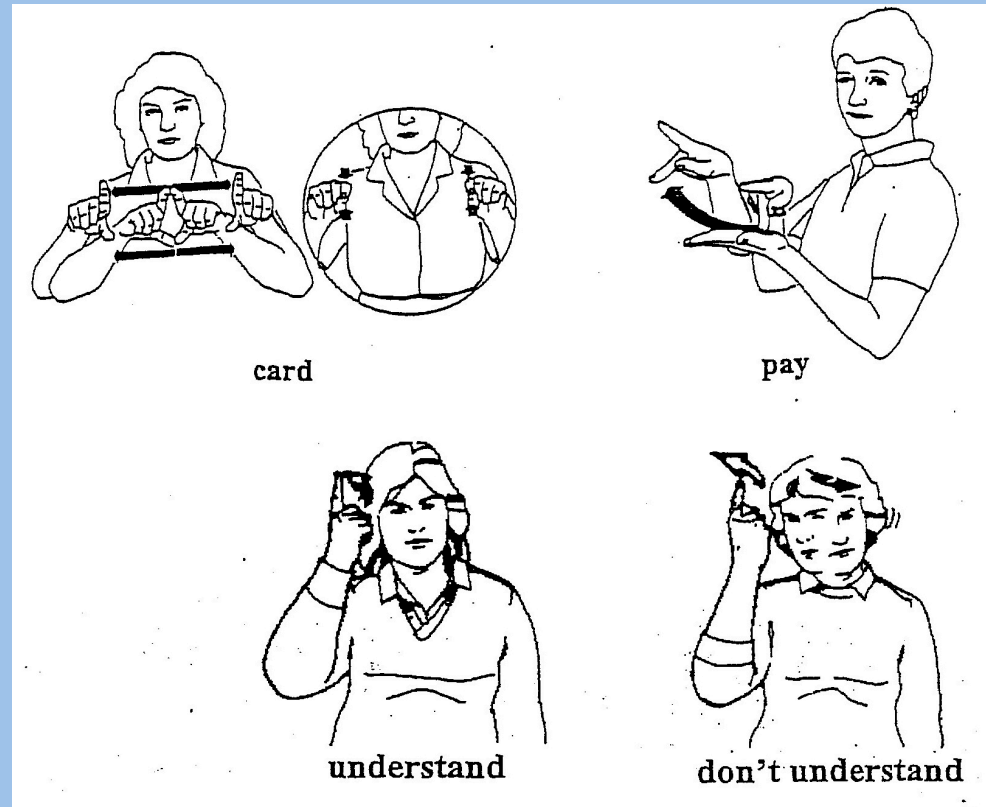
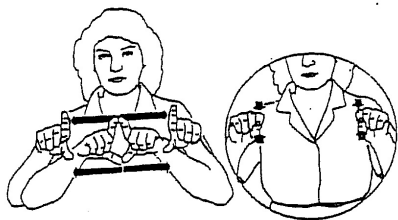


Naturally Acquired Literacy

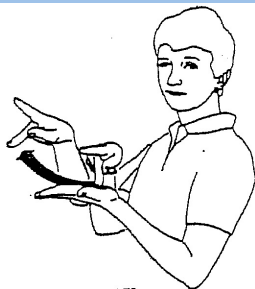
Reading is a Visual Language



American Sign Language (ASL)



card



pay



owe



late



library



understand



don't understand



emergency



deaf

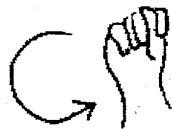


close

Days of the Week



Monday



Tuesday



Wednesday



Thursday



Friday



Saturday



Sunday

sign **with** **me**

**Communicate
Even Before Your Baby Can Talk!**



Bath



Bed



Cookie



Daddy



Eat



Frog



Gentle



Hear



Help



Horse



Hot



I Love You



Milk



Mommy



More



No Touch



Potty



Shoes



Telephone



Thank You



Where



www.signwithme.com



[Cute Signing Baby](http://www.youtube.com/watch?v=7gSZfW4gVhI)

<http://www.youtube.com/watch?v=7gSZfW4gVhI>

Sign Language Videos

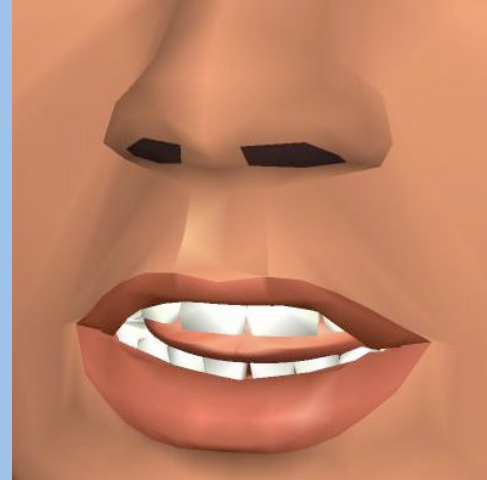
Sign Language Lessons

<http://www.youtube.com/watch?v=7cayMkVidpc>

Toddler Talk

http://www.youtube.com/watch?v=xF_Pvh7WNGI

SpeechReading



Cued Speech

CUED SPEECH CONSONANT HANDSHAPES

1



p
d
zh

2



k
z
v
tH (the)

