

# THE SCIENCE AND THEORY OF LANGUAGE DEVELOPMENT

# LEARNING GOALS

1

Explain who studies language development and why.

2

Describe some major approaches to studying language development.

# INTRODUCTION

A **theory** is a claim or hypothesis that may be tested repeatedly with an array of scientific methods; when the **accumulated evidence** consistently supports a given theory throughout time, it becomes an accepted part of the knowledge base in a particular discipline, and we can then use the theory to make **predictions** about natural phenomena.

In the area of language development, theories provide explanations for **how** and **why** children develop their capacity for language across the different domains.

# THEORY AND CLINICAL PRACTICE

**Evidence-based practice (EBP)** involves integrating theoretical knowledge with scientific inquiry to inform decision-making.

# WHO STUDIES LANGUAGE DEVELOPMENT?

DISCIPLINE	MAJOR FOCUS	SAMPLE RESEARCH QUESTIONS
<i>(Developmental) psychology</i>	Human mind and behavior and the changes that occur in humans as they age	To what extent do individuals experience word naming challenges as they age? (Verhaegen & Poncelet, 2013)
<i>Linguistics</i>	Aspects of human language, including phonetics, phonology, morphology, syntax, and semantics	How do the phonological features of one's native language affect the perception of phonemes in nonnative languages? (Pajak & Levy, 2014)
<i>Psycholinguistics</i>	Psychological and neurobiological factors that enable humans to acquire, use, and understand language	To what extent can electrophysiological studies reveal how infant phonetic representations develop into adult representations? (C. Phillips, 2001)
<i>(Linguistic) anthropology</i>	Relationship between language and culture; social use of language; language variation across time and space	How does the way in which a person expresses information verbally relate to how they encode information in gesture? (Kita & Özyürek, 2003)

# WHO STUDIES LANGUAGE DEVELOPMENT?

DISCIPLINE	MAJOR FOCUS	SAMPLE RESEARCH QUESTIONS
<i>Speech-language pathology</i>	Prevention, diagnosis, and treatment of speech and language disorders	To what extent does evidence support the use of commercially available tests of child language for identifying language impairment in children? (Spaulding, Plante, & Farinella, 2006)
<i>Education</i>	Aspects of teaching and learning	To what extent does comprehensive language and literacy intervention promote language and literacy development in preschool children? (Wasik, Bond, & Hindman, 2006)
<i>Sociology</i>	Aspects of society such as cultural norms, expectations, and contexts	In what ways does the presence of an interpreter contribute to communication patterns between a physician and a patient? (Aranguri, Davidon, & Ramirez, 2006)

# WHY STUDY LANGUAGE DEVELOPMENT?

## BASIC RESEARCH

**Theoretical or basic research:** In this type of research, researchers develop, test, and refine theories about language development. When the outcomes of basic research consistently confirm a theory, the theory becomes an accepted explanatory principle—akin to knowledge.

The **purpose of basic research** is to improve understanding of a particular phenomenon.

**Example** research topic : How children learn the meanings of words?



# WHY STUDY LANGUAGE DEVELOPMENT?

## APPLIED RESEARCH

**Applied research** contributes to specific social needs by testing the viability of certain practices and approaches.

Applied researchers usually test **language-development practices** relevant to three main contexts: homes, clinical settings, and schools.

**Example:** research focusing on the identification of children at risk for language impairment.

Identifying who are in risk

Developing ways to treat



# WHAT ARE SOME MAJOR APPROACHES TO STUDYING LANGUAGE DEVELOPMENT?

- **Speech perception**
- **Language production**
- **Language comprehension**

# APPROACHES TO STUDYING SPEECH PERCEPTION

**Goal of speech Perception studies** understand how infants begin to parse the speech stream to begin to learn the sounds and words of their native language.

## **Methods for studying speech Perception**

- head-turn preference procedure.
- high-amplitude nonnutritive sucking (HAS) procedure.
- Brain imaging techniques.

