

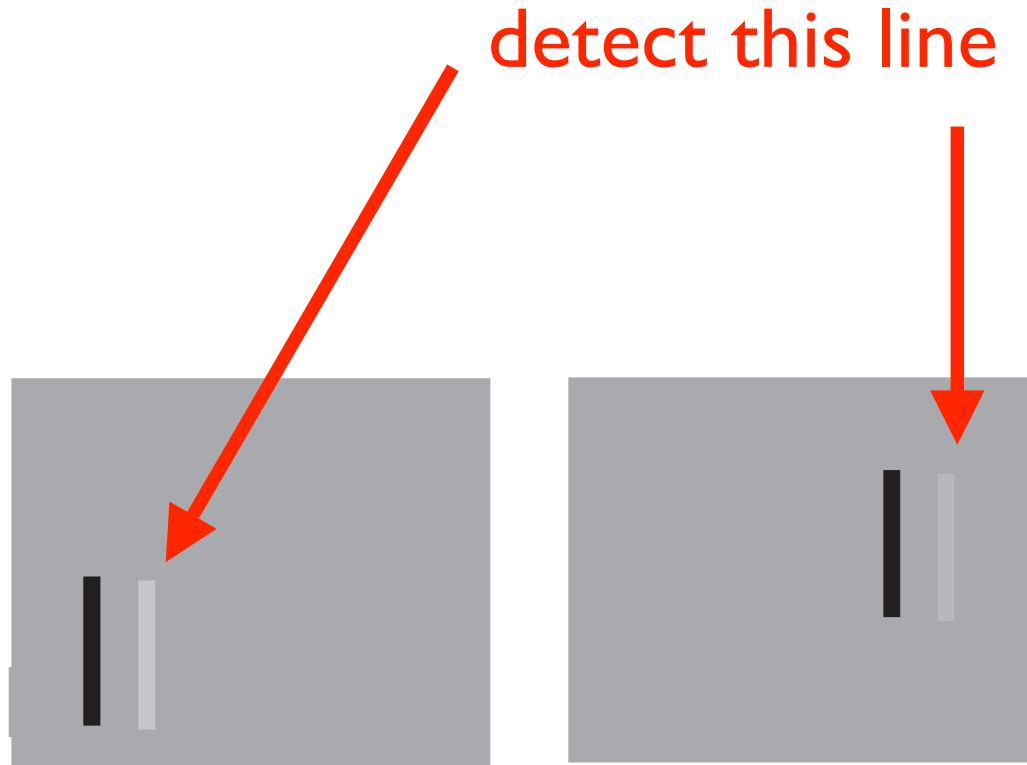
Background: Evidence

Gregor Schöner
Institute for Neural Computation (INI)
dynamicfieldtheory.org

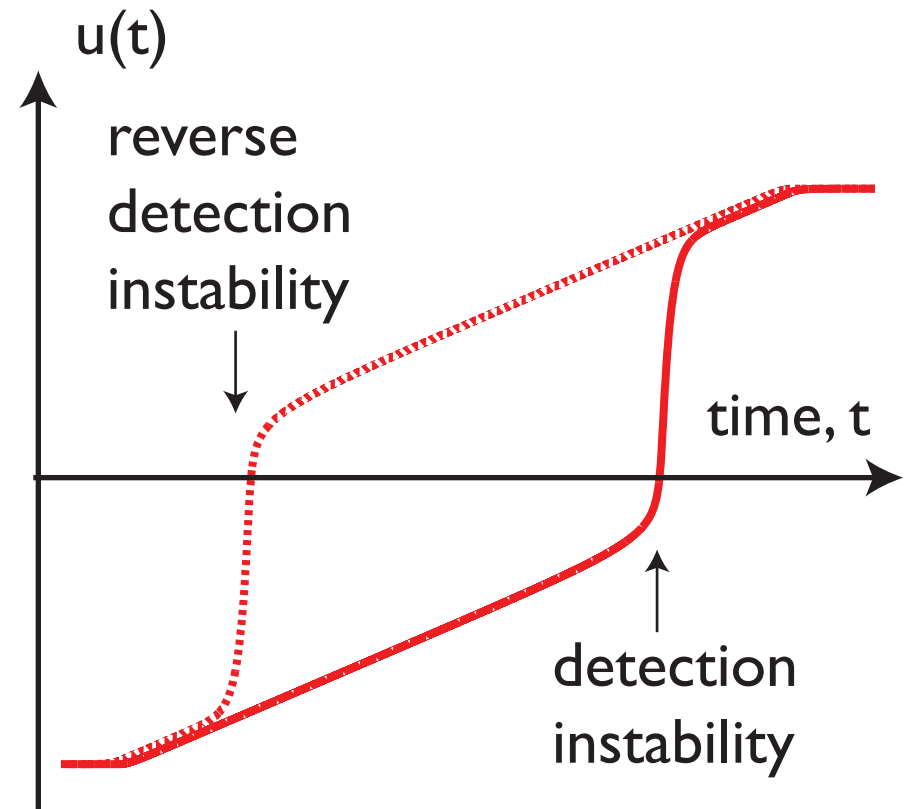
Detection

- are peaks/units of representation separated from sub-threshold activation states by a gap caused by interaction

Very low level perception

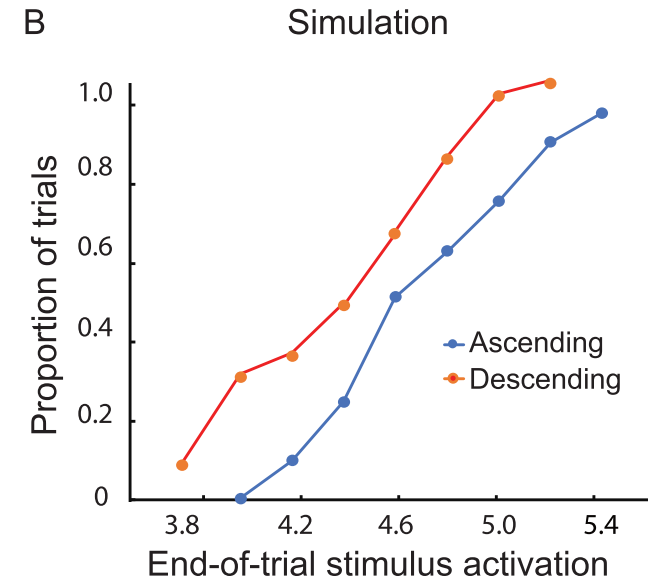
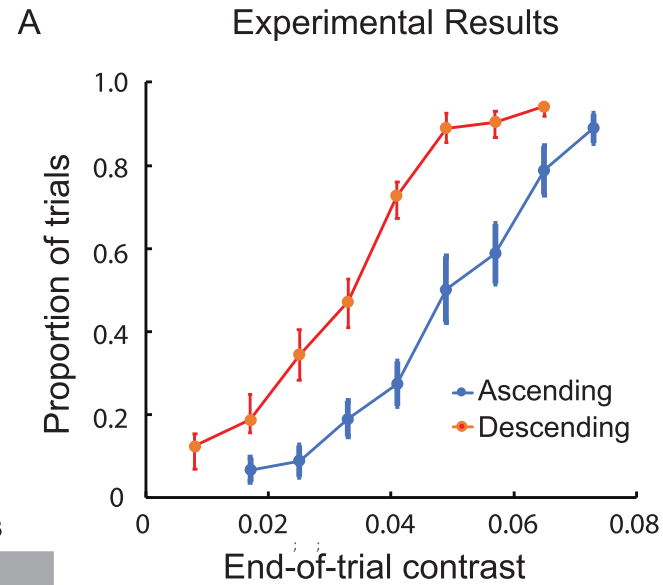
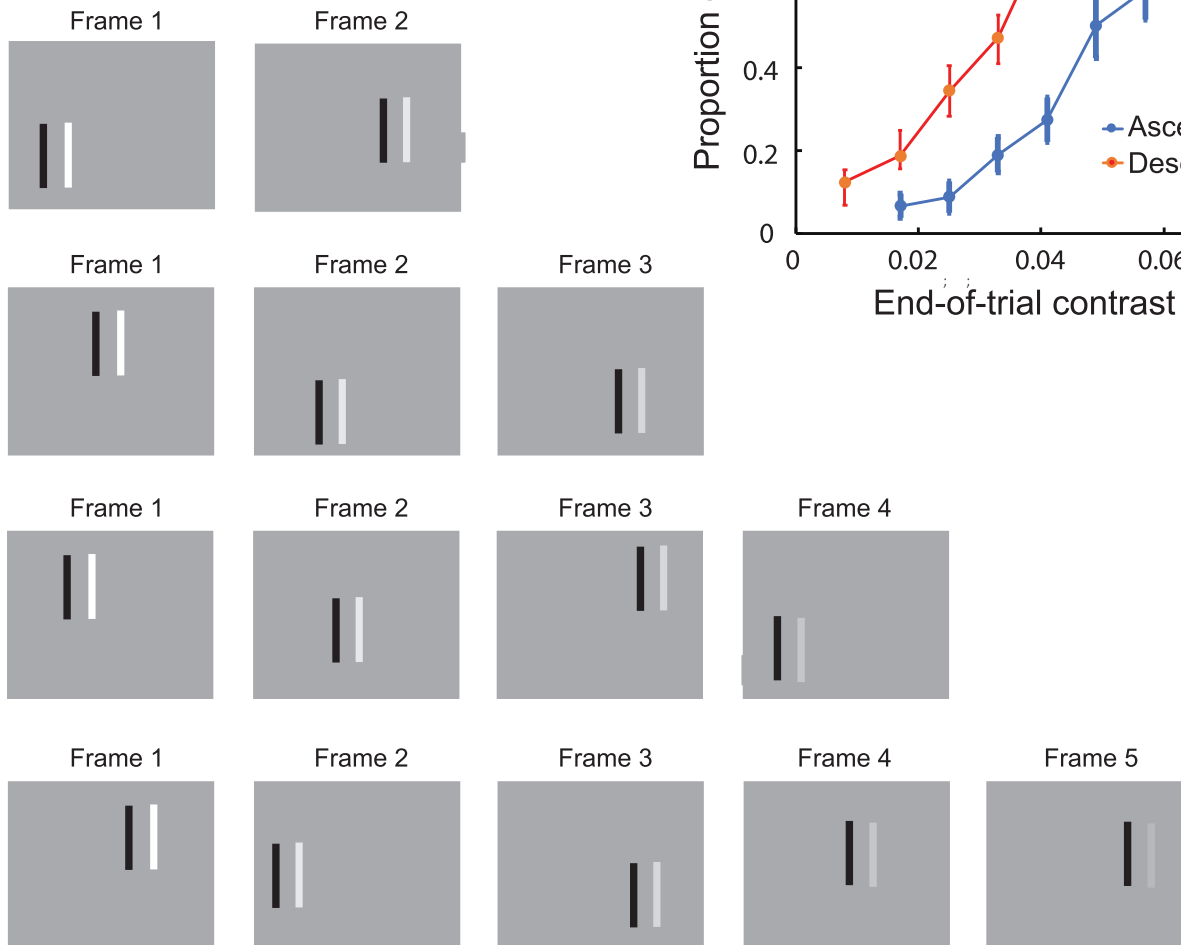


