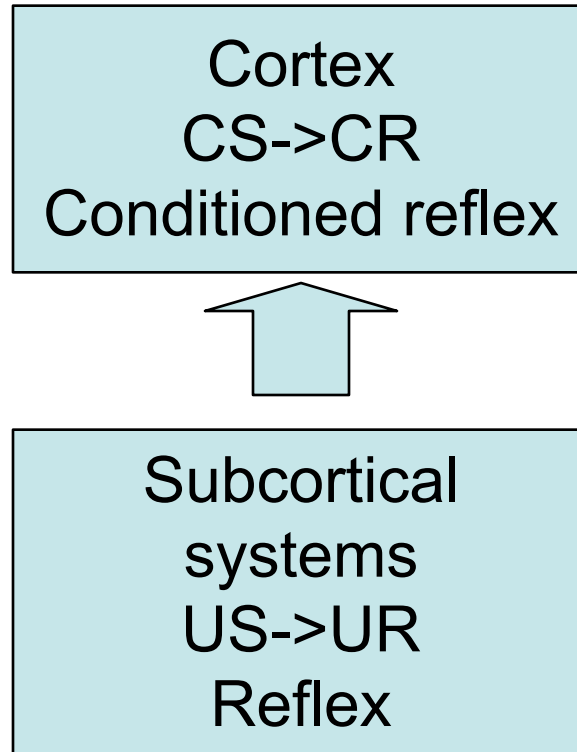


1, 2 or 3 learning systems?

The Cortical Analyzer as the substrate of learning:

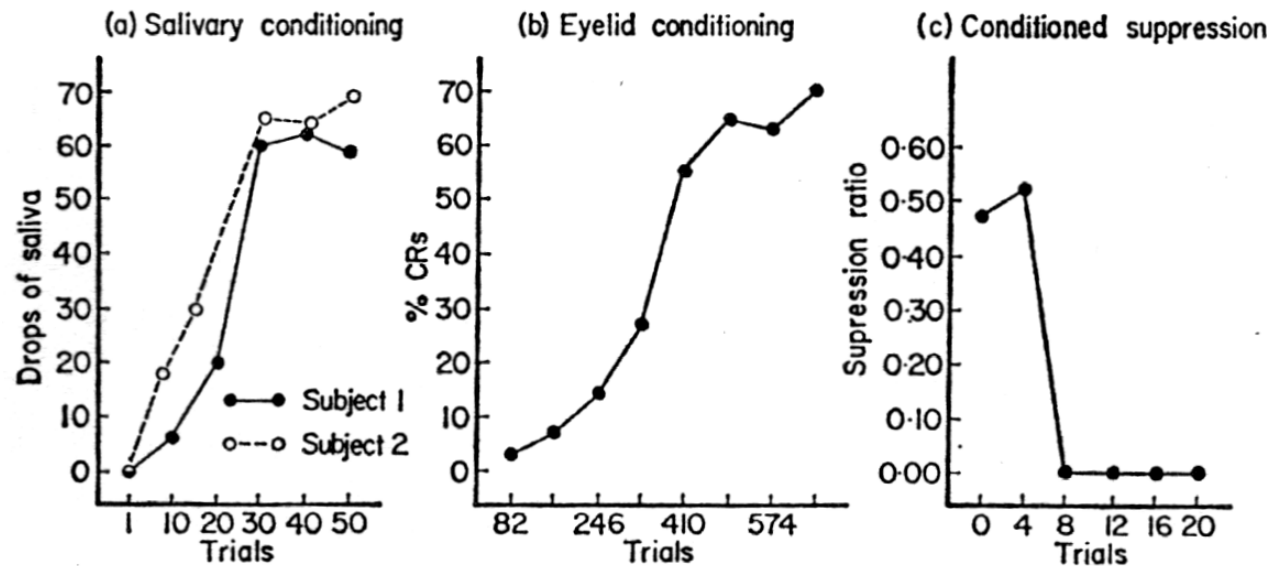


Cortical analyzer:

