POSTER PRESENTATION



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What is the effect of noise on the interval timing neural network?

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Cognitive processes, such as decision making, rate calculation and planning, are strongly affected by the ability of subjects to perceive durations in the seconds-tohours range (interval timing) [1]. A classic interval timing paradigm is the peak interval (PI) procedure which consists of interspersed reinforced and probe trials. During the reinforced trials, a stimulus such as a tone or light is turned on to signal the beginning of the to-betimed interval and the subject's first response after the criterion time is reinforced. During the probe trials, no reinforcement is given and the stimulus remains on for about three times the criterion time [2]. The mean response rate over a very large number of trials has a Gaussian shape whose peak measures the accuracy of criterion time estimation and the spread of the timing function measures its precision. In the vast majority of species, protocols, and manipulations to date, interval timing is both accurate and time-scale invariant, i.e. time-estimation errors increase linearly with the estimated duration [3]. We used a computational model of interval timing that mimics the activity of cortico-striatal structures involved in interval timing known as striatal beat frequency (SBF) model (Figure 1) [4]. In mammals, administration of DA agonist, *e.g.*, methamphetamine or cocaine produce an immediate, scalar (proportional), leftward shift in perceived time (responding earlier in time than under control conditions) whereas DA antagonist, *e.g.*, haloperidol, has an opposed effect. Upon



Figure 1 (A) Schematic representation of the two main areas involved in interval timing: frontal cortex (FC) and basal ganglia (BG). (B) SBF model consists of a set of cortical oscillators, a reference memory that stores the state of the system at reinforcement time, a working memory, and a decision block that mimic the activity of BG's spiny neurons. FC: frontal cortex; MC: motor cortex; BG: basal ganglia; TH: thalamus. GPE: globus pallidus external; GPI: globus pallidus internal; STn: subthalamic nucleus; SNc/r: substantia nigra pars compacta/reticulata; VTA: ventral tegmental area; Glu: glutamate; DA: dopamine; GABA: gamma-aminobutyric acid; ACh: acetylcholine.}

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