3



s
h
r

4



n
b
hw (why)

5



m
f
t

6



sh
l
w

7



j
g (go)
th (thumb)

8



y
ng
ch

Example of Cued Speech

- hand gesture
 - /d, p, zh/
- speechread
 - /b, p, m/
- denotes /p/



Orin Cornett
1913-2002



Cued Speech Videos

Overview of Cued Speech

<http://www.youtube.com/watch?v=plPw4H-ZsMg>

Learning Cued Speech

http://www.youtube.com/watch?v=6B18_G_8JHs

Puzzle of Language Acquisition



"No, Timmy, not 'I sawed the chair'. It's 'I saw the chair' or 'I have seen the chair'."

Language is Special

Innate

independent language organ

independent course of
development

not traditional perception and
learning theory



Noam Chomsky

Univ. of Maryland, Jan. 26, 2012

Language development alla Chomsky

- Chomsky's Language Organ
- not just abstraction, induction, generalization, and analogy
- languages have particular structures-- because there are severe bounds on what can be learned

Reason Language is Special

- Poverty of the Stimulus
 - natural language grammar is un-learnable given the relatively limited data available to children learning a language, and therefore that this knowledge is supplemented with some sort of innate linguistic capacity

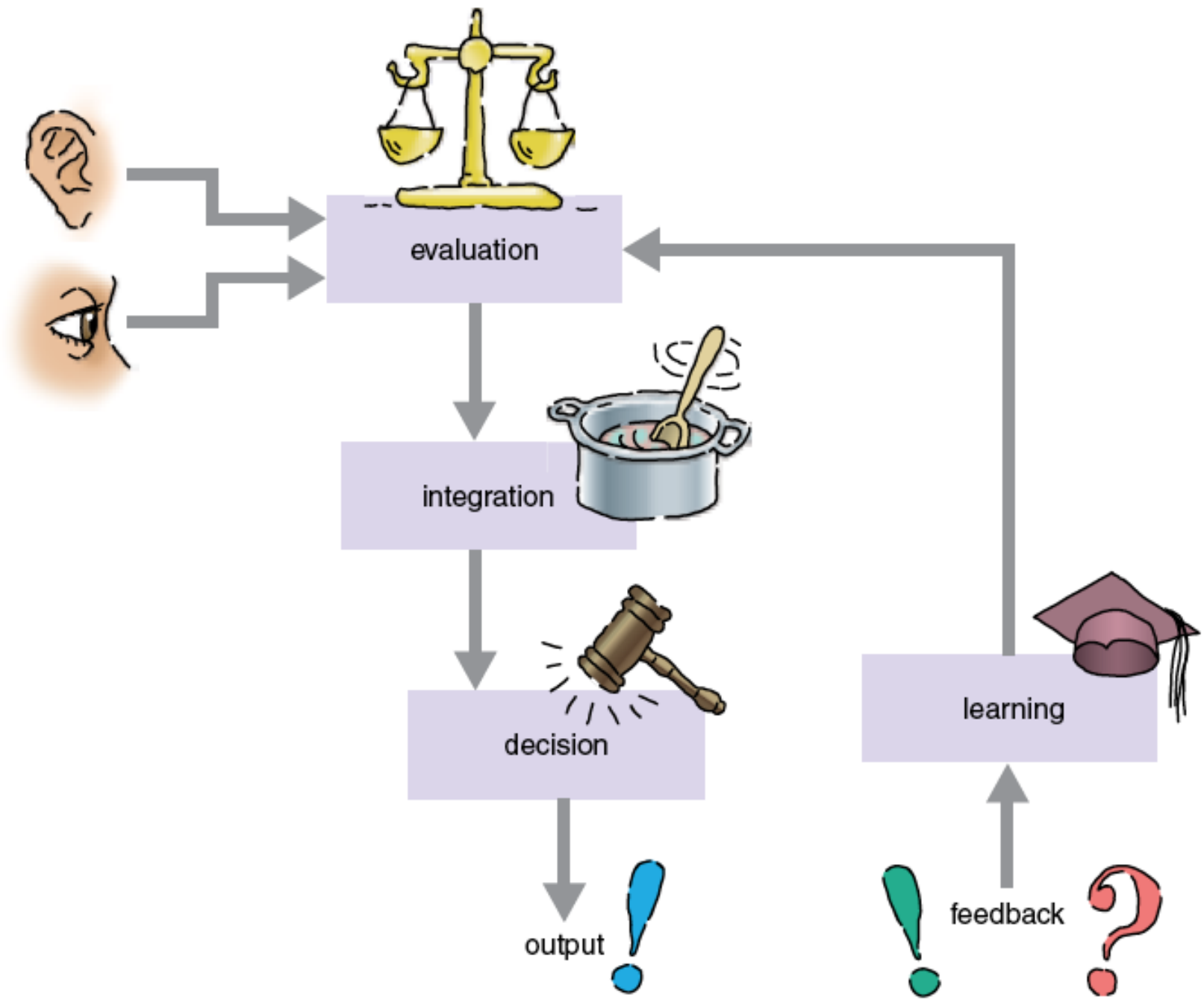


Critique: Language is Special

- Poverty of the Stimulus
 - positive evidence is actually enough to learn the various patterns that linguists claim are unlearnable by positive evidence alone.
 - brain's mechanisms of statistical pattern recognition could solve many of the imagined difficulties.