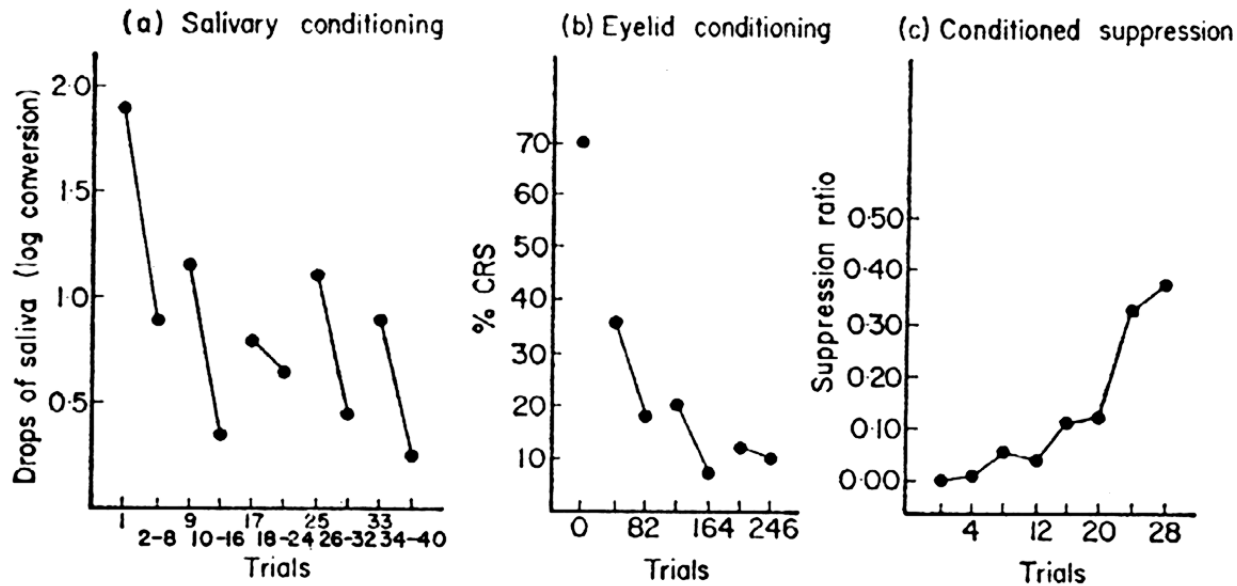
- convergence of CS (sound) and US (food)
- synthesize behavior
- generalize via irradiation
- allow differentiation

Cortex as a dynamic mosaic of excitatory and inhibitory foci

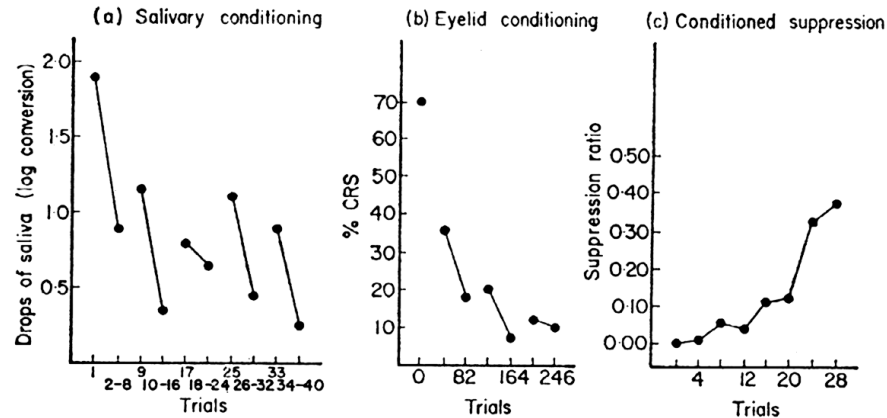
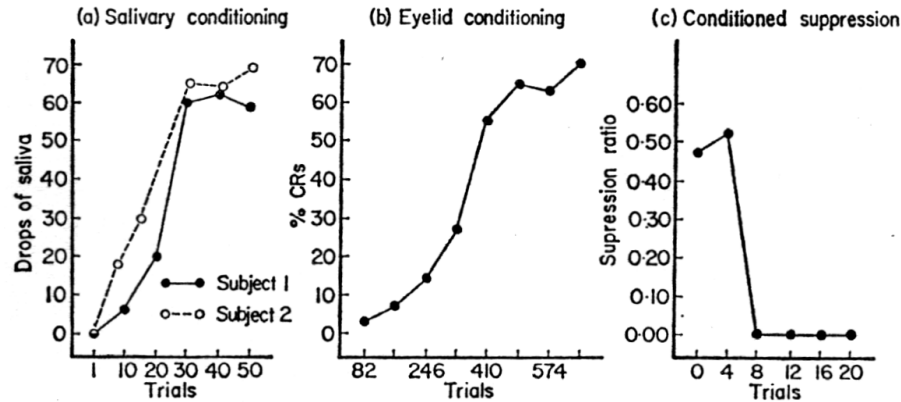
Learning curves: Acquisition



