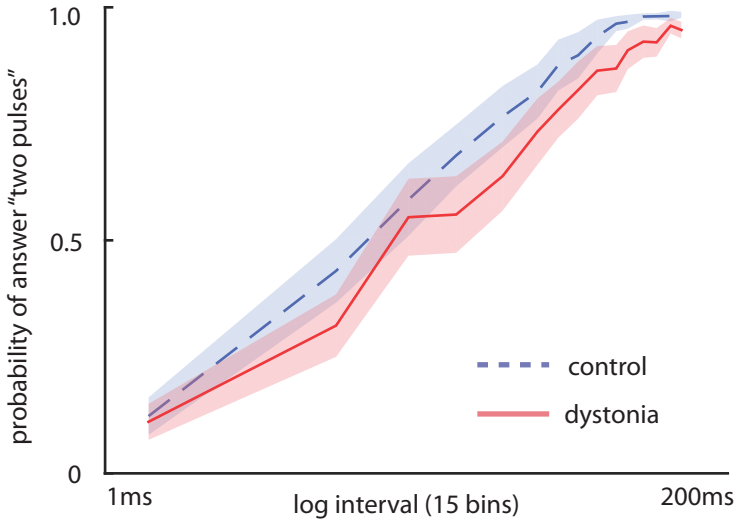


Supplementary Figure 1.



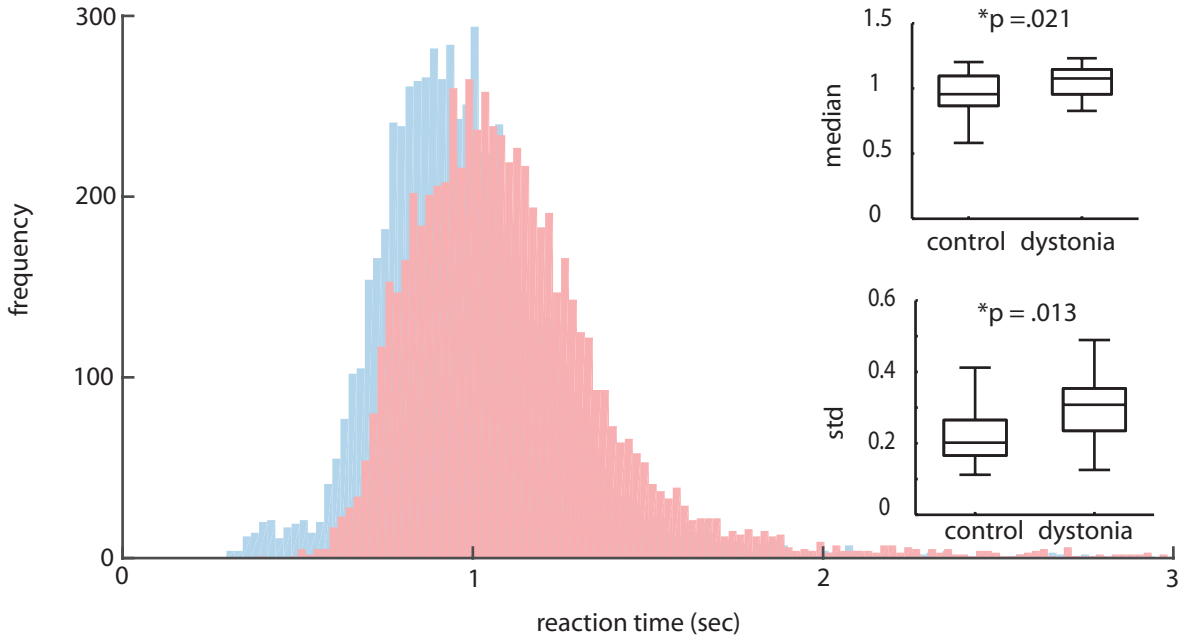

A
Non-decision time
1.2
1
0.8
0.6
0.4
0.2
0
control
dystonia
B
Drift rate
2.5
2
1.5
1
0.5
0
control
cervical dystonia
1
2
3
4
5
6
Interval Bin
C
Decision boundary
*p = .020
0.8
0.6
0.4
0.2
0
control
dystonia