- hysteresis => activation state depends direction of change of input strength



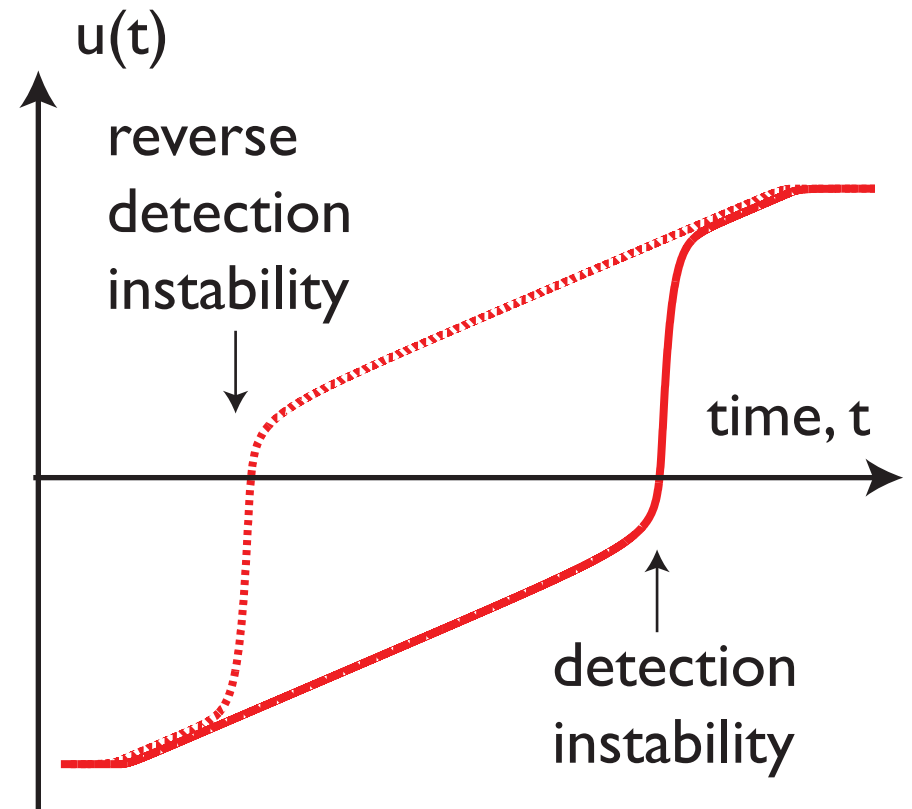
Detection depends on prior state

modified method
of limits



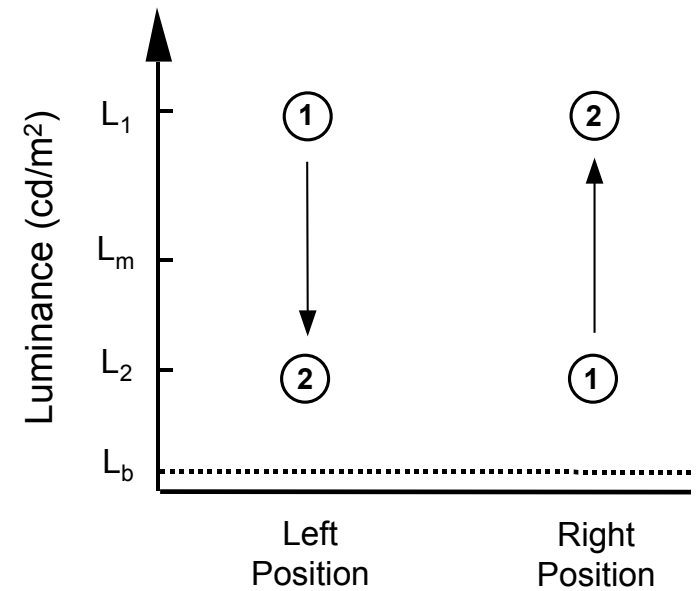
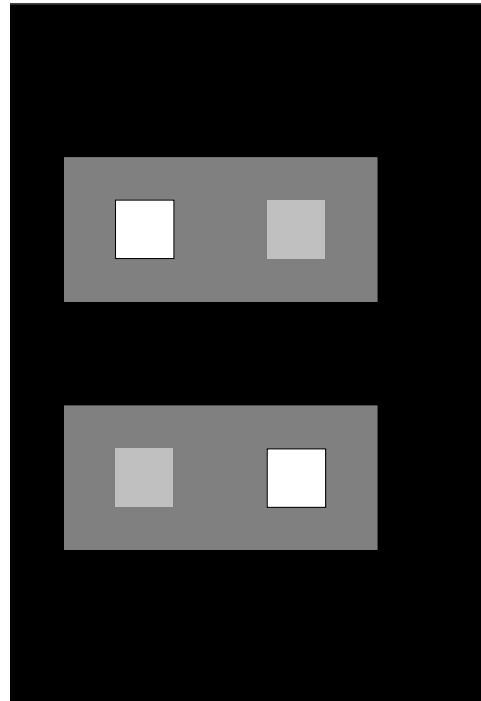
[Hock, Schöner:] Vision 2023]

■ => activation state depends not only on input but also on the prior activation state:



Motion detection

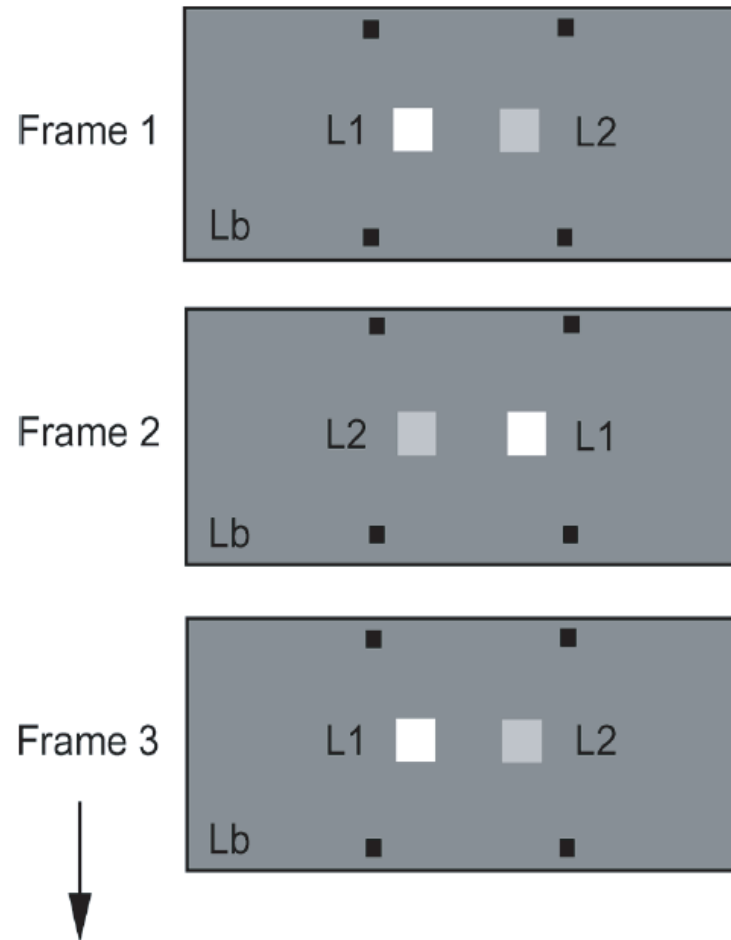
■ in the detection of Generalized Apparent Motion



[Gilroy, Hock *JEP:HPP* 2004]

Detection instability

 varying
BRLC



$$L_m = \frac{L_1 + L_2}{2}$$

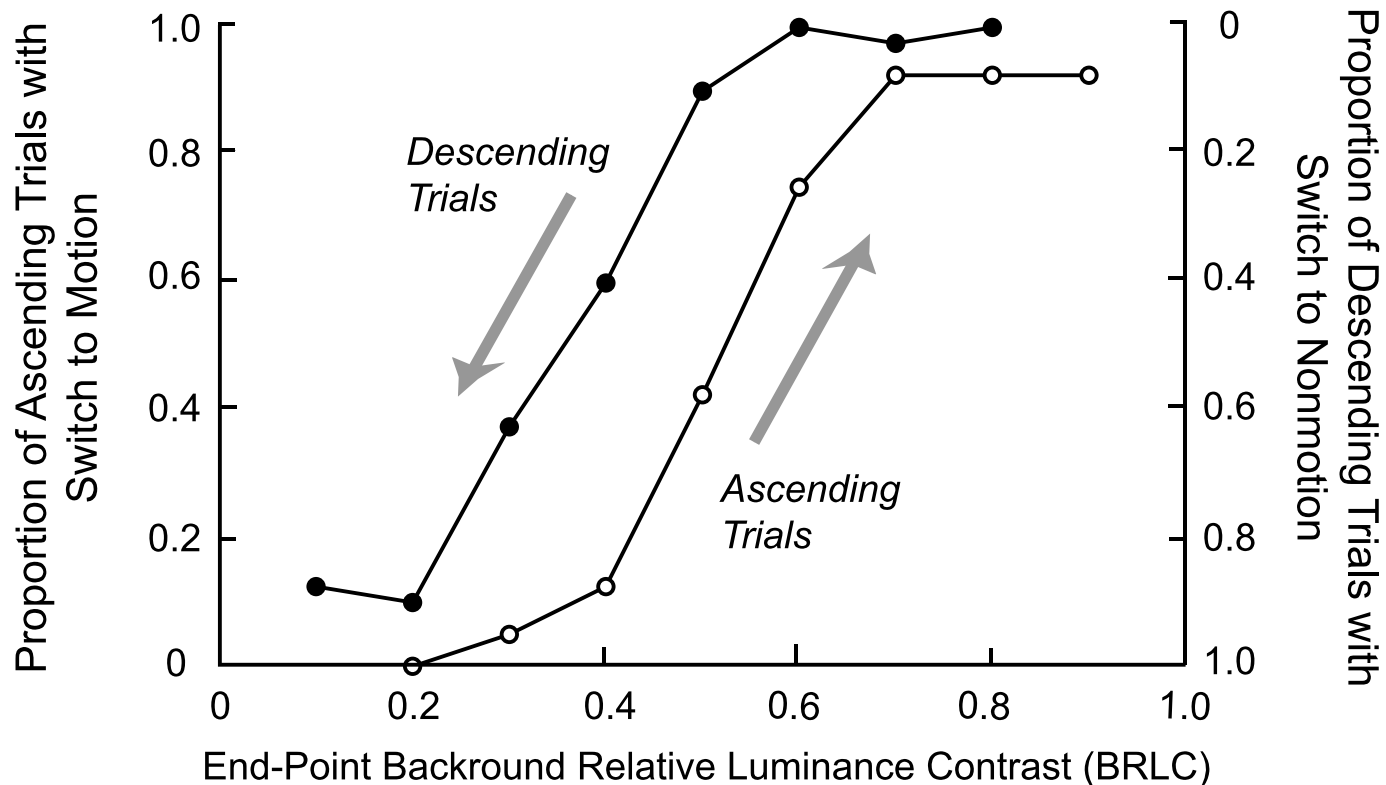
$$\text{Background-Relative Luminance Change (BRLC)} = \frac{L_1 - L_2}{L_m - L_b}$$