Learning curves: Extinction

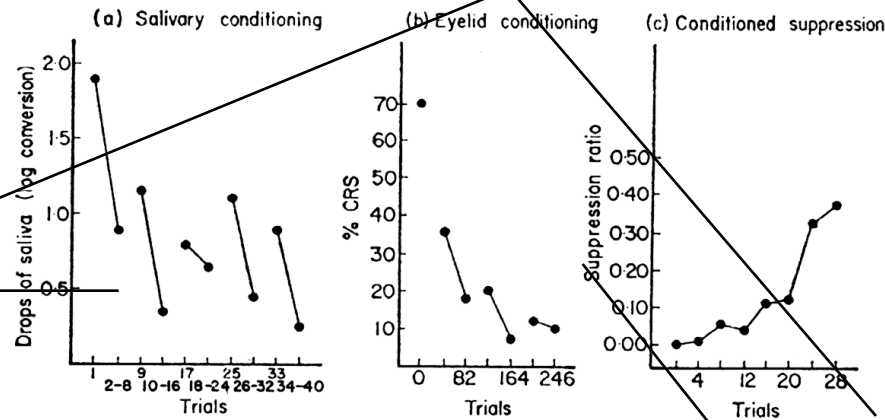
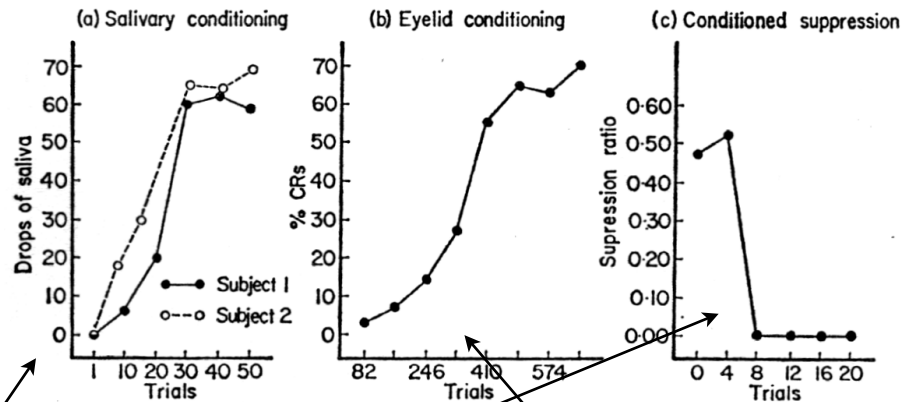


Performance as a signature of multiple learning systems



What does this mean?

