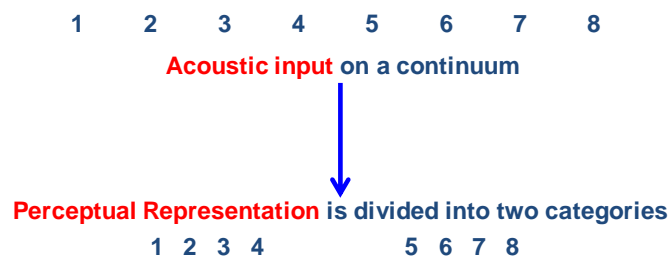


### Speech perception: Categorical perception [Overview of March 27, 2014]

- Some things vary gradually along a physical continuum of values, e.g. loudness, color, VOT
- Some things vary categorically e.g. car brand
  - Some physical phenomena are perceived continuously but we do not necessarily perceive all physical changes as gradual/continuous
  - **Categorical perception** = Perceiving a continuous range of stimuli as members of discrete categories (Harnad, 1987).
  - English VOTs: 0 ms [b] or 60 ms [p]
    - What about a sound with a VOT of 30ms?

[see class handout, which is also downloadable from Blackboard, for graphs]



- VOT in English is perceived *categorically*, with the category boundary at 30ms
  - (i) Good between-category discrimination
  - (ii) Poor within-category discrimination

#### What is Categorical Perception Good For?

- *Stable perception of a variable signal*: Good discrimination between categories, not hindered by variation within a category.
- Helps compensate for the lack of invariance in speech

#### One way of assessing categorical perception (more later): Forced choice identification

- A participant hears a sound, asked to categorize it (e.g., is it [pa] or [ba]?).

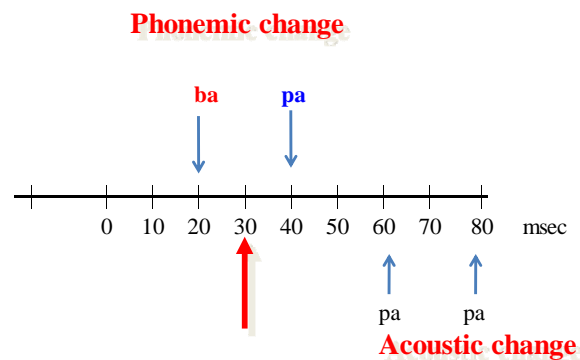
#### Categorical Perception in Infants - Are we born perceiving speech categorically?

**High Amplitude Sucking (HAS)**, sucking rate is the dependent variable.

- Each time infant sucks → speech stimulus
  - Infants get *excited* when they hear sounds
  - Infants get *bored* after a while when sounds are repeated
  - Infants *perk up* again when a new sound is presented
    - *Is a particular sound treated as a new different sound, or the same as the preceding sounds?*
- FIRST = Habituation Phase
- THEN = Switch to playing a new stimulus at a predetermined sucking-rate threshold
  - What happens?
  - Dishabituation (increase sucking rate) OR Continued decrease in sucking rate

*Eimas et al reading (downloadable from Blackboard)*

- 1-month-old and 4-month-old infants habituated to an adult [pa] or an adult [ba].
- Switched stimulus is either:
  - **Acoustic Change**: different VOT from same adult category
  - **Phonemic Change**: different VOT from different adult category
  - **Control**: no change in stimulus



**Results:** Dishabituation in Phonemic Change condition; no dishabituation in Acoustic Change or Control. Infants as young as 1-month perceive VOT changes categorically.

[see class handout, which is also downloadable from Blackboard, for important graphs]

**Important terms/concepts to know:**

Categorical perception  
VOT (voice onset time)  
Lack of invariance  
Good between-category discrimination  
Poor within-category discrimination  
High-Amplitude Sucking  
Dishabituation vs. habituation  
Acoustic change  
Phonemic change