[Gilroy, Hock *JEP:HPP* 2004]

Detection instability

- hysteresis of motion detection as BRLC is varied
- (while response bias is minimized)

H. S. Hock, G. Schöner / Seeing and Perceiving 23 (2010) 173–195



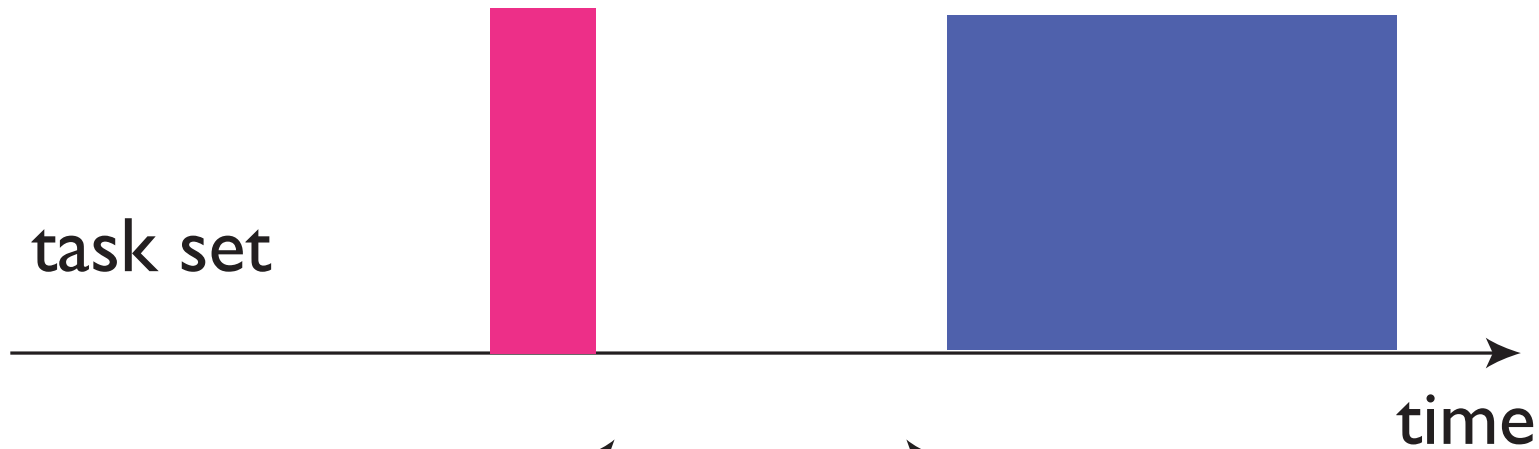
Selection

reaction time (RT) paradigm

imperative
signal=
go signal

response

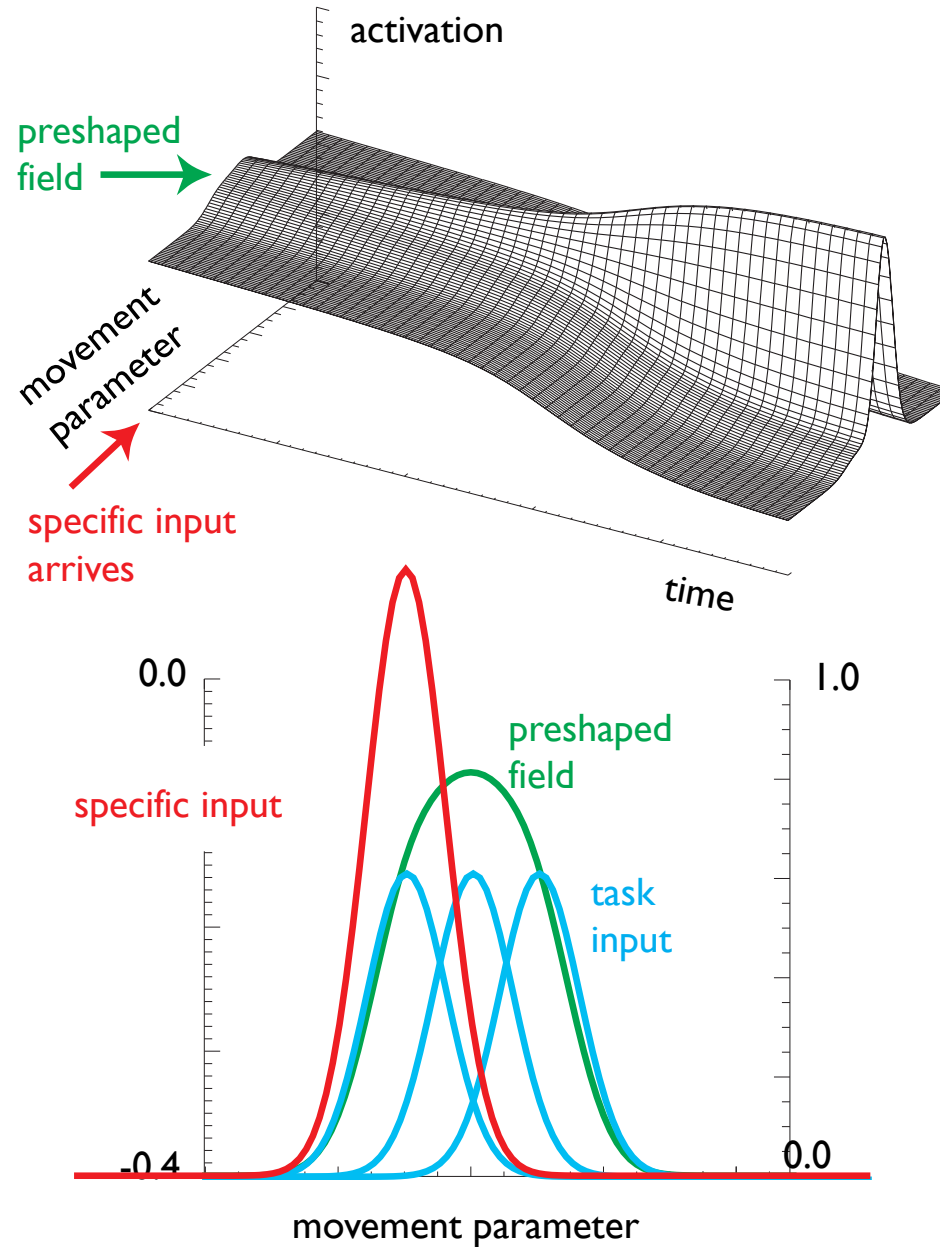
task set



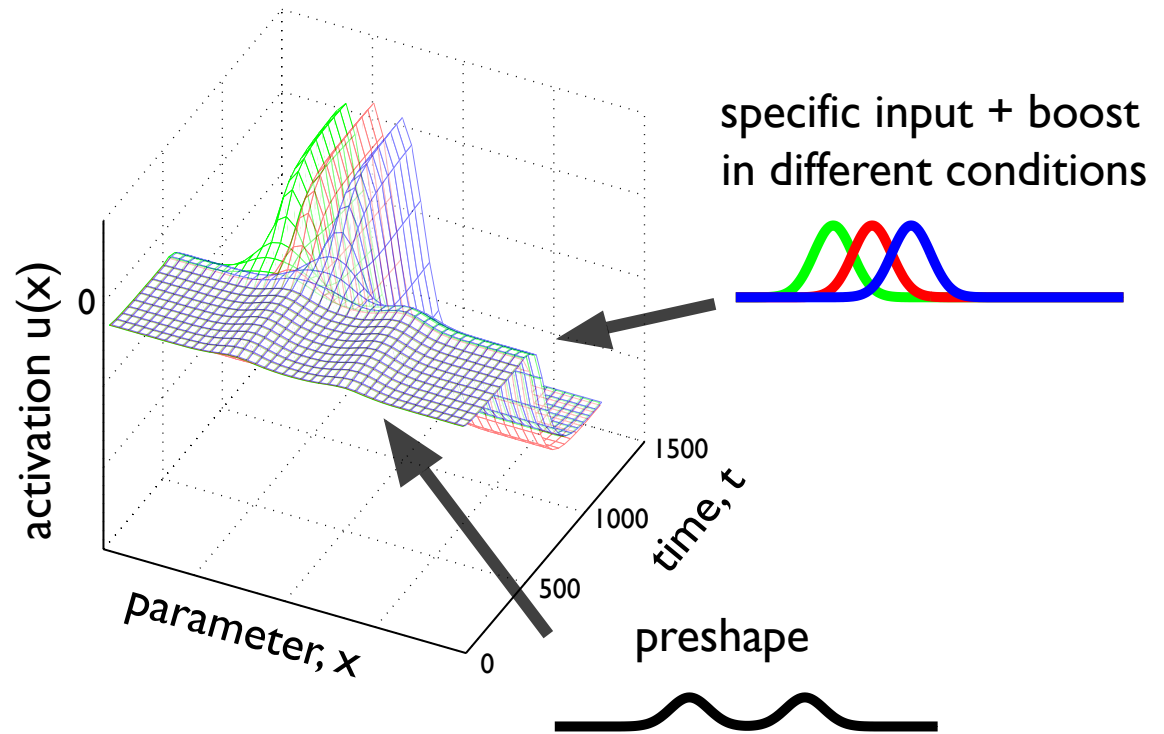
the task set

- is the critical factor in such studies of selection: which perceptual/action alternative/choices are available...
 - e.g., how many choices
 - e.g., how likely is each choice
 - e.g., how “easy” are the choices to recognize/perform
- because the task set is known to the participant prior to the presentation of the imperative signal, one may think of the task set as a “preshaping” of the underlying representation (pre=before the decision)