stochastic learning theory

- Also called Distributional Learning (DL)
- holds that language learning is based on complex, higher-order properties of stochastic patterns in sensory experience, not a mere tabulation of frequency of patterns.



Emergentist Coalition Model

- mapping of words onto referents
 - children rely on multiple cues
- weight given to these cues change across development.
- Example
 - Infants initially rely mostly on perceptual cues
 - Then rely more on speaker's intent and linguistic cues



TRENDS in Cognitive Sciences

Figure 1. The Intermodal Preferential Looking Paradigm.

Habituation Videos

Infant Looking Time Habituation

<http://www.youtube.com/watch?v=dliIzh60qdA>

Workers Sound Discrimination Research

<http://www.youtube.com/watch?v=dAU5CAI1U6M>

The Baby Human

<http://www.youtube.com/watch?v=Ew5-xbc1HMk>

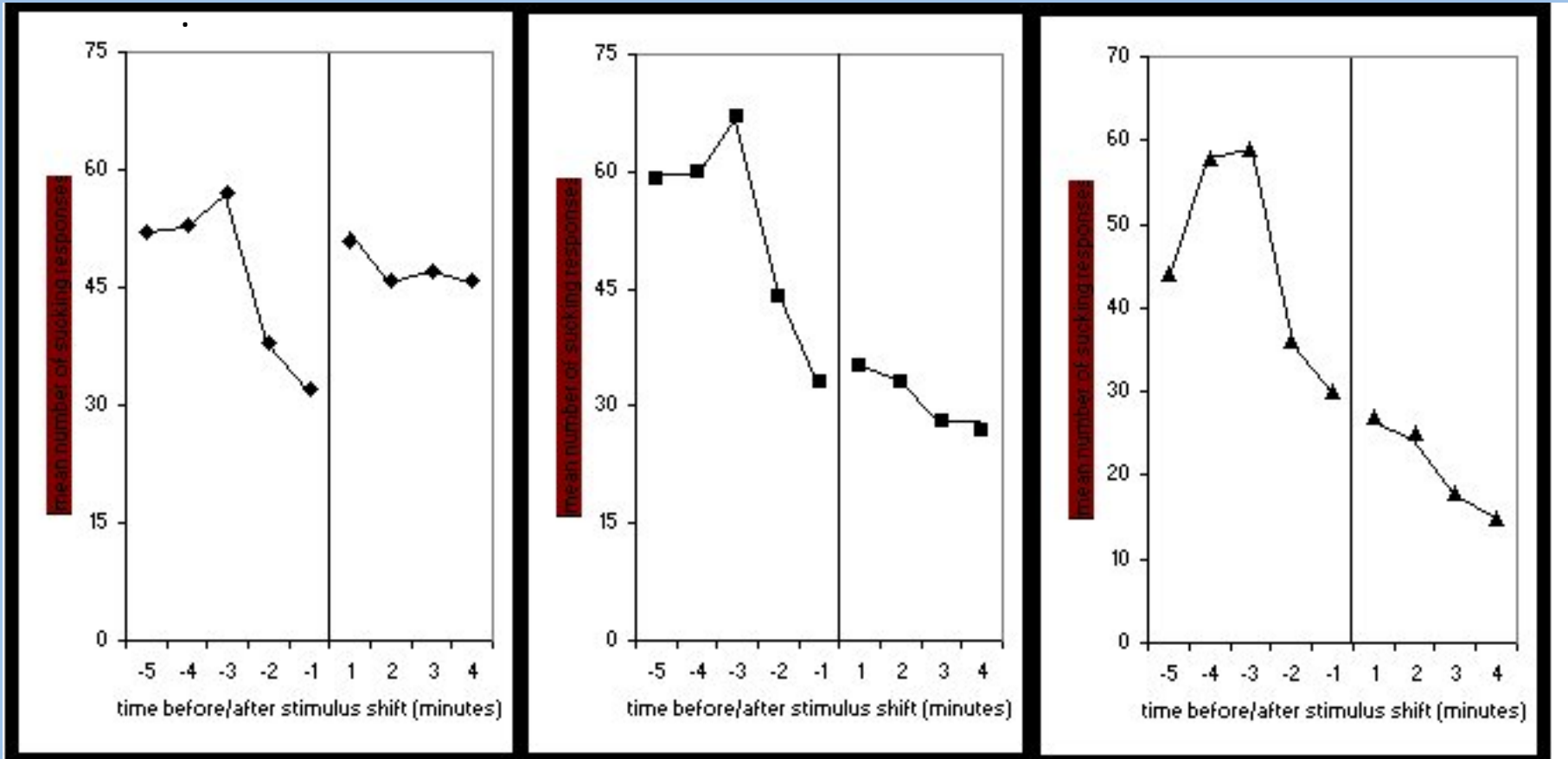
Infants Have the Wetware for Spoken Language

