Overview

★ Current linguistic theory approaches to explaining language and its acquisition
★ The syntax and semantics of questions
★ Strategies for training comprehension of Wh- and Yes/No-Questions
★ Suggestions for helping students ask questions and answer questions

Basics of the Principles & Parameters Theory

The Principles & Parameters Theory dominant in current linguistic research
★ All human languages share a common underlying set of Universal Principles and Parameters
★ Biologically based linguistic universals guide the course of language acquisition
★ This biological initial state is referred to as Universal Grammar (UG)
★ While the lexicon or vocabulary of a language must be learned, structure is based on UG

Chomsky’s Minimalist Program

★ In the nineties, Chomsky introduced the Minimalist Program (within the P&P) with the goal of simplifying linguistic operations
“…more generally the minimalist desire is to conceive language as a ‘perfect’ linking between sound and meaning.”
Lasnik & Uriagerek (2005, p. 8)
★ Chomsky conceives of the language faculty as the optimal solution to linking sound and meaning for sentence interpretation

The Lexicon Takes on Greater Role

★ Interactions between the lexicon and the Computational system of human language (CHL) are important aspects of the program
★ The Lexicon (the mental dictionary of lexical items or words with their linguistic properties) has taken on a far greater role than in earlier generative grammar theory
The Lexicon

The Lexicon consists of the mental dictionary of all words together with their idiosyncratic properties. Lexical entries consist of:
★ Phonological and semantic properties (sound and meaning)
★ Syntactic features such as categorial membership (i.e., Noun, Verb, Determiner, etc.), inflectional behavior (e.g., how it is marked for number, person, and gender)
★ Syntactic Argument Structure for Verbs (e.g. run requires only one argument, a Subject “The girl runs”; kiss requires two arguments, a Subject and an Object “The father kisses the baby”; give requires three arguments “The girl gives the baby a toy”).

Functional Category Examples

★ Determiners (Associated with Nouns)
  here, there, this, that, these, those
  I, we, you, he, she, they
  me, us, you, him, her, them
  my, your, our, his, her, their
  mine, yours, ours, his, hers, theirs
  himself, herself, themselves
★ Tense (Associated with Verbs)
  -ed, will, Aux & Copular “be”
  do not, does not, is not
★ Complementizers
  if, that, whether, Wh-questions, Yes/No-questions

Importance of Functional Category Forms

As the Functional Categories are acquired, the hierarchical nature of sentences emerges.
★ Children in the early word combination stage produce Noun and Verb phrases with few Functional Category forms:
  Example: ball roll
  (instead of the adult The ball is rolling)
★ In sentences of competent language users, Nouns combine or Merge with Determiners and become Determiner Phrases (DP)
★ Similarly, Verbs combine or Merge with Tense elements and become Tense Phrases (TP)
★ Determiner and Tense forms emerge before Complementizers

Functional Category Forms Difficult for Children with Language Disorders

★ Hierarchical sentence structure emerges as the Functional Categories are acquired.
★ Children with language disorders have more difficulty mastering Functional Categories than Lexical Categories.
★ Mastery of Determiner, Tense, and Complementizer forms is necessary for the development of adult syntactic competence.

General Guidelines for Developing Language Competence

★ Grammar (lexicon & syntax) is acquired through listening therefore receptive language intervention should be a central component in programs for children with language disorders.
★ Children with language disorders do not develop language competence based on environmental linguistic input alone (Primary Linguistic Data) as do neurotypically developing children.
★ Structured receptive intervention designed to develop vocabulary and syntax is critical for children with language disorders.
**General Guidelines for Developing Language Competence**

- Pragmatics, or the use of language in social contexts, has its own set of principles and operations that are separate from UG.
- Since pragmatics is distinct from the formal grammar component (lexicon and syntax) of language, it should be addressed in separate goals (e.g. Language Goals vs. Communication Goals)
- Each child’s language needs (vocabulary and syntax) should be considered apart from and in addition to his or her communication needs

**Functional Categories: Forms Necessary for Syntax Competence**

- Children with language impairments show deficits in Functional Category form use
- Determiners and Tense lexical items emerge before Complementizers
- Determiner and Tense forms should be the initial focus of syntax intervention
- After core Determiner & Tense forms have been mastered, introduce Complementizer Yes/No- and Wh-Questions

**Yes/No-Questions**

The simplest Yes/No-Questions are those that move the Modal or Auxiliary to a position preceding the Subject.