A

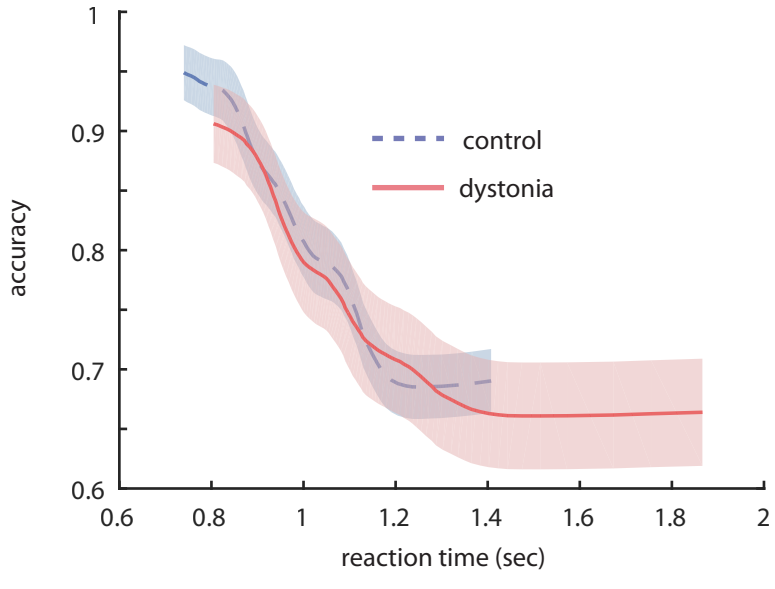


	hit rate (%)	false pos (%)	T_{50} (ms)	T_{75} (ms)	T_{98} (ms)	slope
control	83.4	2.15	31.9	64.3	141	38.9
dystonia	77.4	1.08	36.6	88.1	168	31.0
p-value	0.197	0.774	0.302	0.302	0.707	0.189

B

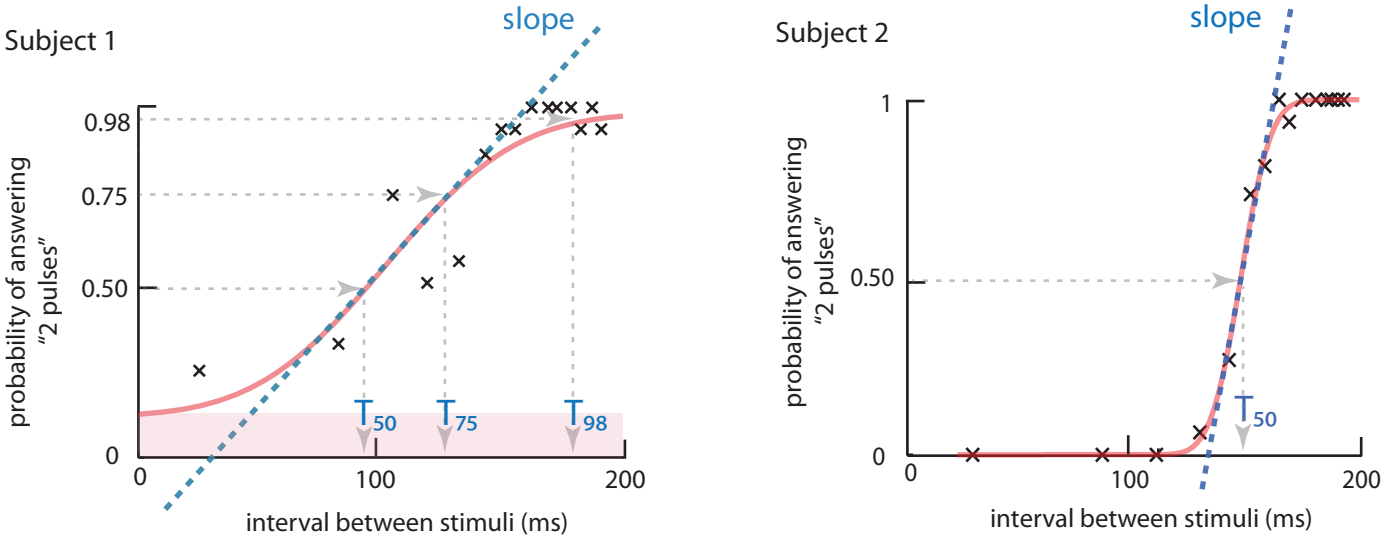


C



A Psychometric analysis

symbol	*parameter*	*interpretation*
T50	0.50 threshold	sensitivity measure at different levels of response certainty
T75	0.75 threshold	
T98	0.98 threshold	
-	0.50 slope	acuity/range of parameter over which decision difficult



B Drift diffusion model

parameter	*interpretation*
nondecision time	sum of all other processes involved (sensory encoding, motor execution of response)
drift rate	quality of stimulus, amount of input information
decision boundary	criterion setting/speed-accuracy trade off