<http://www.youtube.com/watch?v=Ew5-xbc1HMk>

Infants Perceive Subtle Distinctions in Speech

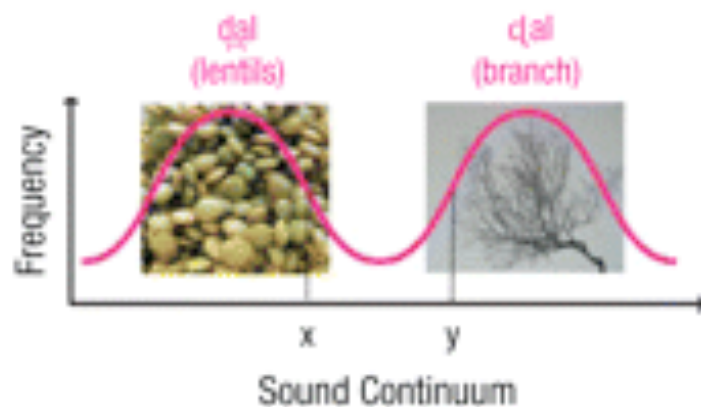
Infants Perceive Categories and When They Occur

<http://www.youtube.com/watch?v=dAU5CAI1U6M>



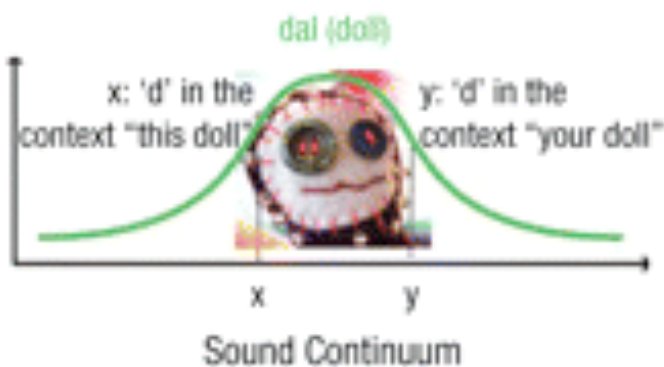
Hindi (Discrimination)

Natural Language Environments



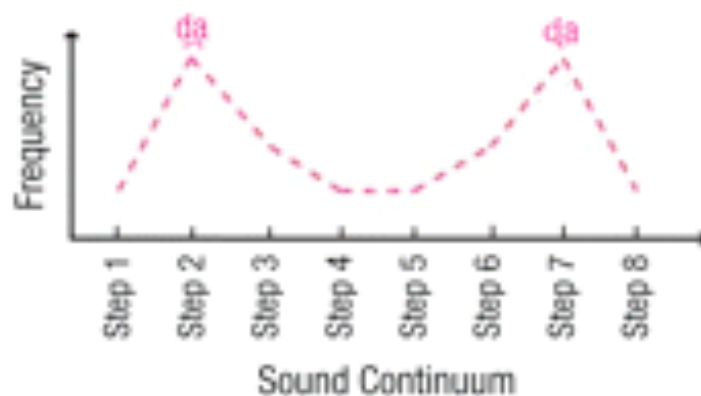
English (No Discrimination)

Frequency



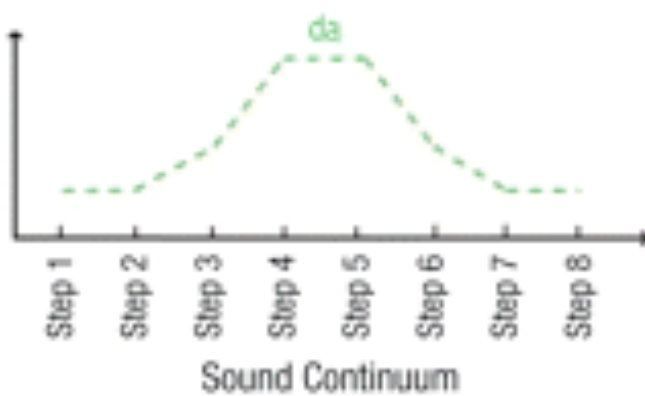
Bimodal (Discrimination)

Distributional Learning Environments



Unimodal (No Discrimination)

Frequency

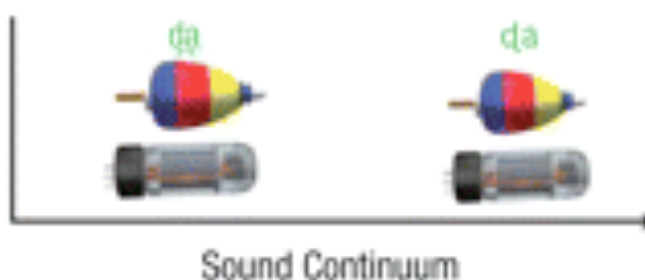


Consistent Pairings (Discrimination)