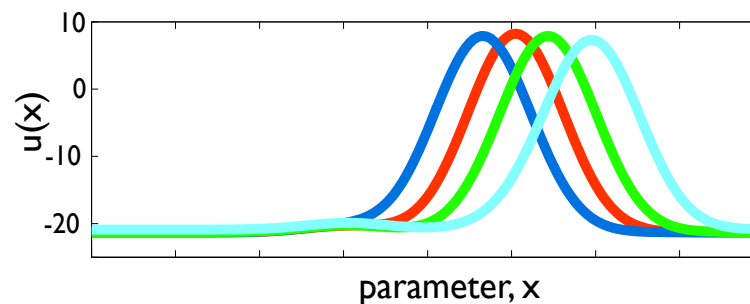
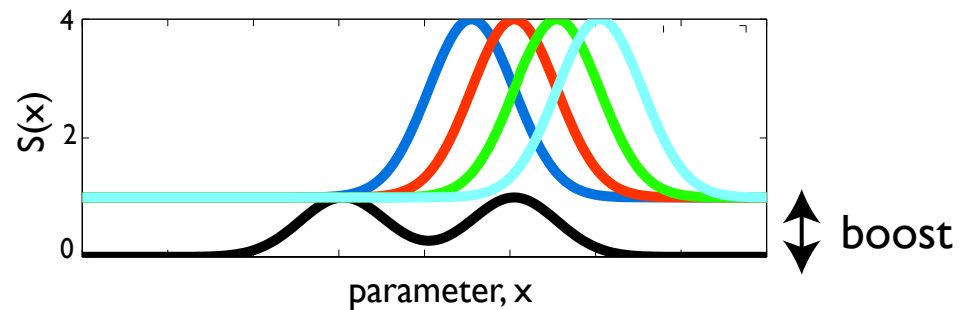
notion of preshape



weak preshape in selection

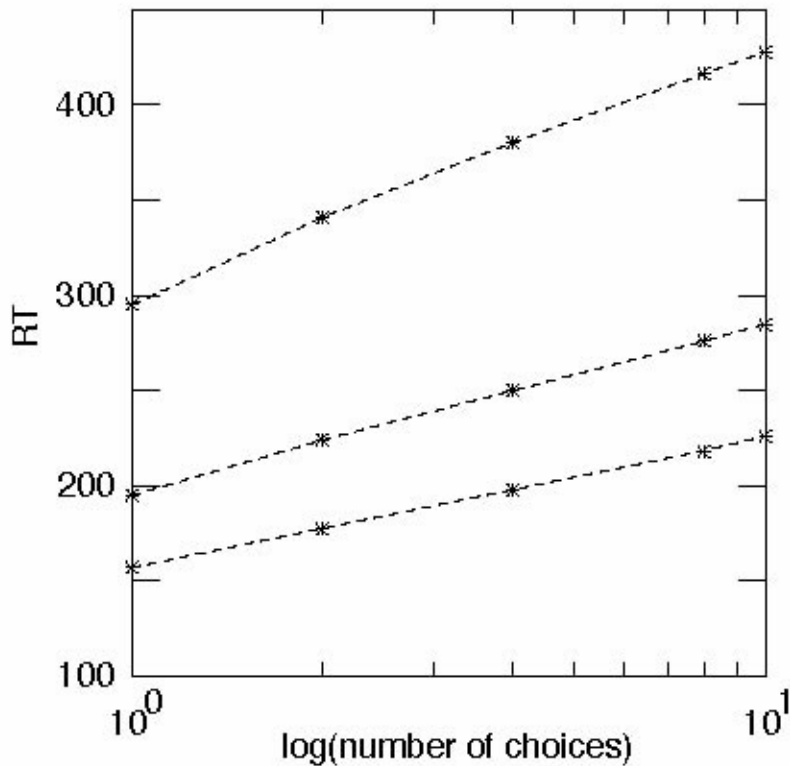


- specific (imperative) input dominates and drives detection instability

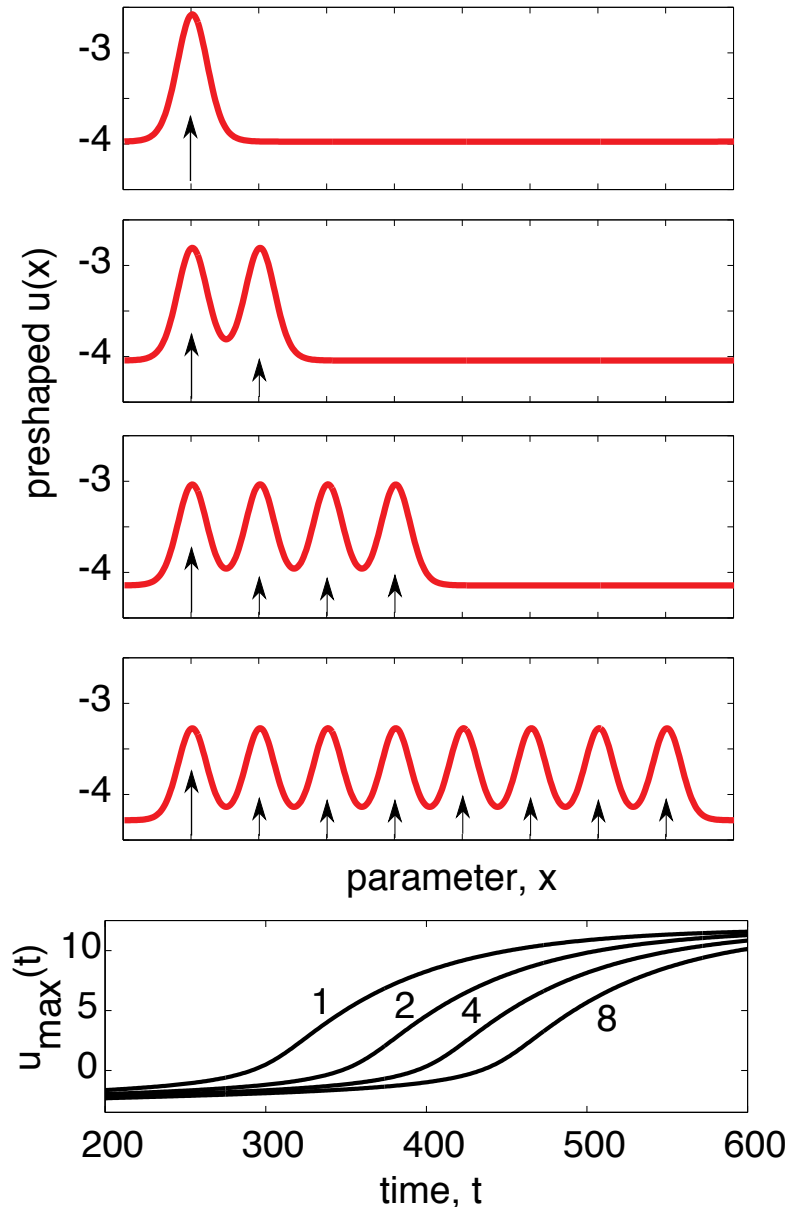


using preshape to account for classical RT data

- Hick's law: RT increases with the number of choices

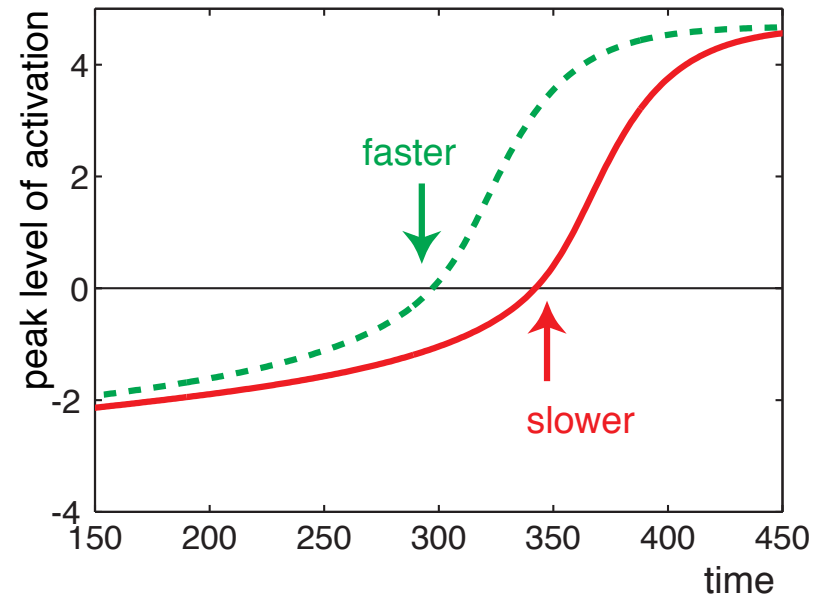
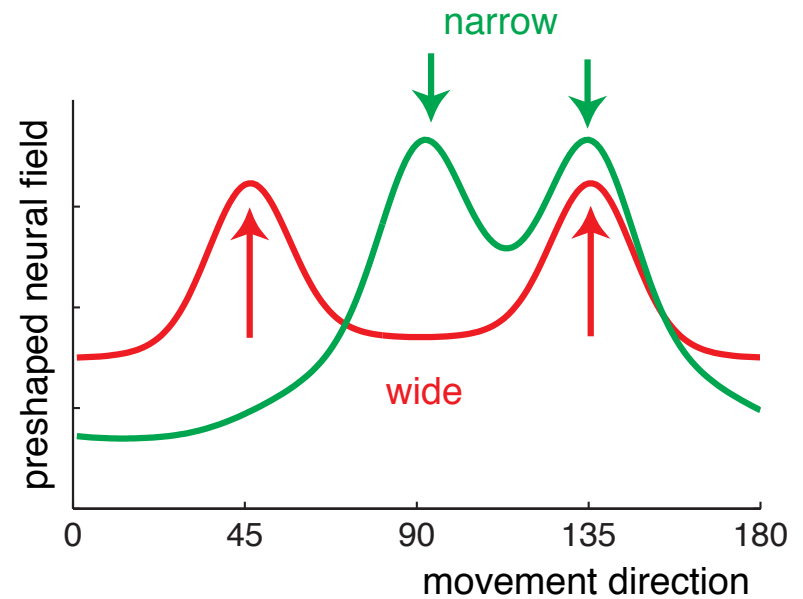


[Erlhagen, Schöner, Psych Rev 2002]