Performance as a signature of multiple learning systems



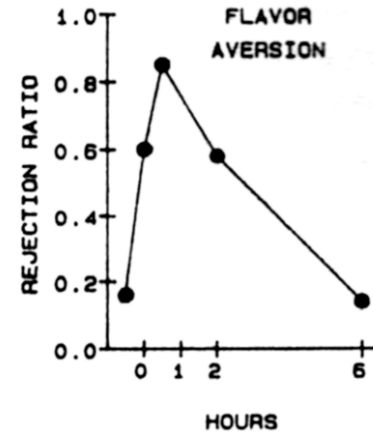
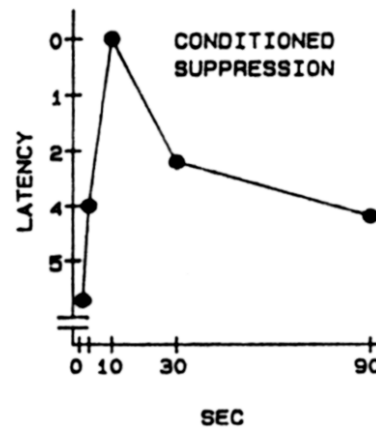
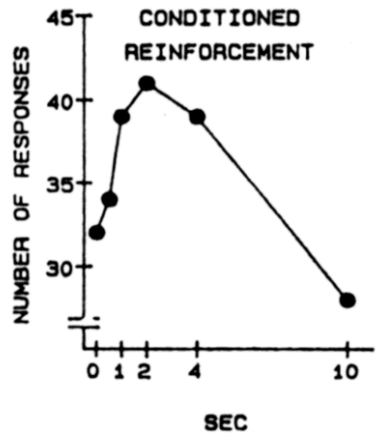
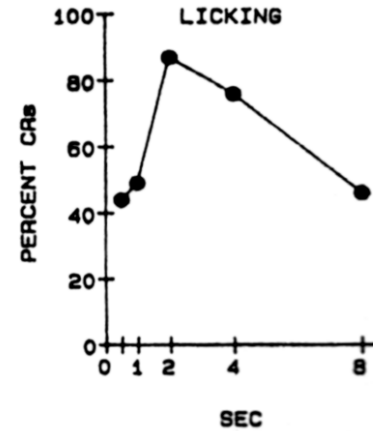
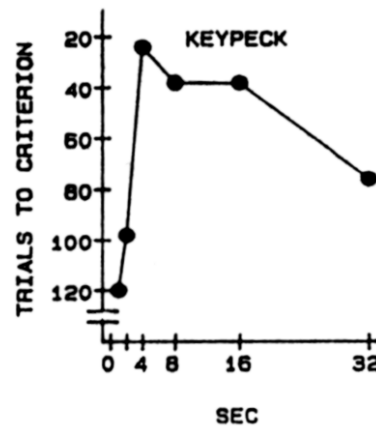
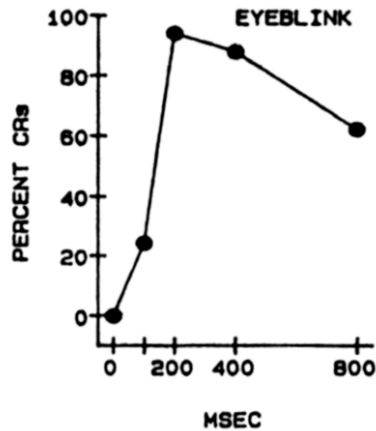
Non-specific learning

Specific learning

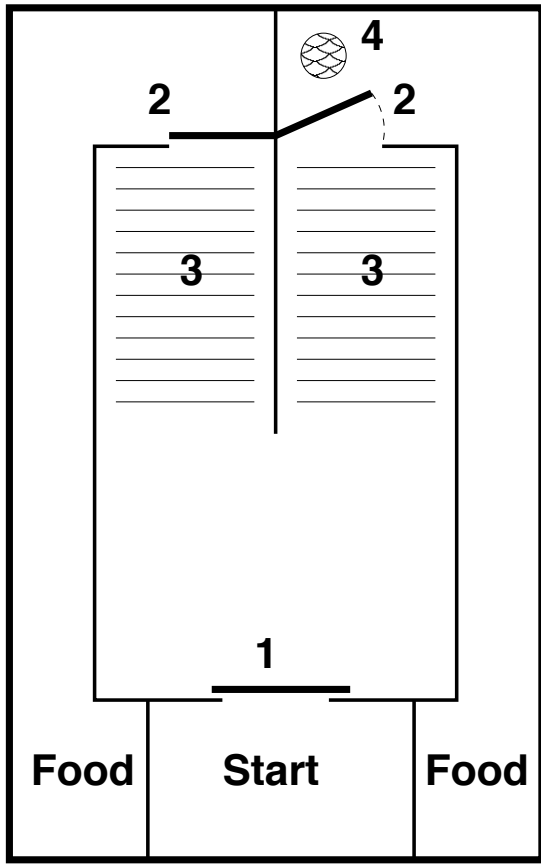
2 phase theory of classical conditioning (Konorski)

More problems....