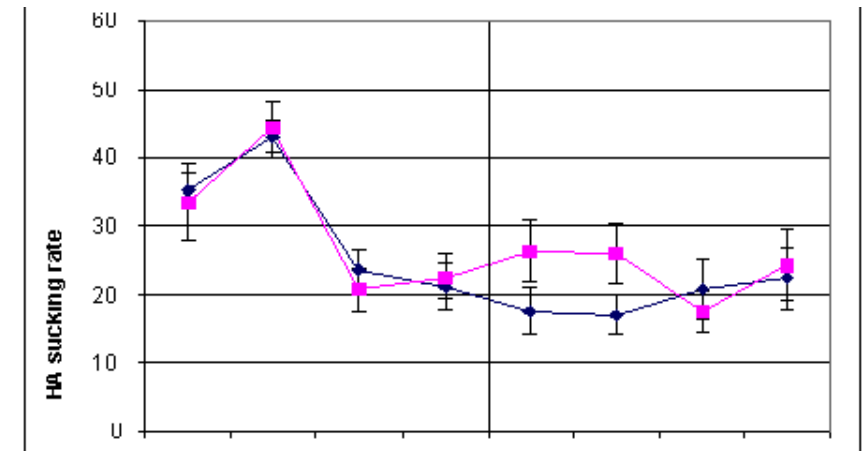
# HIGH-AMPLITUDE NONNUTRITIVE SUCKING

## What is it used for?

- To test whether infants can discriminate different stimuli (e.g., sounds /ba/-/pa/, language X and Y)
- Age range: 0-4 months

## Merits/demerits

- Can be used with very young infants
- Single observation per subject



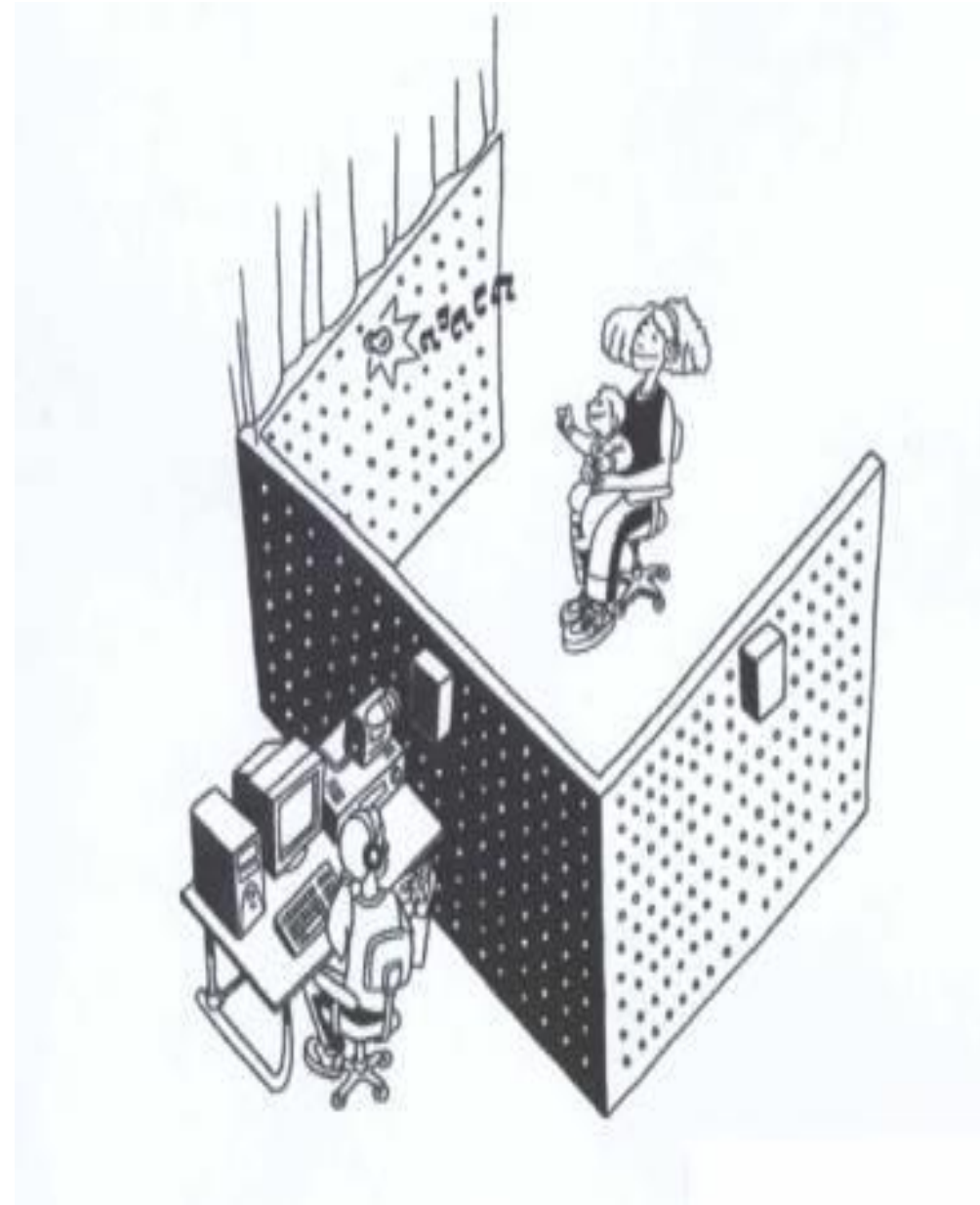
# HEAD-TURN PREFERENCE PROCEDURE

## What is it used for?

- To test whether children can discriminate one type of stimuli from another (e.g., infant- vs adult-directed speech; nativelike vs non-nativelike phonotactics)
- Age range: 4-24 months