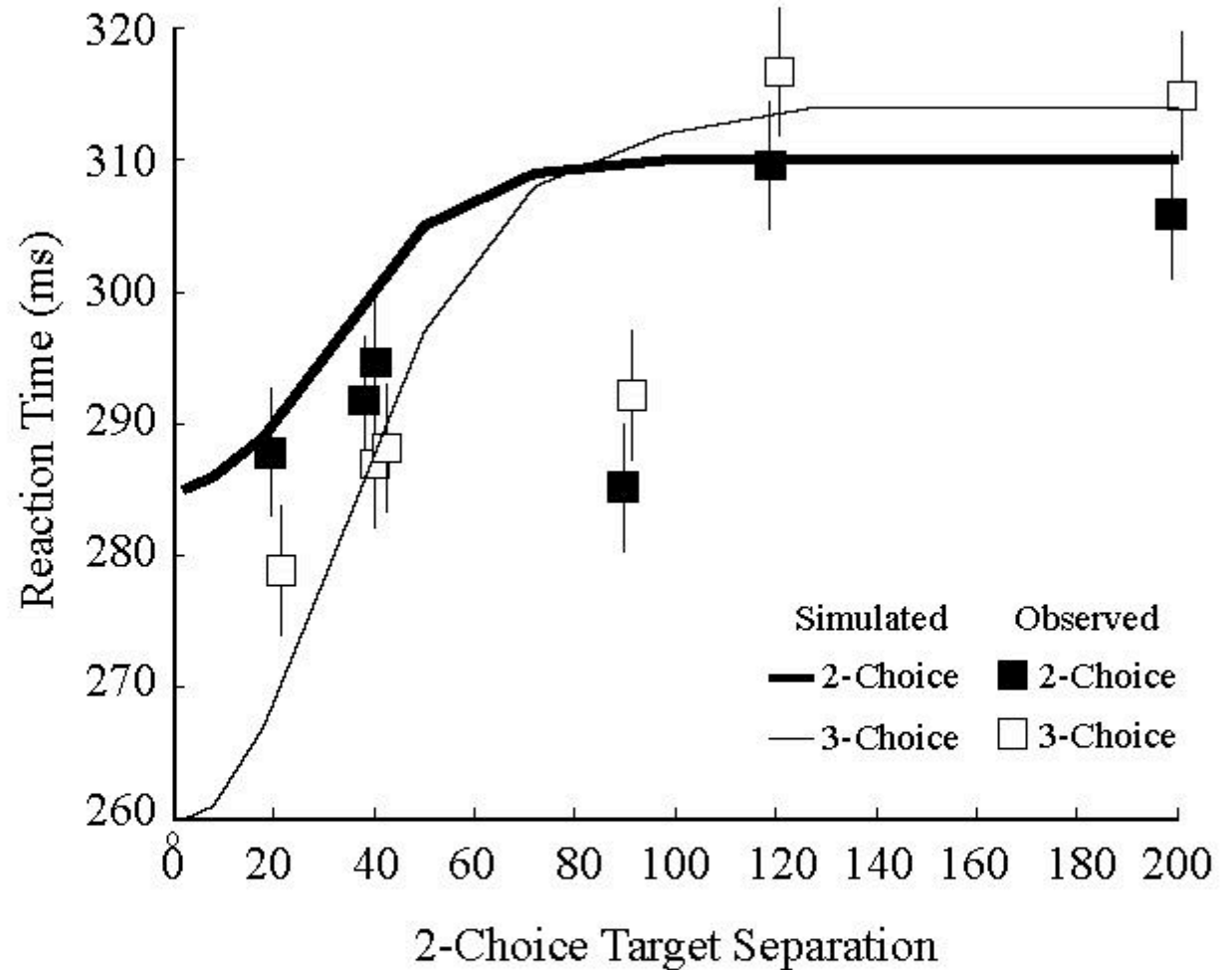
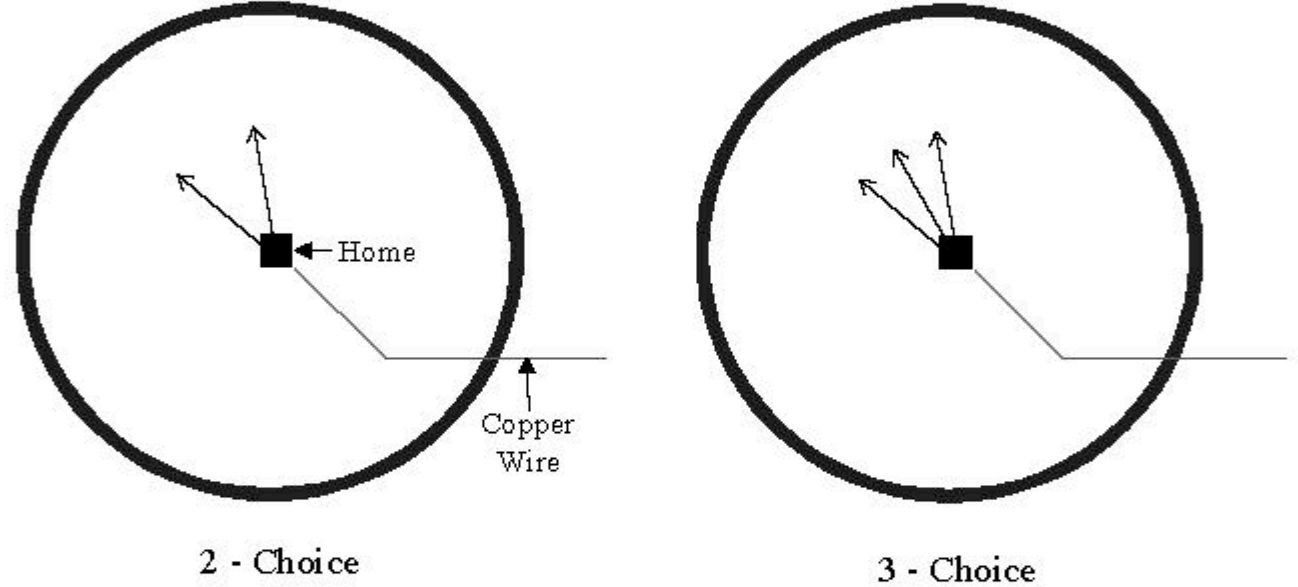
metric effect

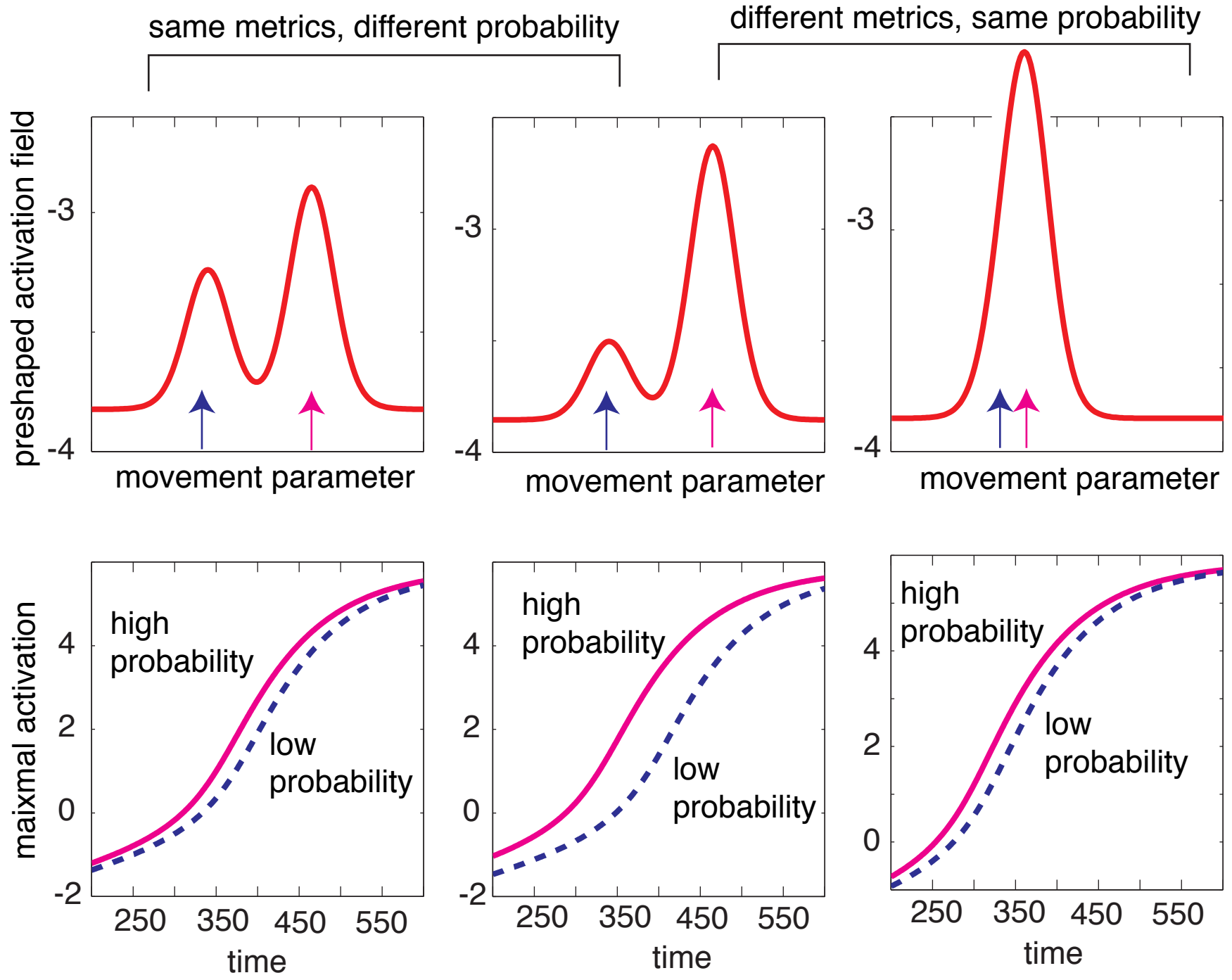
- predict faster response times for metrically close than for metrically far choices