Learning parameters: Interstimulus Interval (ISI)

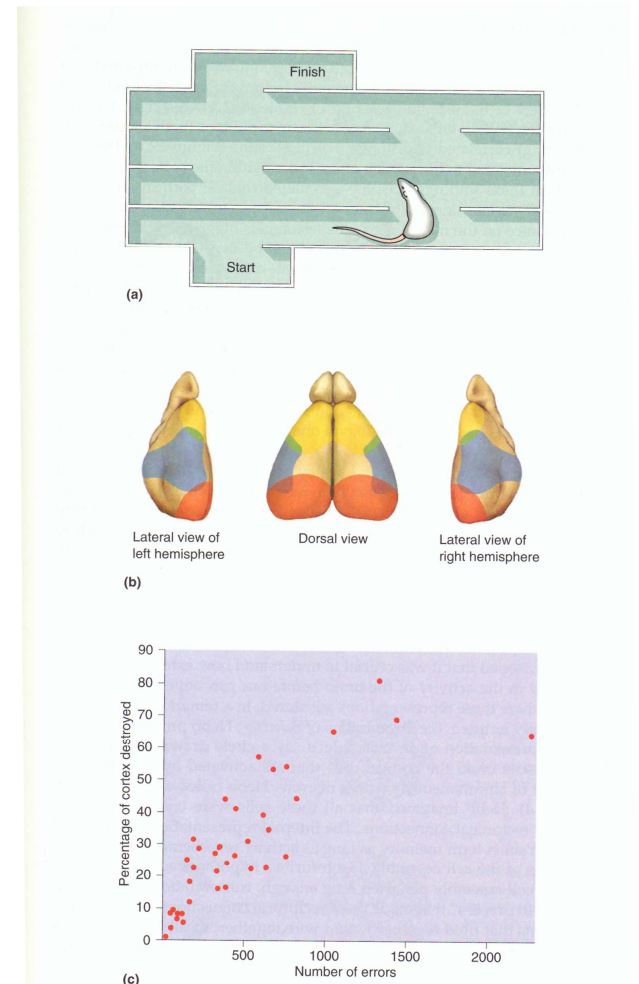


Karl Lashley's experiments: Brain Mechanisms and Intelligence (1929)



Yerkes Discrimination Box

- Rats are trained to negotiate a maze
- receive lesion of varying size/location
- performance correlates with **SIZE** of lesion only
- 2 new principles: Mass action and Equipotentiality