Yes-No-Questions covered in the curriculum:
- *Is the boy reading a book?*

**Theory Based Syntax Intervention**

- Since children with language disorders have difficulty mastering Functional Categories, intervention should provide training on these forms and the structures in which they appear
- New grammatical forms are most efficiently acquired in receptive contexts not communicative settings
- While speech-language pathologists recognize the importance of receptive training, time is a problem
- That’s where Assistive Technology can help

**A Closer Look at Complementizers**

Within the Complementizer Functional Category two forms of direct questions are the focus of the curriculum to be presented:

- Yes/No-Questions (e.g. *Is the boy swimming?/Can you jump?*)
- Wh-Questions and Wh-Movement (e.g. *Who/What is on the chair?* no movement versus *Who/What is he carrying?* with movement)

**Wh-Questions**

- Wh/What-Questions can have the Wh-Element in the Subject position
  - For example *Who/What is on the chair?* where both *Who* and *What* are in the Subject position at the front of the sentence
  - Contrast that with *Who/What is the boy carrying?* where the Wh-Element must move from the Object position after the Verb to the front of the sentence
Comprehension of Wh-Questions

- Children with specific language impairment (SLI) have more difficulty comprehending *Who/What* Object questions (with movement) than *Who/What* Subject questions (Deevy & Leonard, 2004) which have no movement.
- This suggests training should begin with *Who/What* Subject questions (no movement).

Sentence Generation

- In earlier generative grammar theory, Phrase Structure and Transformational Rules were the mechanisms proposed for sentence generation.
- In the P&P and Minimalist Program the Computational system of human language (CHL) generates sentences from a lexical array in a principled economical fashion.

Generating a Sentence

- The first step in generating a sentence is copying items from the lexicon.
- Once a lexical array is chosen, the Computational system (CHL) combines words using two operations:
  - **Merge** combines elements
  - **Move** repositions words &/or phrases

Building a Simple Sentence

- **She is hitting the ball.**

Diagram:

```
  TP (Tense Phrase)
     /     
    /       
  T (Head)   VP (Verb Phrase)
              /     /     /
  V (Head)  Specifier  N  DP
          /       
  she is   the hitting  ball
```

- **Merge** combines elements.
- **T (Head)**, **V (Head)**, **D (Head)**, **N** (Head), **TP (Tense Phrase)**, **VP (Verb Phrase)**, **Specifier**.
**Wh-Question without Movement**

Who is hitting the ball?

**Wh-Question with Movement**

What is she hitting?

**Yes/No-Question**

Is she hitting the ball?
Questions: A Suggested Progression

★ In developing question comprehension, students must learn the syntax of questions and the semantics of Wh- Elements (e.g. what, who, where, why, how)

  • An initial step in introducing question comprehension would be to present Who/What Subject contrasts (e.g. Who/What is on the chair?)
  • Next would come Who/What Object contrasts (e.g. Who/What is the mother carrying?)

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Question Comprehension Curriculum

★ Smith College psychologist and distinguished child language acquisition researcher Jill de Villiers has been a guiding force in developing the question comprehension curriculum to be presented

★ University of Massachusetts linguist Tom Roeper has also contributed important insights into the design of the curriculum

Question Comprehension Curriculum

The software currently under development has:

★ Three Levels of question comprehension training
★ Each Level has seven Modules that use multiple exemplars
★ An Optimized Intervention® expert system automatically delivers the curriculum, collects data, & has built-in reports
★ With Optimized Intervention®, students can use the programs in their classrooms thus expanding the services you provide
★ Increased services mean students reach their goals more quickly

Support for this project was provided by Small Business Innovation Research Grants from the National Institutes of Health Institute on Deafness and Other Communication Disorders (NIDCD)

Level 1 Modules for Question Training

1. Introducing Who
2. Who/What Without Movement
3. Who/What With Movement
4. Who/Where
5. Who/What/Where
6. Who Exhaustive Pairing
7. Who is V-ing/What & With What

Level 2 Modules for Question Training

1. Exhaustive Paired Sets Who & Whom/What/Where
2. Exhaustive Paired Sets Verb Contrasts
3. Who is V-ing What & With What/Where Exhaustive Question Contrasts
4. Who With/Without Negation & Yes/No Question Contrasts
5. Who/What & Yes/No-Question Contrasts
6. Subject-Verb-Object
7. How Instrument

Level 3 Modules for Question Training

1. How Manner
2. Why Cause
3. Why Purpose
4. How/Where
5. Why/Where
6. How/Why
7. How/Why/Where
Optimized Intervention®

- Optimized Intervention begins with probe testing to determine appropriate content and the level of instructional support needed.
- Once training begins, Optimized Intervention automatically adjusts instructional support based on student responses.
- As the curriculum is mastered, new content is assessed and enters into training.