Acquired Distinctiveness Learning Environments



Inconsistent Pairings (No Discrimination)



Infants Sensitivity to Speech

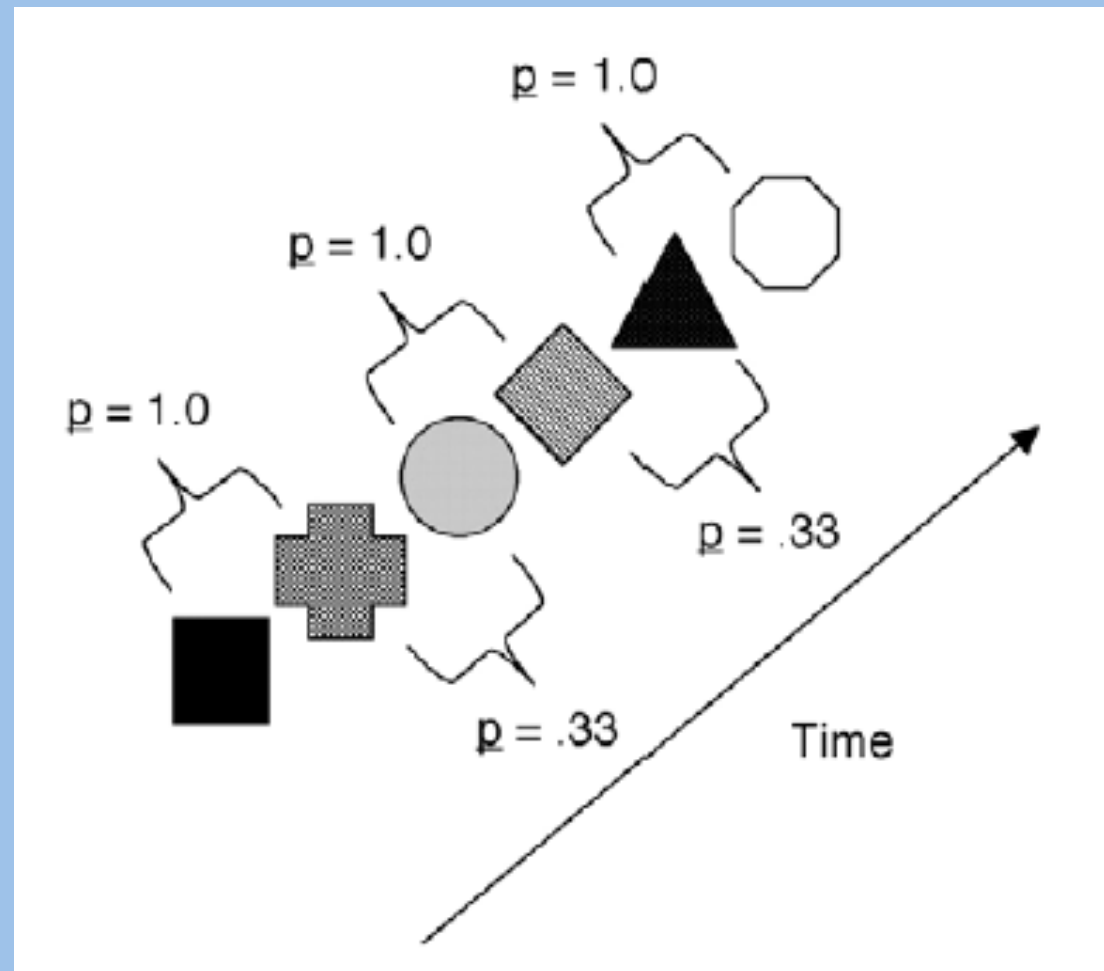
- Begin Life sensitive to all phonetic contrasts
- 10 months and sometimes earlier
 - Beginning to refine their categories
 - Still sensitive to differences
 - Can learn distributional information
 - Sensitive to contextual information
 - Acquired distinctiveness can occur

Babies

- [Infant Learning and Intelligence](#)
- <http://www.youtube.com/watch?v=upMfun48euc>