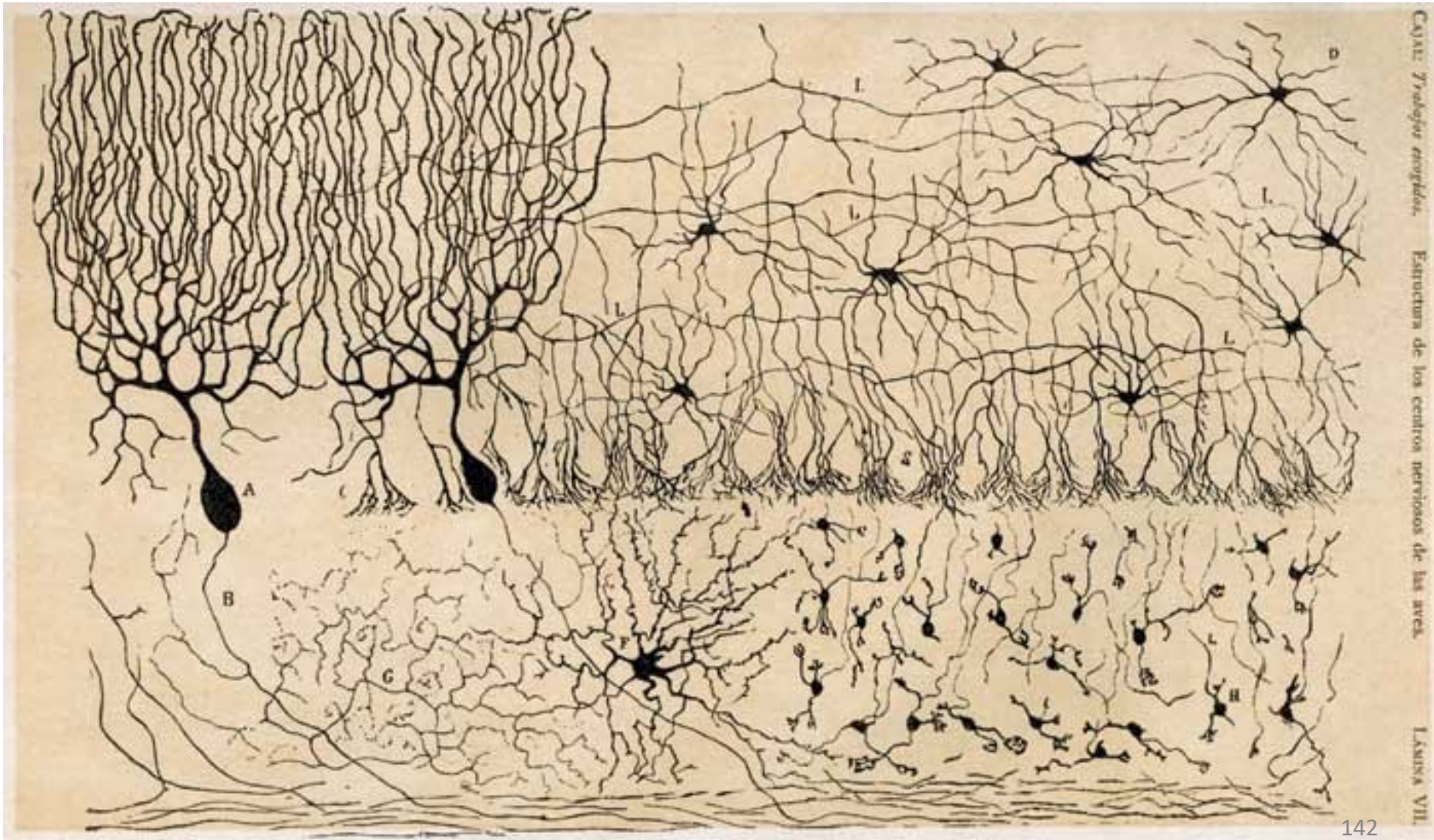
Karl Lashley's conclusion:

"I began life as an ardent advocate of muscle-twitch psychology. I became glib in formulating all problems of psychology in terms of stimulus-response and in explaining all things as conditioned reflexes. ... I embarked enthusiastically upon a program of experiments to prove the adequacy of the motor-chain theory of integration. And the result is as though I had maliciously planned an attack on the whole system"(Lashley 1930, p.14)