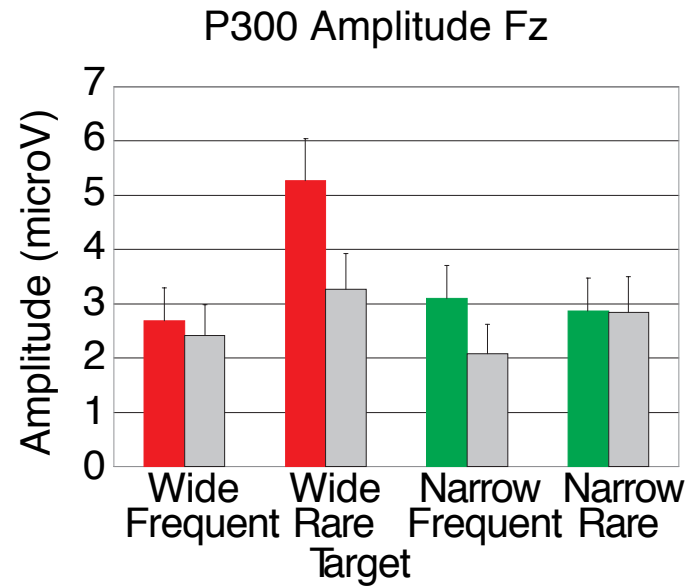
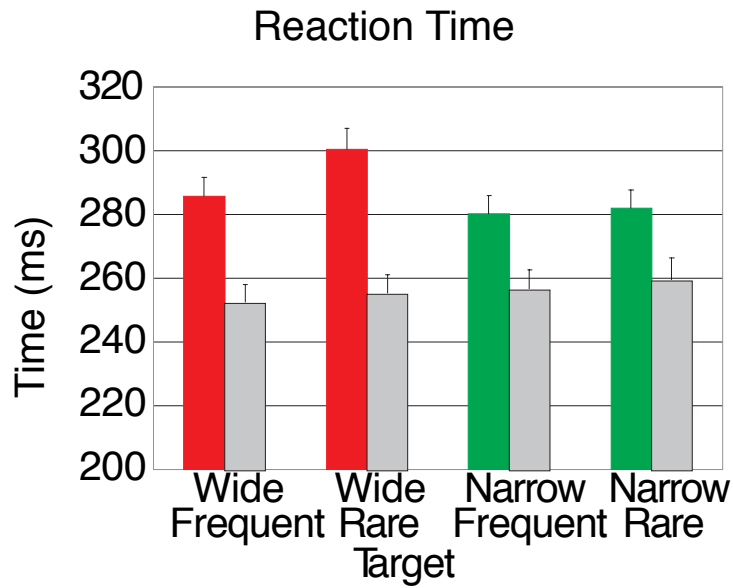
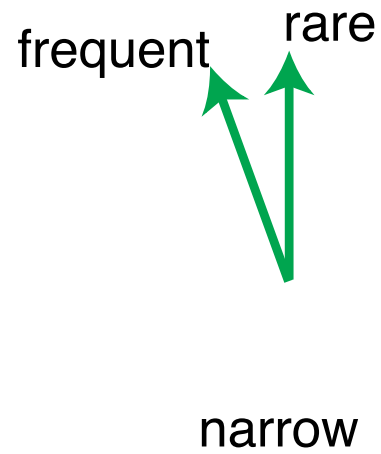
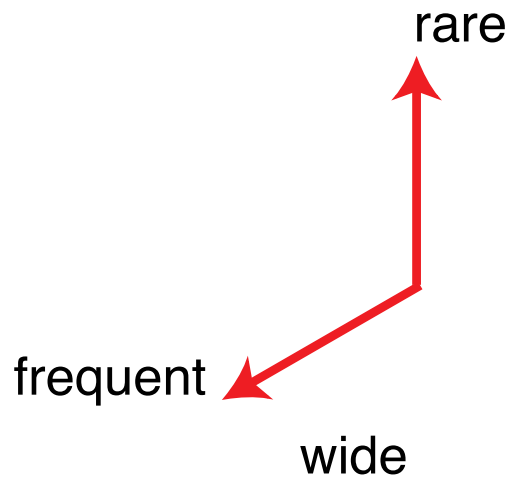
[from Schöner, Kopecz, Erlhagen, 1997]

experiment: metric effect





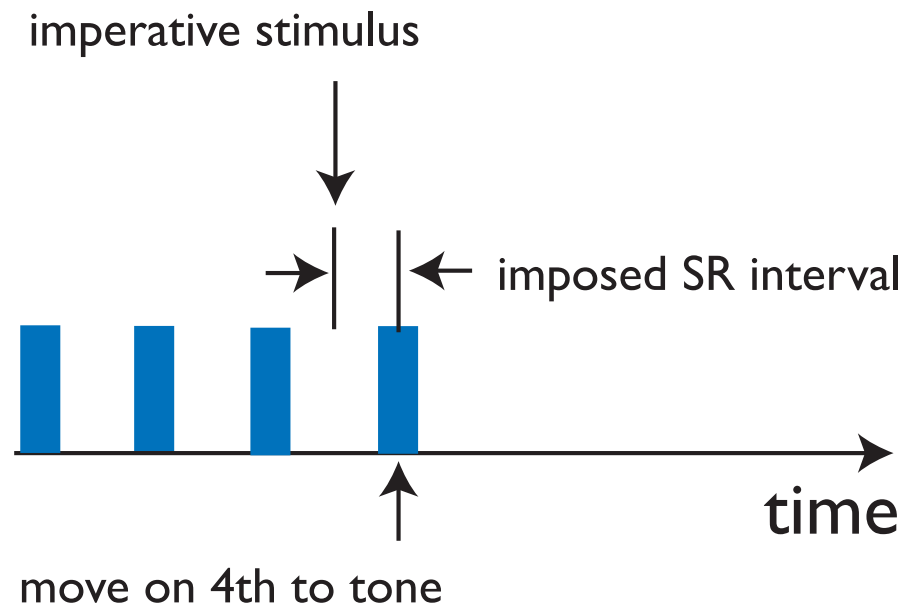
[from Erlhagen, Schöner: Psych. Rev. 2002]



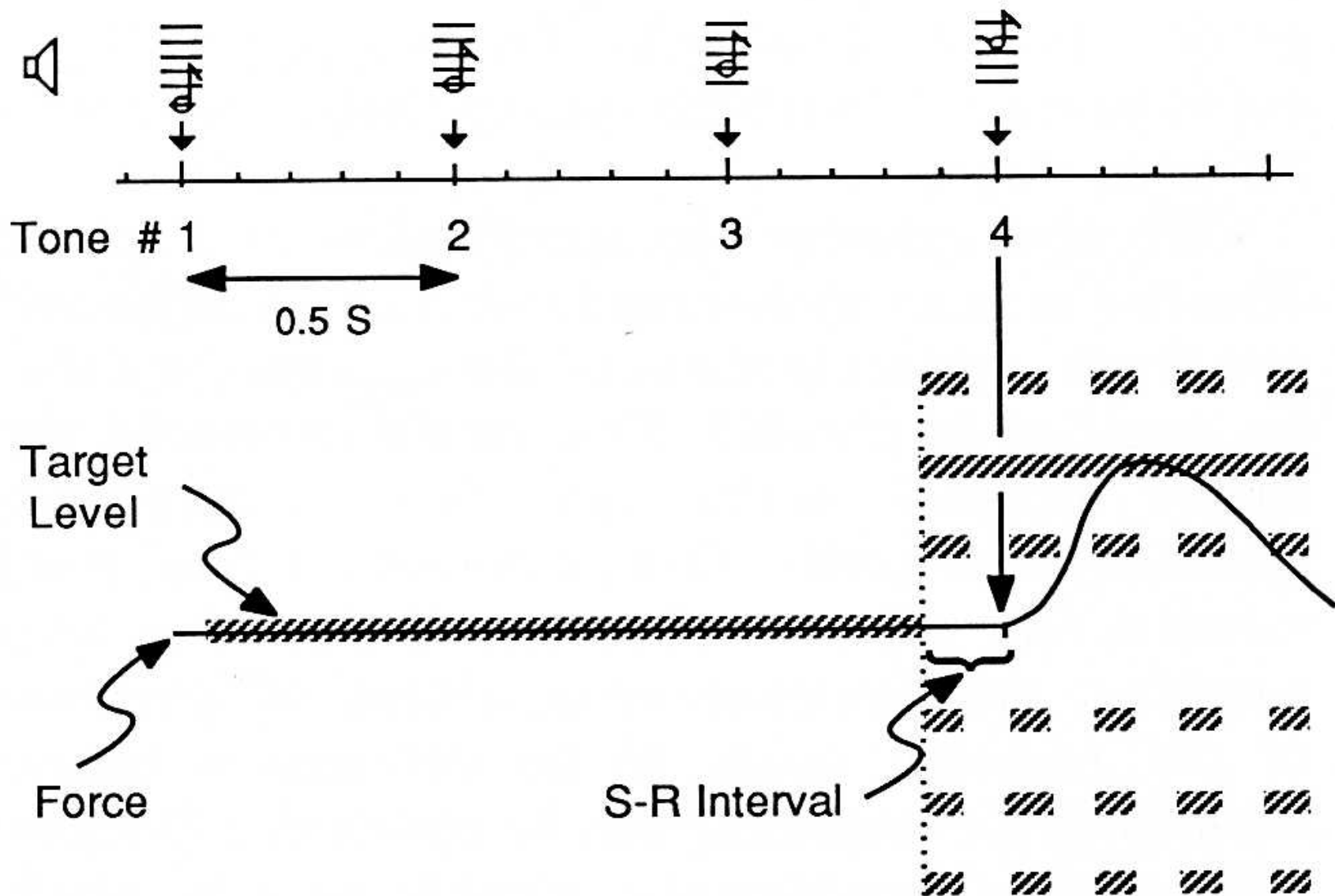
[from McDowell, Jeka, Schöner, Hatfield, 2002]

Time course of selection decisions: Behavioral evidence for the graded and continuous evolution of decision