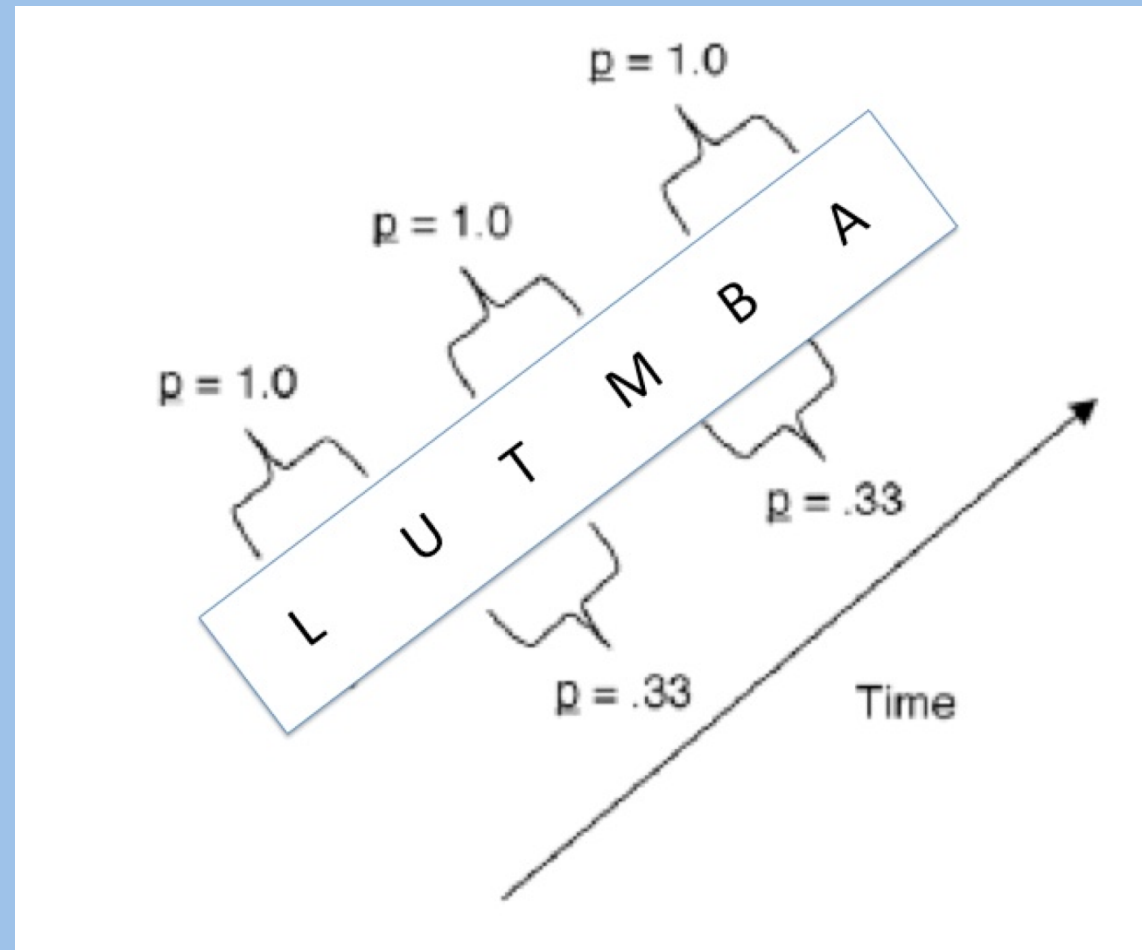
Babies

- Association Engines
- Learn Statistical Constraints
 - Speech
 - Music
 - Objects



Babies

- Association Engines
- Learn Statistical Constraints
 - Speech
 - Music
 - Objects
 - **Letters?**



Puzzle of Language Acquisition

- General Learning Principles
 - May be sufficient
- Generalization
 - Forms
 - Structure of the Expression
 - Functions
 - Meaning of the Expression

form and function

- Structure of the expression
- Meaning of the expression

Form And Function

- old forms express new functions
 - milk please ----> treat please
- new forms express old functions
 - milk please ----> please pass the milk

Infants understanding of words

- link object words to referents
 - 10 months of age
- understand verbs like dance and open
 - 15 months of age

Influences on Infants' Word Learning

- Interest
 - 10-month-olds
- Action produces a result
 - At 21 months versus 33 months
- Names for their own actions
 - Versus others' actions
- Agent performing the action
 - Familiar versus unfamiliar

(a) Front-angle containment event



(b) High-angle containment event



(c) High-angle behind event



(d) High-angle support event



Infants categorization

- across categories of containment
 - 6 months of age
- across categories of support
 - 14 months of age



Standard



Action-same-object different(AS)



Object-same-action-different(OS)

TRENDS in Cognitive Sciences

Figure 1. In the standard trial (a), children saw a video clip of a woman

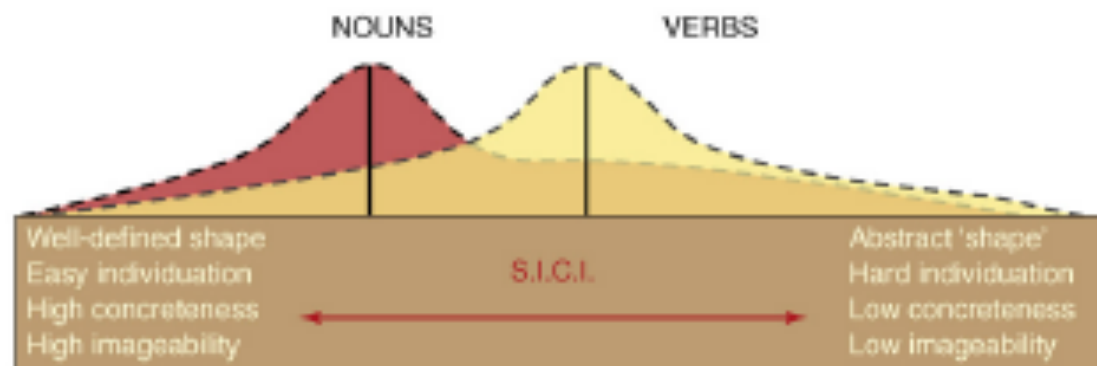
Path and manner

- Path
 - the movement of a figure with respect to a ground object.
 - 9 months
- Manner
 - how the figure moves within an event (e.g., climbing or walking)
 - 13 months
- Path relations are easier to detect and categorize than manner relations.