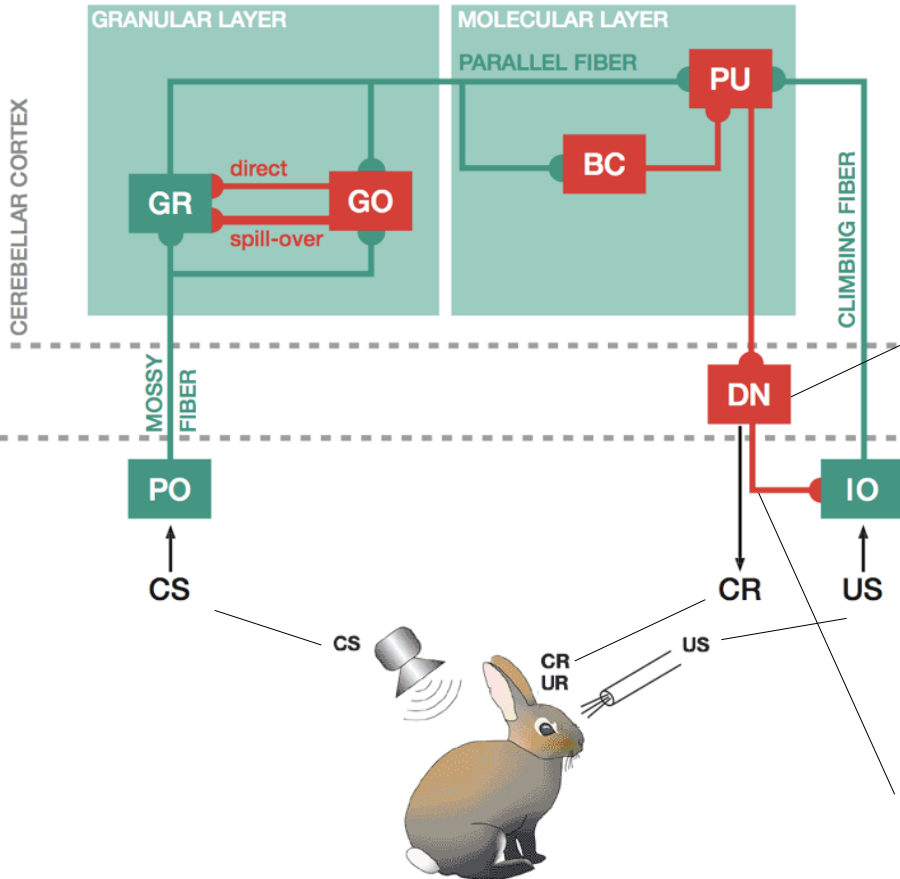
June 7, 1890 - August 7, 1958

Learning in the cerebellum: the control theory view

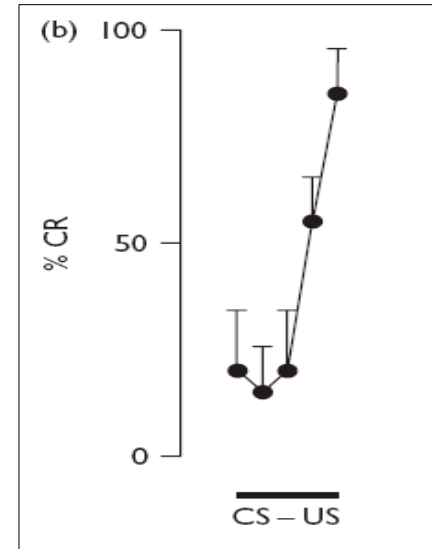


Cerebellum: Key features

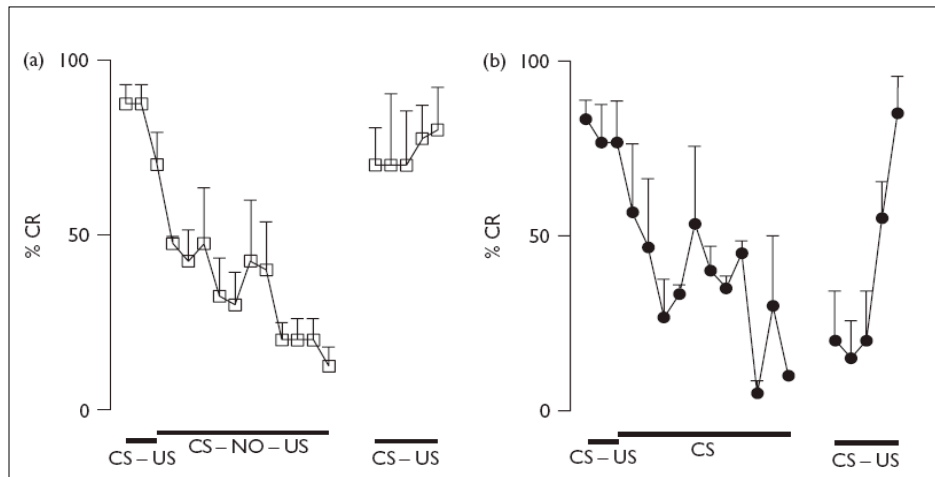
Verschure & Mintz (2000) Neurocomp; Hofstotter et al (2003) Eur J. Neurosci;