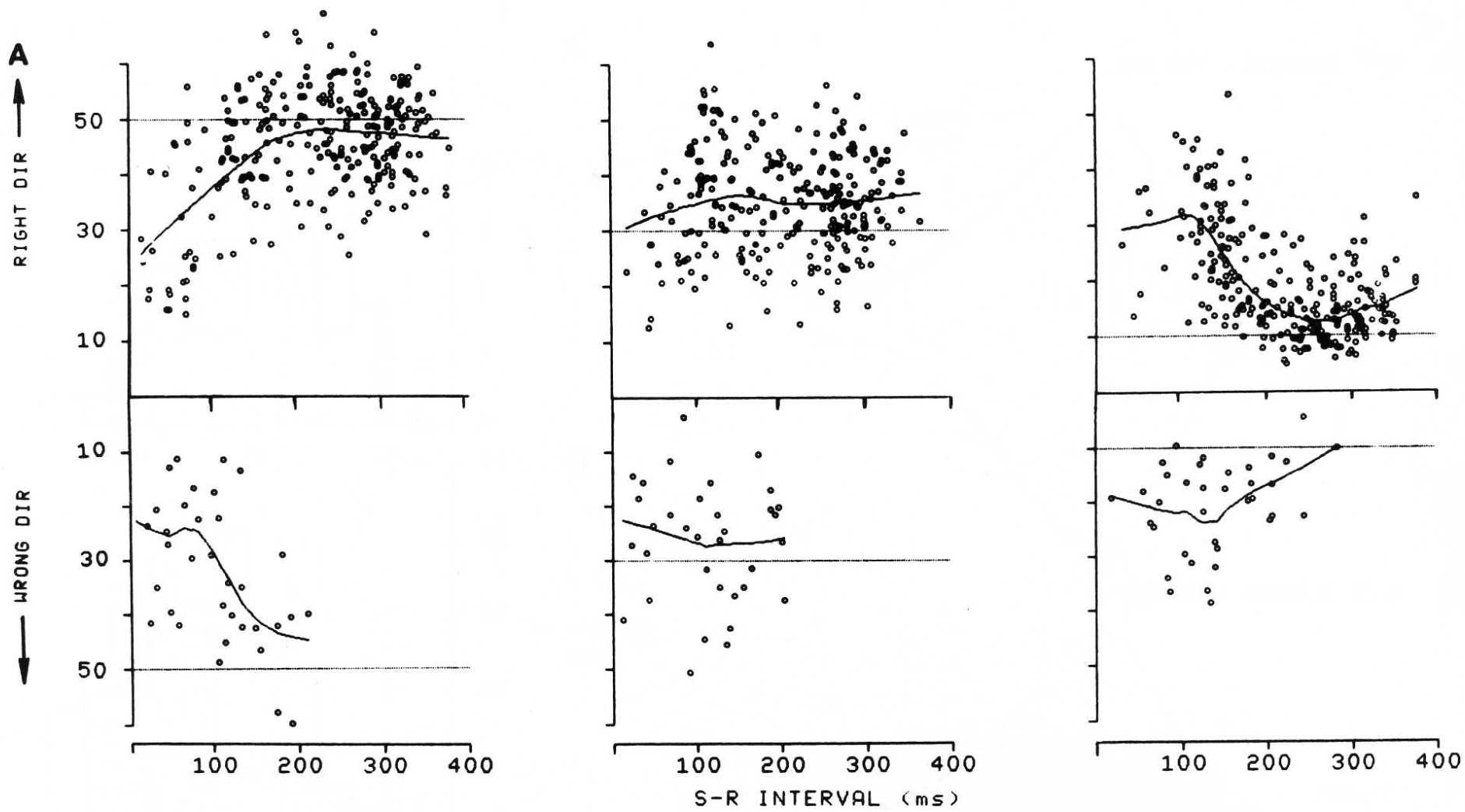
timed movement
initiation paradigm



[Ghez and colleagues, 1988 to 1990's]

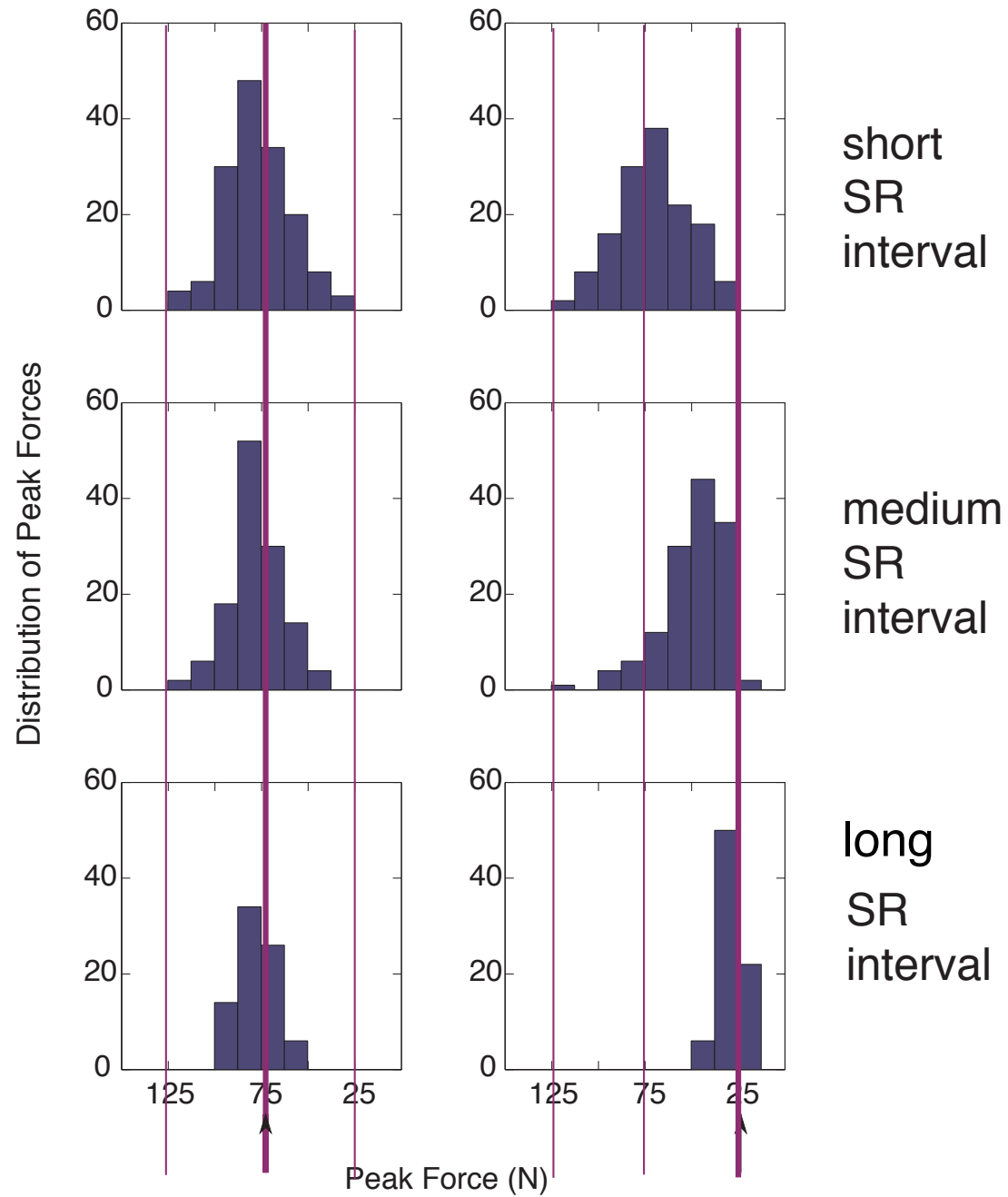


[Favilla et al. 1989]

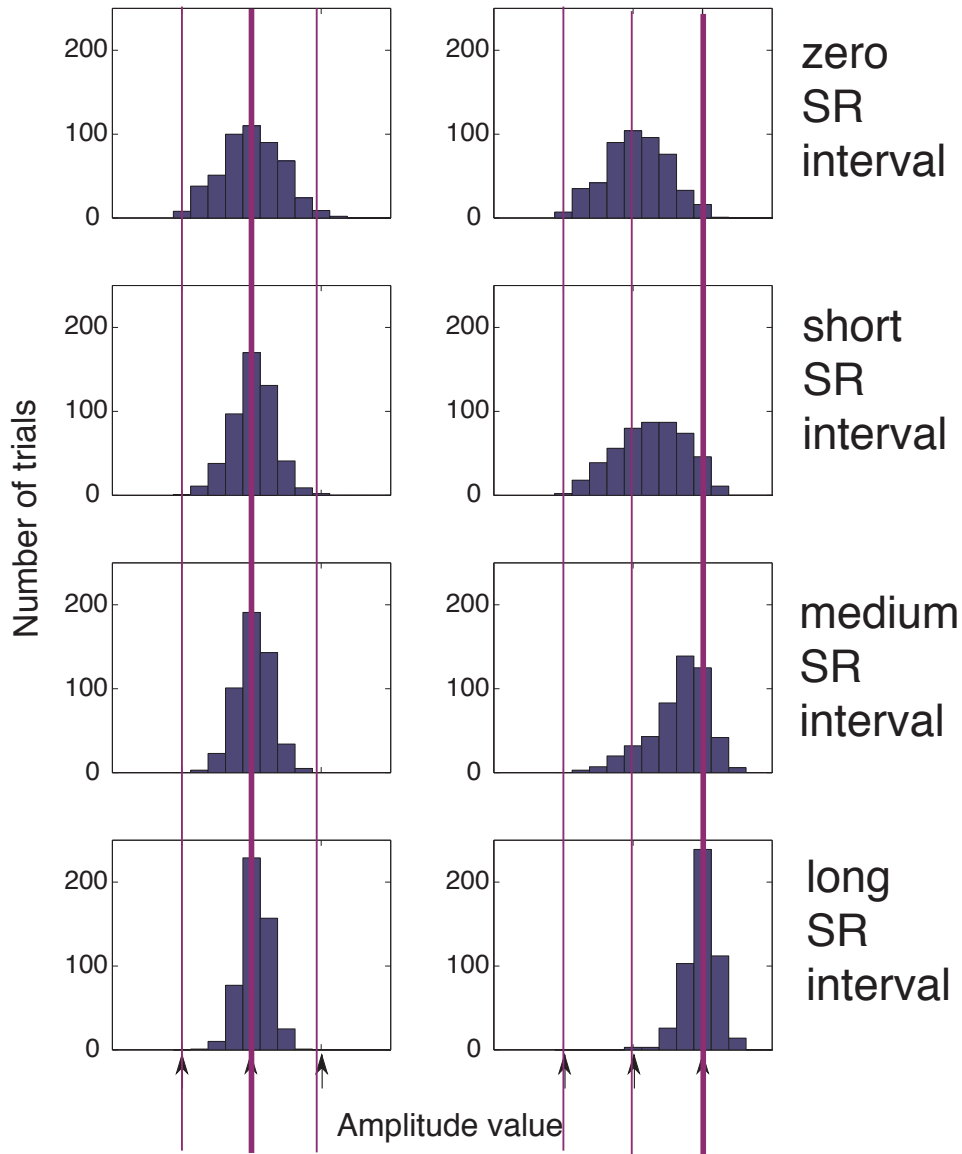


[Favilla et al. 1989]

