



## Identifying Termination Rules in Perceptual Decision Making

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Both descriptive and normative theories of decision making over the last decades[1] have consolidated a model whereby decision commitment takes place when the relative evidence favoring one alternative reaches a certain decision bound. However, sensory evidence is often terminated before a decision bound has been reached. How is commitment achieved under incomplete evidence? Almost universally, it has been assumed that decision-makers will, in these conditions, choose the option to which the decision variable is closest when evidence is terminated[2]. However, the empirical validity of this rule has not been scrutinized against alternatives. Here, we studied this problem in a rat sound lateralization task which we have previously shown is very well described by a model based on bounded accumulation of evidence[3]. To study early termination, we imposed varied maximum sound durations, sometimes shorter than the typical reaction time (RT).

The baseline RT behavior was well described by a variant of the drift diffusion model (DDM) including both stimulus dependent and anticipatory processes[4]. However, the standard early termination rule failed to describe choice accuracy for short duration stimuli, and had to be modified in two ways: first, by considering that evidence integration continues after offset (approximated by exponential decay of the neural activity providing the sensory input). Second, by assuming that if the decision bound is not reached during this period, the subsequent choice is random, implying that rats appear to fail to translate accumulated evidence into choices unless the decision bound is hit within the extended integration period. Overall, this work quantifies decision-making under temporal constraints, indicating that bound-crossing is a fundamental requirement to reliably convert integrated sensory evidence into a specific behavioral choice.

**perceptual decision-making, evidence accumulation, reaction time, computational modeling, incomplete evidence**