## Merits/demerits

- Low task demands
- Only works with long stimuli (e.g., passages, repeated words)
- Familiarity vs novelty



# APPROACHES TO STUDYING LANGUAGE PRODUCTION

**Goal of language production studies** is to help inform practitioners of children's ability to use language expressively. In these studies, researchers examine children's emergent form, content, and use capabilities.

Such studies may involve **normative research**.

## **Methods for studying language Production**

- Observational
- Experimental

# OBSERVATIONAL STUDIES

The context of these studies can either be :

- Natural
- Semi-structured

In observational studies, researchers typically **record** children's language for a certain period, after which they **transcribe** the language and **analyze** it for specific properties or qualities.

# EXPERIMENTAL STUDIES

Experimental studies:

- ☐ researchers are inventive in designing experiments to assess children's production abilities
- ☐ Manipulation variable of interest
- ☐ May include pseudowords to assess phonological skills and repetition of sentences to assess grammatical skills



# APPROACHES TO STUDYING LANGUAGE COMPREHENSION

**Goal of language comprehension studies** is to assess what children understand about language

Such studies may involve **visual fixation on a stimulus, pointing , acting out sentences.**

# WHAT ARE SOME MAJOR LANGUAGE- DEVELOPMENT THEORIES?

## Questions Language Theories Should Answer:

- What do infants bring to the task of language learning?
- What mechanisms drive language acquisition?
- What types of input support the language-learning system?

# WHAT DO INFANTS BRING TO THE TASK OF LANGUAGE LEARNING?

Some theorists propose infants arrive in the world essentially preprogrammed to acquire language. Other theorists contend infants learn language through their experiences.

## Nature vs Nurture

# WHAT MECHANISMS DRIVE LANGUAGE ACQUISITION?

Some theorists propose the processes people use to learn language are **domain specific**, or dedicated solely to the tasks of comprehending and producing language. Other theorists contend that people use processes for learning language that are **domain general**, or the same as processes they use in other situations, such as solving problems and perceiving objects and events in the environment.

Remember the modularity concept?

# WHAT TYPES OF INPUT SUPPORT THE LANGUAGE-LEARNING SYSTEM?

Some theorists suggest that increasing **knowledge of social conventions** and a child's desire to interact with others are the most important supports for language development. Other theorists propose that when children simply hear more and more language, they **use “positive evidence”** that other people provide to make assumptions about the structure of their native language.

# MAJOR LANGUAGE-DEVELOPMENT THEORIES

- **Nurture-inspired theories** are often called **empiricist theories**, and they rest on the notion that humans acquire language through experience.
- **Nature-inspired theories**, also called **nativist theories**, generally hold that much knowledge is innate and genetically transmitted rather than learned by experience.
- **Interactionist theories** acknowledge that language develops through the interaction between nature-related and nurture-related factors.

# NURTURE-INSPIRED THEORY

**Behaviorist Theory** B. F Skinner (1904–1990)

**Notion of behaviorism** : all learning is the result of operant conditioning (Skinner, 1957).

In **operant conditioning**, behaviors that are reinforced become strengthened, and behaviors that are punished become suppressed.

According to this theory, environmental stimuli elicit verbal responses, or language, from children. children then “learn” language as adults reinforce their verbalizations.



# INTERACTIONIST THEORIES

## Social-Interactionist Theory

**Lev vy- gotsky (1896–1934)** stressed the importance of social interaction between an infant and other, more capable persons for children's language acquisition.

**Vygotsky** believed that prior to 2 years of age, general cognition and language are intertwined, but at about age 2 years, these two processes begin to develop as separate capabilities.