Goal Paths Over Source Paths

- 12-month-olds attend preferentially to goal paths over source paths in dynamic, non-linguistic events
- 14 months of age children form categories of goals though not of sources

SICI continuum



Examples

Proper nouns (<i>Marty, Sue</i>)	Concrete nouns (<i>spoon, ball</i>)	Relational nouns (<i>uncle, grandmother</i>)	Abstract nouns (<i>peace, hope</i>)	
Instrument verbs (<i>eat-meat</i>)	Action verbs (<i>jump, hug</i>)	Path verbs (<i>exit, ascend</i>)	Intention verbs (<i>pour, spill</i>)	Mental verbs (<i>think, believe</i>)

TRENDS in Cognitive Sciences

Why early experiences matter



Newborn Brain

Average weight
333 grams

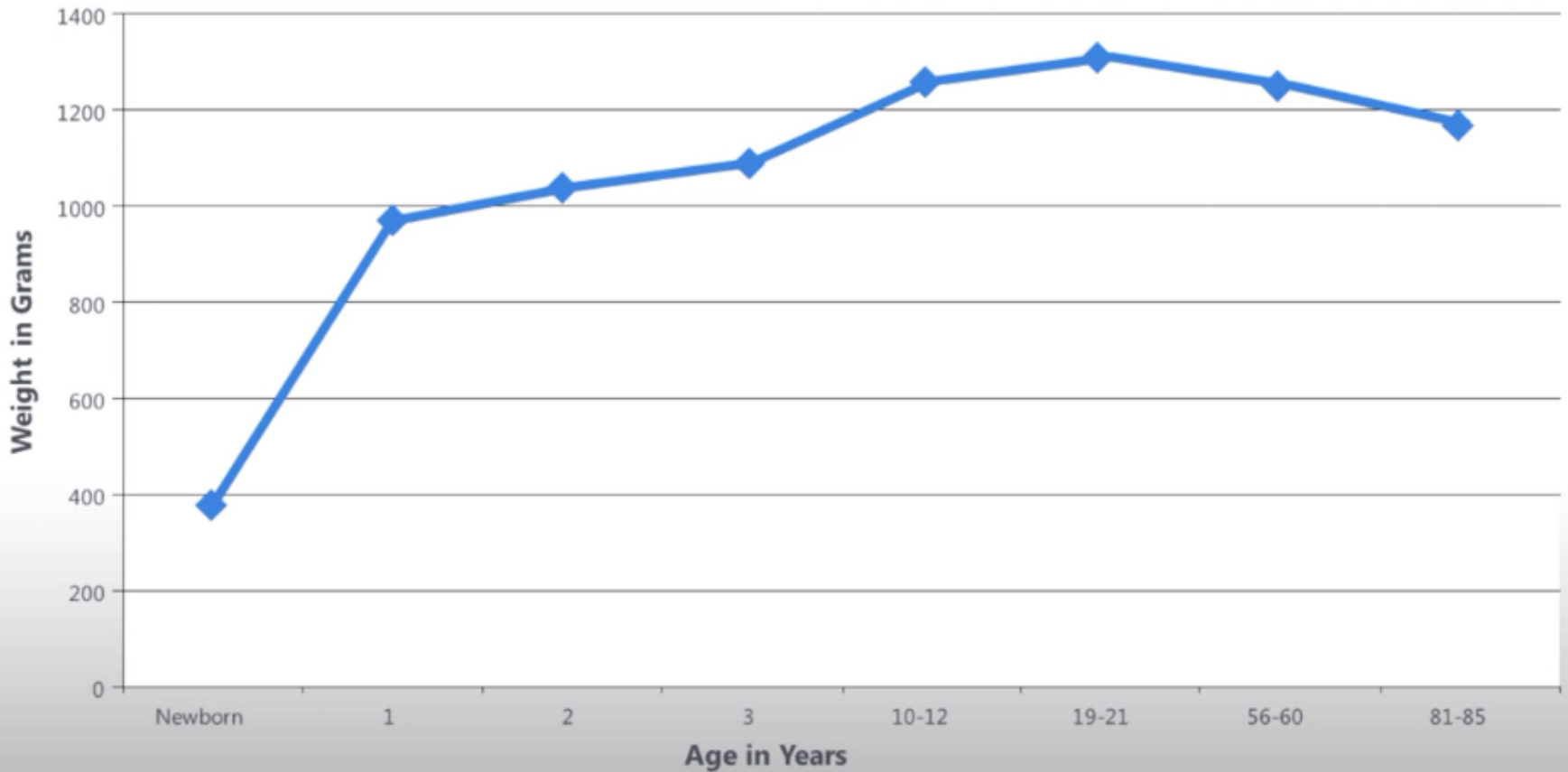


2 Year Old's Brain

Average weight
999 grams

Brain photo courtesy IsaacMao, Flickr

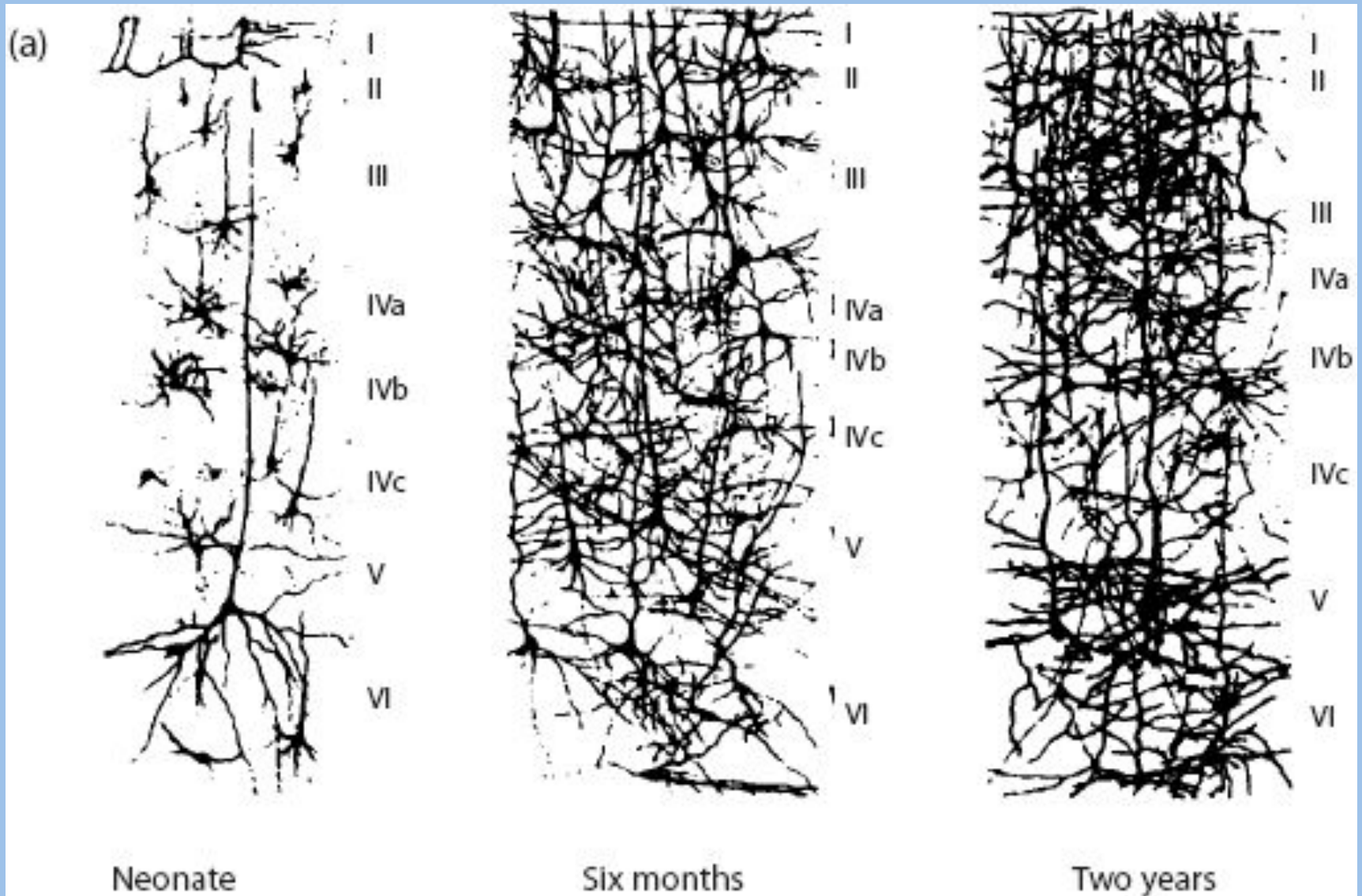
Brain Growth over the Lifespan



TEDxRainier - Dimitri Christakis - Media and Children

Childhood decides everything
John-Paul Sartre

Explosive Brain Development



Critical Periods

- Auditory System
- Visual System
- Language System(s)
 - Speech
 - Sign
 - Reading (Hypothesized)

[Dr. Andrew Melthoff](#)

<http://www.youtube.com/watch?v=y4MCqFkbQXI>

Still face experiment

<http://www.youtube.com/watch?v=apzXGEbZht0>



Matata and Kanzi

[Kanzi, the Bonobo](#)

<http://www.youtube.com/watch?v=jKauXrp9dl4>

