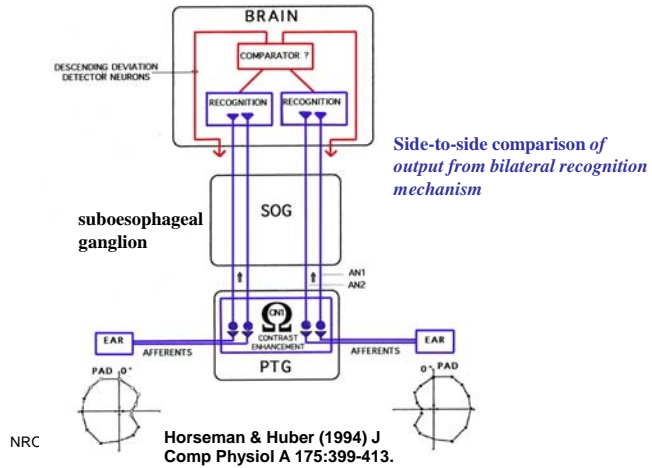


Cricket auditory processing ca. 1994



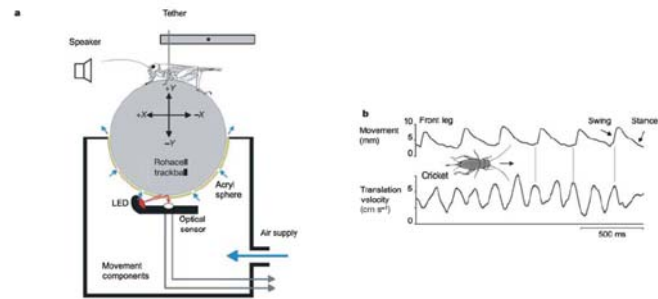
Complex auditory behaviour emerges from simple reactive steering

Hedwig & Poulet (2004) Nature 430:781:785

NROC34 2012:2b

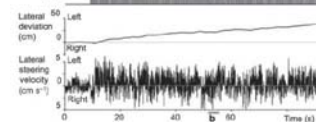
2

Improved treadmill

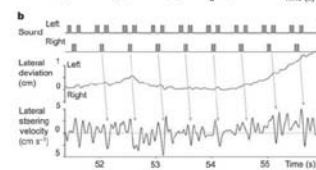


Separate overall path and steering movements

a
Left Sound Right Pulses 4:2 (left:rt)



Walk to the left, but steering movements to both sides.

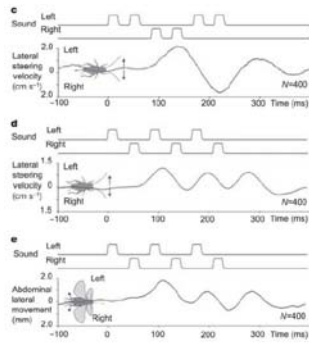


NROC34 2012:2b

Fig. 2

4

Higher temporal resolution



Actually steering back and forth whenever the sound switches sides.

Split-song: go straight ahead because they turn left and right equally.

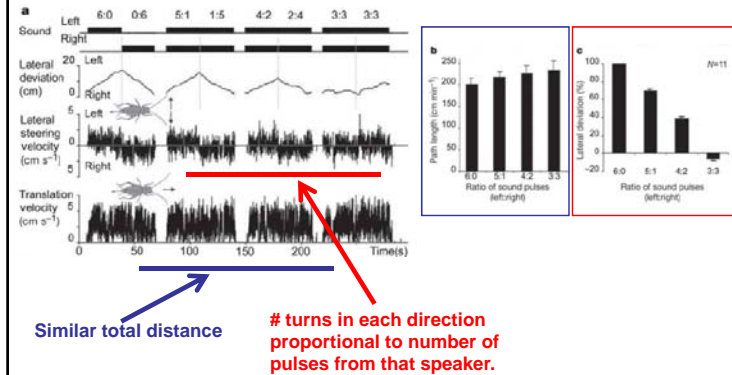
Same for flying phonotaxis.

NROC34 2012:2b

Fig. 2

5

Turn directions in proportion to contributions from different sources



Similar total distance

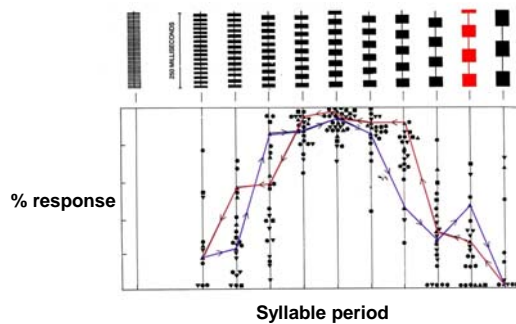
turns in each direction proportional to number of pulses from that speaker.

NROC34 2012:2b

Fig. 3

6

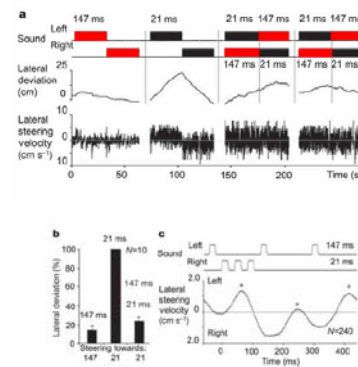
What is effect of a non-preferred temporal pattern?



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7

“Poor” vs “good” song



Non-preferred song has little effect by itself, but when combined with preferred temporal pattern (different direction) elicits turns - degrades response to preferred song.

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Fig. 4

8

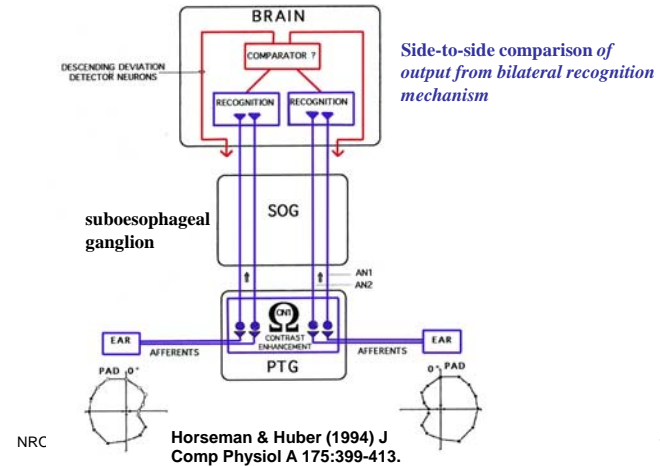
What's it all mean?

- Phonotaxis *gated* by recognition, but steering is independent of recognition process.
 - Do nothing unless they hear an acceptable temporal pattern (recognise a song).
 - Recognition initiates phonotaxis (start walking towards sound source).
 - “Directional updates” are based on finer features of stimulus (individual sound pulses).
 - As long as the “gate” is open, steer towards the last sound heard.

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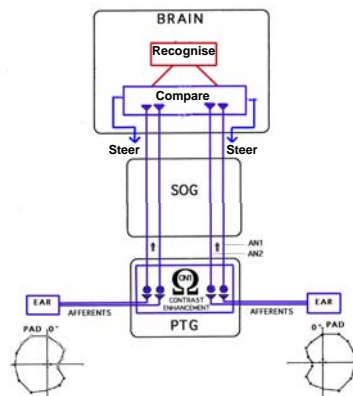
9

Cricket auditory processing ca. 1994



10

Cricket auditory processing ca. 2004



NROC34 2012:2b

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