Learning curve

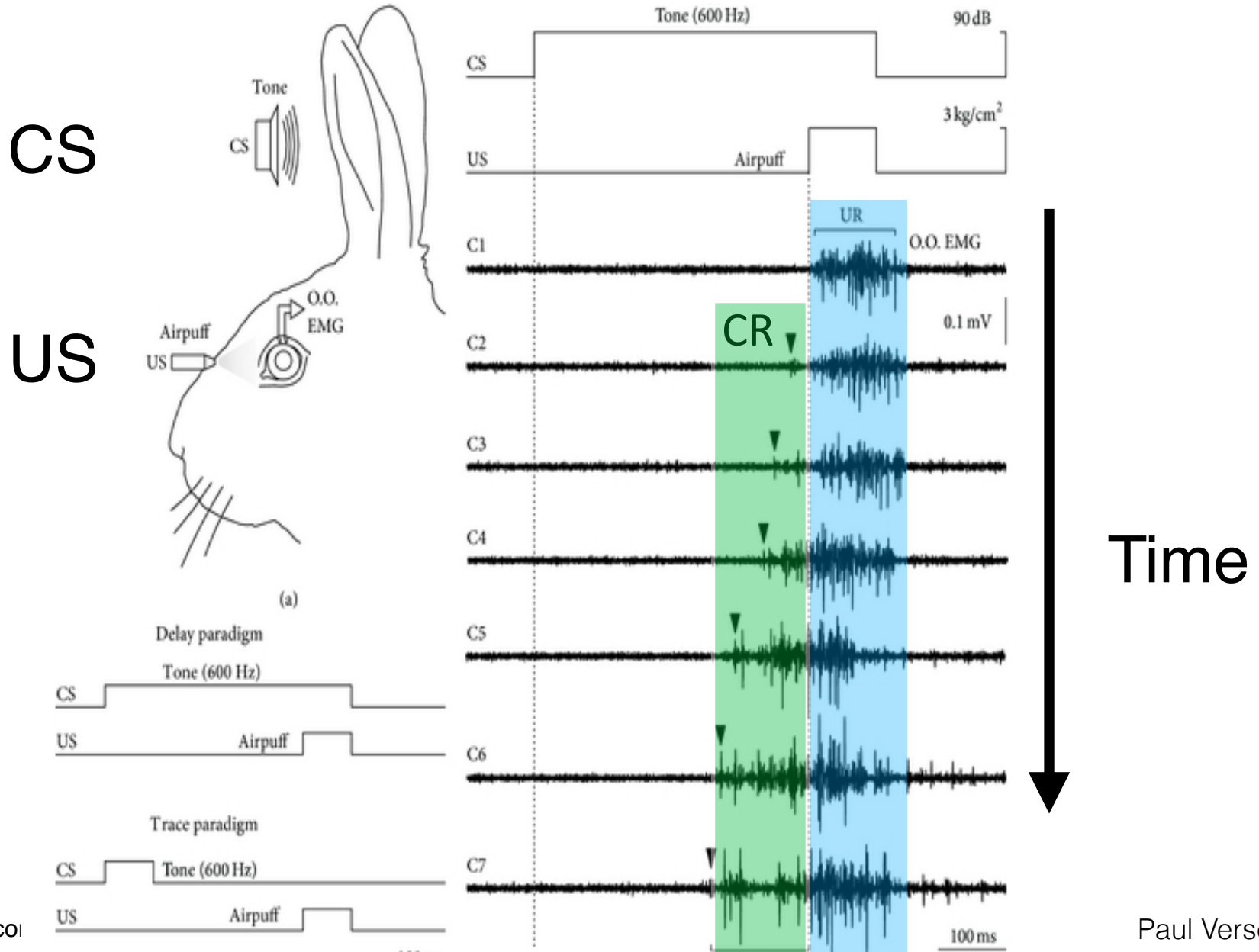


Bengtsson et al., *Neuroreport* 2007



Extinction due to CS alone and/or DCN stimulation

Classical Eyeblink Conditioning



The brain is build around priors