**zone of proximal development:** which is the difference between a child's **actual developmental level** and his or her level of **potential development**.

evolving skills **vs** acquired/mature skills

# ZONE OF PROXIMAL DEVELOPMENT

## Example

“Lori and her 4-year-old son, Alexander, are having a conversation about rhyming words in a storybook. Without assistance from Lori, Alexander cannot produce rhymes. For instance, she asks him, “What is a word that rhymes with cat?” and receives no response. However, when Lori provides Alexander with support, by telling him three words that rhyme with cat (bat, fat, mat), he can produce a rhyming word (rat)”

# INTERACTIONIST THEORIES

## Cognitive Theory

**Piaget (1923)** viewed language as a **domain-general** ability that closely follows children's **general cognitive development**.

Piaget viewed children **as active agents** in constructing their understanding of language. According to Piaget, children are **egocentric** and developmentally predisposed to view the world from only **their perspective**.

Children do not replace egocentric speech with true dialogue until they develop the ability to **see others' perspectives**.

# INTERACTIONIST THEORIES

## Intentionality Model

The **child is responsible** for driving language learning **forward**.

In this model children learn language when what they have in mind differs from what other individuals around them have in mind because they must express themselves to share this information.

To acquire language, then, **children must be intentional**, they must take strides to engage in social interaction, and they must put forth **effort** to construct linguistic representations for the ideas they want to express and then act to express these ideas.

# INTERACTIONIST THEORIES

## Competition Model

The model describes **specific mechanisms** through which children acquire language. E.g, **frequent** language forms are acquired early while **infrequent/rare** language forms are acquired later in life.

Multiple language forms compete with one another until the input **strengthens the correct representation** and the child no longer produces an incorrect form.

**Overgeneralization** : E.g., I goed.

# REFER TO THE BOOK

**Connectionist theories**

**Usage-Based Theory**

# NATURE-INSPIRED THEORIES

**Universal Grammar** noam chomsky (1965)

The term **universal grammar (UG)** describes the system of grammatical rules and constraints consistent in all world languages.

Chomsky postulated that language acquisition depends on an innate, species-specific module dedicated to language and not to other forms of learning. This module is called the **language acquisition device**.

According to **UG theory**, children are born with a basic set of grammatical rules and categories that exist in all languages. This implicit knowledge children have about language is called **linguistic competence**, whereas the actual comprehension and production of language in specific situations is called **linguistic performance**.

Mistakes and omissions in children's speech indicate performance difficulties and not a lack of competence.



# NATURE-INSPIRED THEORIES

## **Modularity Theory** Fodor's (1983)

A **modularity perspective** of language views it as an innate capacity localized to domain-specific processors that are **encapsulated** in their functions from other processors.

The concept of **encapsulation** means that language modules operate independently to perform dedicated functions, yet can interact with one another at higher levels to produce combinations of functions. Because language modules operate independently, different types of input drive language development forward in different areas (e.g., the lexicon, syntax, morphology).

For example, the number and kinds of words a young child hears form an environmental influence that helps shape the lexicon, whereas innately given syntactic rules help shape the child's sentence formation abilities.


# NATURE-INSPIRED THEORIES

## Bootstrapping theories

**Bootstrapping** means accomplishing a goal by personal effort or with minimal outside assistance.

**syntactic bootstrapping** describes the process by which children use the syntactic frames surrounding unknown verbs to successfully constrain or limit the possible meanings of the verbs.

**semantic bootstrapping:** After children acquire a large, diverse lexicon from their observations of objects and events in the world, they use correspondences between semantics and syntax to determine the syntactic category to which each word belongs.



**Prosodic bootstrapping** suggests infants use their sensitivity to the acoustic properties of speech (e.g., pitch, rhythm, pauses, stress) to make inferences about units of language, including clauses, phrases, and words.

# A SUMMARY FOR THE BEHAVIORIST PERSPECTIVE

- Behaviorism stresses on the importance of environment
- Children are viewed as empty tanks to be filled with experiences.
- Child is viewed as having no knowledge of language rules
- Parents are “credited” for teaching language by providing models for the child to imitate.
- By selective reinforcement, parent shape child utterances into adult forms

# CRITICS OF THE BEHAVIORISM VIEW

## The role of imitation is questioned :

- children produce utterances that they never heard before or are never produced by adults e.g., daddy goed work .
- Imitation decreases after the 2<sup>nd</sup> birthday, although a lot of language is acquired after this age.
- If imitation is important, it would be evident throughout the language learning period.

# NATIVIST INTERPRETATION

Nativists stress that language is **innate** or **biologically-based**. That is, humans are born with **species-specific capacity** for language that is realized with minimal assistance from the environment.

Noam Chomsky is a linguist that is closely associated with the Nativist view.

# PRACTICES LANGUAGE THEORIES MAY INFORM

- Prevention
- intervention and remediation
- enrichment