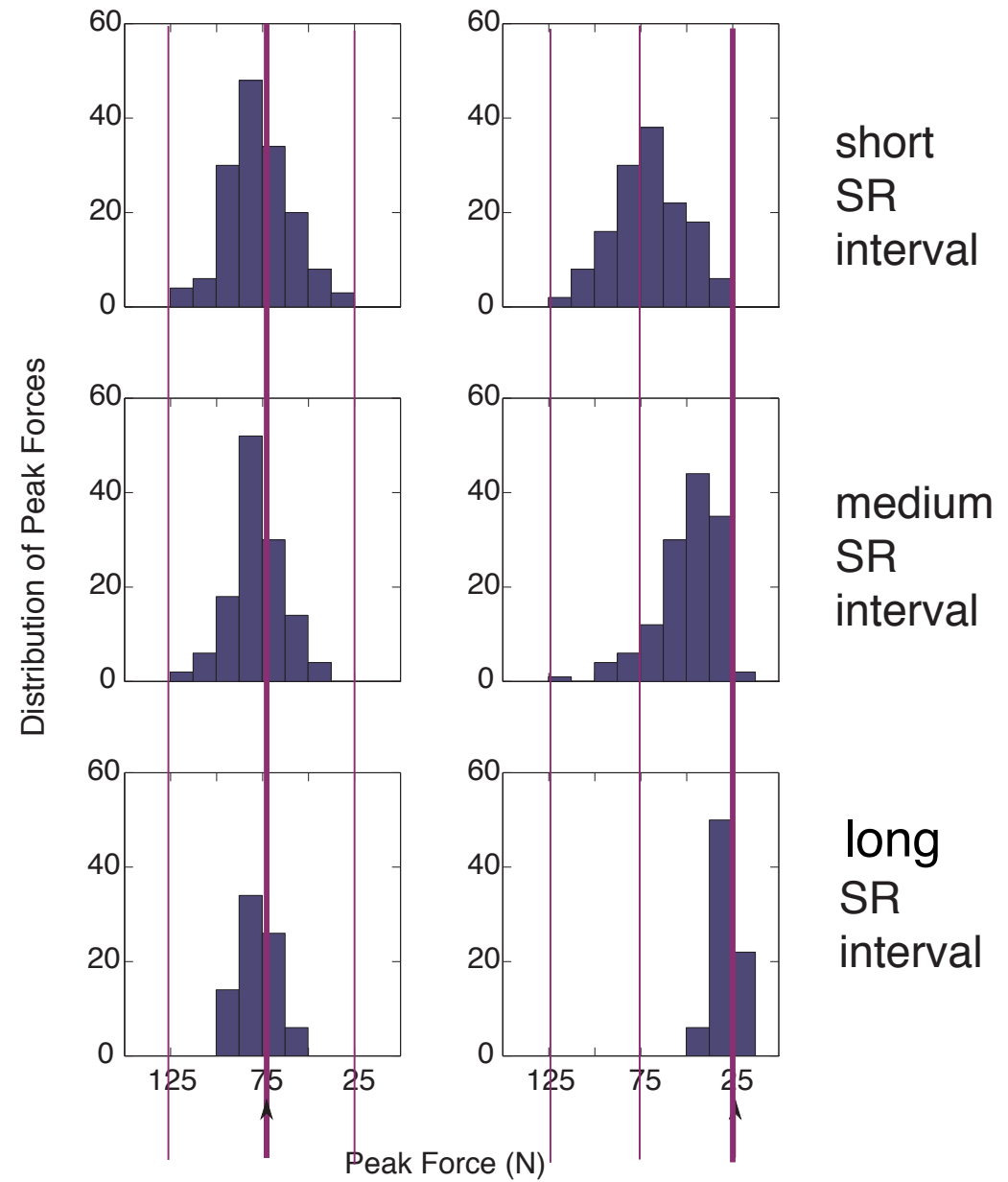
Experimental results of Henig et al



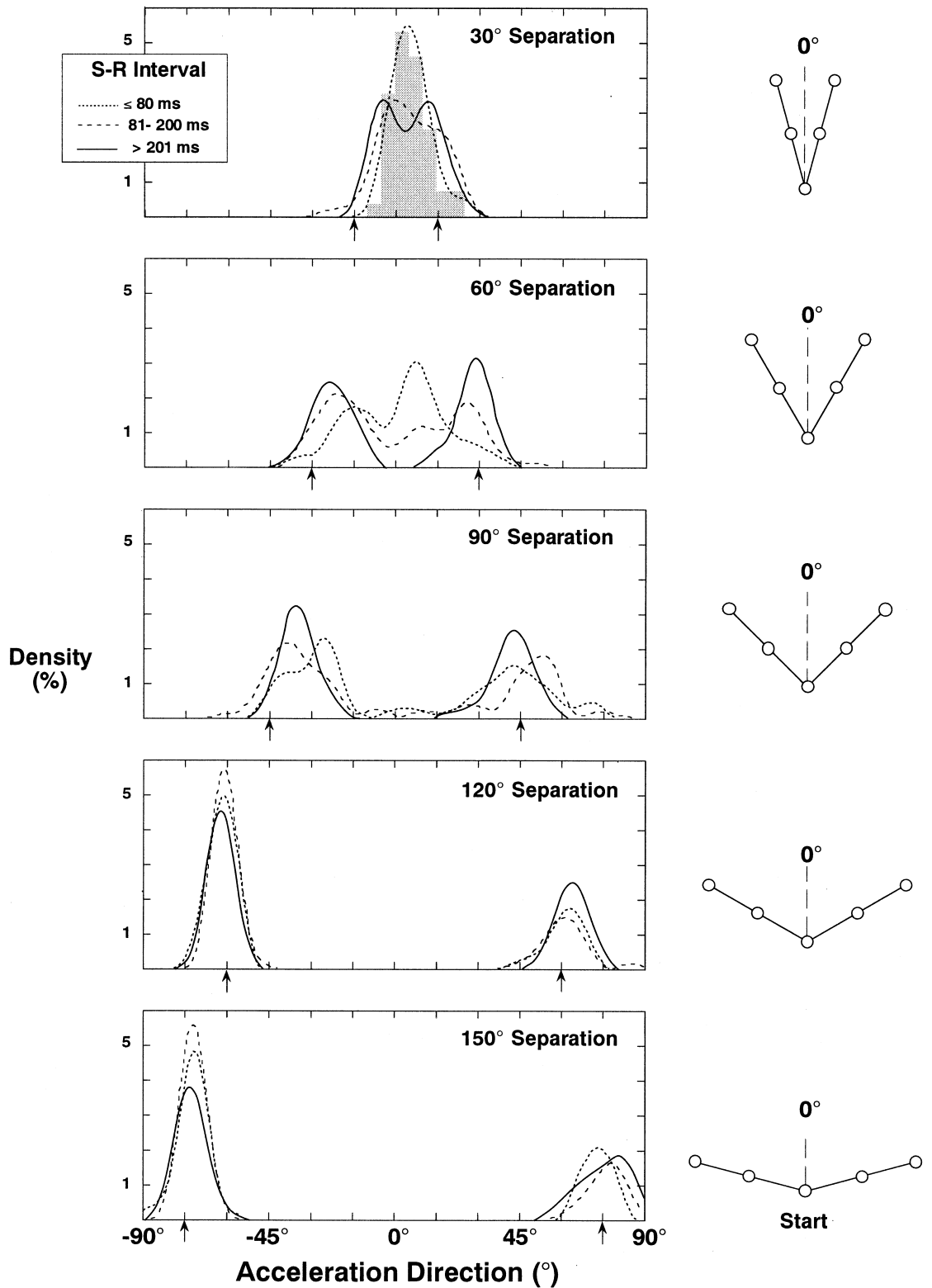
theoretical account for Henig et al.



Experimental results of Henig et al



■ infer width of
preshape peaks in
field

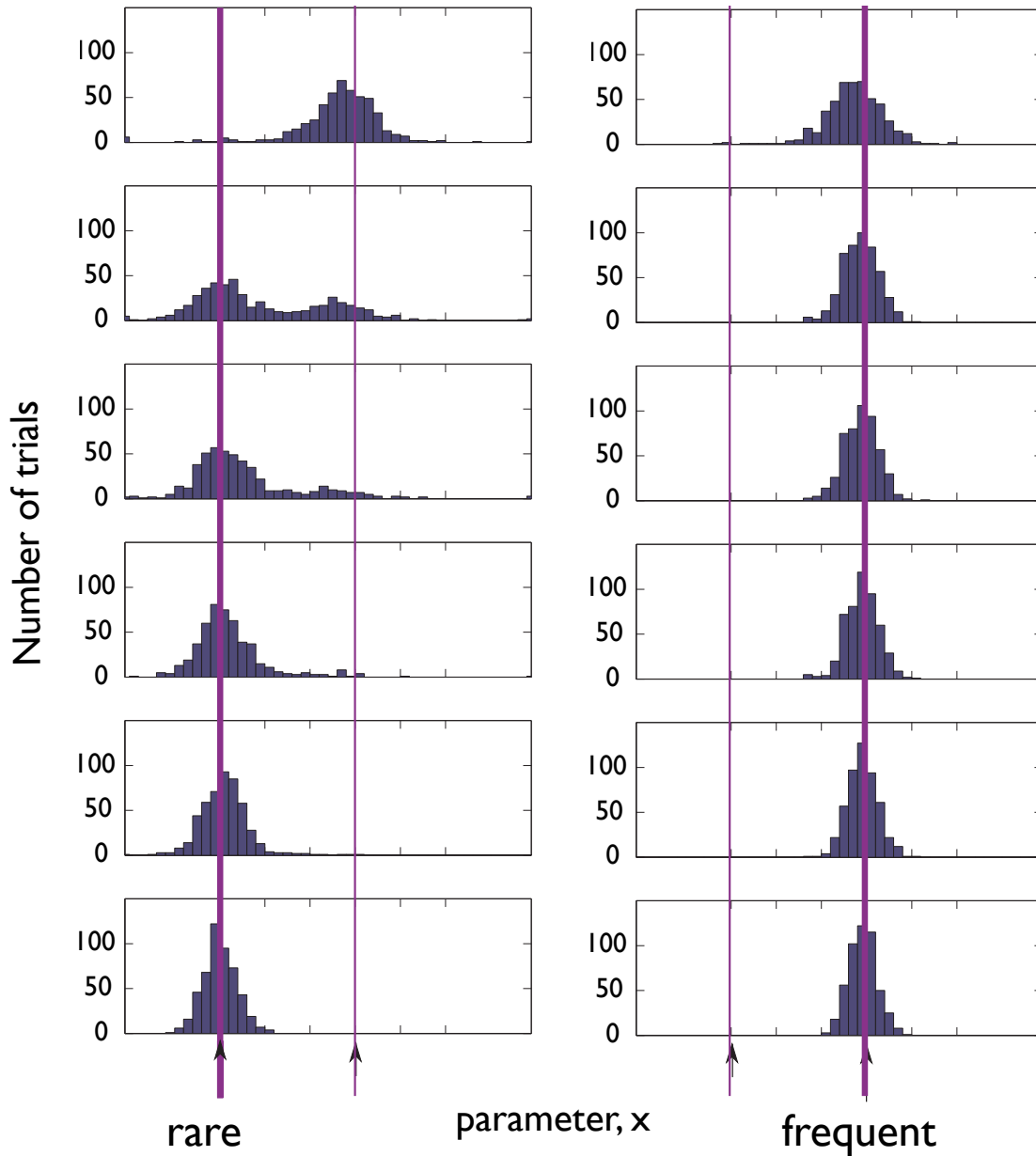


[Ghez et al 1997]

probability in timed movement initiation

rare frequent

rare frequent



short SR interval:
observe preshape

long SR interval:
observe stimulus-defined
movement plan