Who/What/Where

This Module comes after the student has mastered Who with Verb contrasts and Who/What contrasts.
- The next clip shows the Discourse Introduction to the Who/What/Where Module.
- This introduction always precedes the initiation of either a testing or training set.
- Following the introduction is a trial.

Who Exhaustive

- In this Module, students must answer the question exhaustively by choosing all participants in the activity.
- If the student does not choose all the participants, the program cues him/her to the correct answer.
- Students can also make errors by choosing the wrong people or item.
- The next clip is at the Intermediate level.

Training Examples from the Curriculum

- Who/What/Where
- Who Exhaustive
- Yes-No versus Who with Negation
- How Instrument
- How Manner
- Why Cause
- How Instrument-Why Purpose Contrast
- How Manner-Why (Cause) Contrast

Where Trial

- The trial is presented at the Intermediate level of training.
- The Intermediate training level includes pre-trial instruction and knowledge of the correct response (KCR) following a response either through reinforcement or corrective feedback.
- The Beginning training level uses cueing to the correct response in addition to pre-trial instruction and KCR.
- The Advanced training level presents a trial with no antecedent instruction but does provide KCR.

ANIMATED EXAMPLE
To view, please visit: www.laureatelearning.com/presentations/asha2009
Yes/No versus Who With & Without Negation

★ The next clips have contrasting question sets that require the student to discriminate between Yes/No- and Wh-Questions with and without Negation
★ Both trials are at the Intermediate level and show the feedback (cueing) given when a student makes a mistake
★ Note that even if the student succeeds in answering the question with cueing, the trial is still counted as wrong

Semantics of Two How Question Types

Two different types of How questions are trained in the curriculum
★ How Instrument questions are those that require a response as to what will be used as a tool or instrument (e.g. How can I unlock the door? … with a key)
★ How Manner questions are those that require a response specifying the way in which something will be done (e.g. How is girl dancing? She’s dancing on her toes)

How Instrument and How Manner

★ The first example shows a How Instrument trial at the Intermediate level
★ The trial demonstrates the feedback if a student fails to get the correct answer after cueing
★ The second example shows a How Manner trial at the Advanced level with no antecedent instruction
Semantics of Two Why Question Types

★ Why Cause questions are those that require a response that indicates what caused the action (e.g. Why is the girl sad? She’s sad because her balloon got away)
★ Why Purpose questions are those that require a response as to what the purpose or reason was for the action (e.g. Why did the cowboy get the ladder? He got the ladder so he could help the cat out of the tree)
★ The following clip shows Why Cause at the Intermediate level

How/Why Contrasts

The final two clips show examples of How/Why contrasts
★ How Manner contrasted with Why Purpose
★ How Instrument contrasted with Why Cause
Expressive Asking & Answering

- The stimuli used to train question comprehension can also be used to encourage question asking and answering.
- By using the same familiar stimuli for question asking and answering as used for question comprehension, students are better able to see the continuities among understanding, answering, and asking questions.

Expressive Asking & Answering

- The next picture from the program can be used as a stimulus for eliciting Who/What/Where-questions and answers.

Expressive Asking & Answering

- Children with language disorders, especially those with Autism Spectrum Disorders, need to practice question asking and answering in structured settings.
- As with comprehension training, question asking and answering trials should at first be mass trained (multiple exemplars of the same question contrasts).
- Only after the child can use questions in a structured setting should s/he be expected to use questions in social settings for communication purposes.

Expressive Asking & Answering

- Modeling can be used as it was in the comprehension training examples just shown.
- Within a stimulus set of contrasting forms, take turns asking and answering questions.
- Provide prompts and additional models if necessary.
- Use text cues if necessary.
Expressive *Who/What* Example

Model:  *Who is the father painting?*
        *He’s painting the girl, that’s who.*
While pointing to the girl ask:  *Who is the father painting?*
★Accept responses of either the whole sentence or the girl which is grammatically correct in context (Determiner must be present)
★Responses without the Determiner *the* should be correctly modeled
When asking students to generate questions that have just been modeled, text cues are frequently helpful especially those that contain just the *Wh*-Elements being targeted

Syntax Mastery Is Necessary for Communication Competence

While communication competence is our ultimate goal for the students we serve, structured receptive and expressive language training can help our students master essential syntax and become better communicators

Develop Syntax by Training *Functional Category Forms*

★ Begin by training Determiner and Tense forms
★ Complement this training with instruction on Prepositions
★ Once students are well on their way mastering earlier developing forms introduce Complementizers in Yes/No- and *Wh*-Questions

To view this presentation with the animated computer clips, please visit:
www.laureatelearning.com/presentations/asha2009