From Sounds to Sentences: The Development of Literacy

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OPEP, March 2013
Components of Literacy

Phonemic Awareness

Vocabulary

Comprehension

Alphabetic Principle

Fluency

Reading in an Alphabetic Writing System

Scarborough, 2001
Literacy
Reading, Writing, Listening & Speaking

Skills
• Concepts about print
• Ability to manipulate sounds
• Alphabet knowledge
• Word reading
• Spelling
• Fluency

Knowledge
• Concepts about the world
• Ability to understand ideas
• Ability to express ideas
• Vocabulary
• Oral language skills

Lead for Literacy, 2012
From “Amelia Bedelia”

Amelia Bedelia went inside.
“Such a grand house.
These must be rich folks.
But I must get to work.
Here I stand just looking.
And me with a whole list of
things to do.”
Amelia Bedelia stood there a
minute longer.
“I think I’ll make
a surprise for them.
I’ll make lemon-meringue pie.
I do make good pies.”

So Amelia Bedelia went
into the kitchen.
She put a little of this
and a pinch of that
into a bowl.
She mixed and she rolled.
Soon her pie was ready
to go into the oven.
“There,” said Amelia Bedelia.
“That’s done.”

Amelia Bedelia,
Parish, 1992
### What skills are required?

#### Skills-Based Competencies

<table>
<thead>
<tr>
<th></th>
<th>Map sounds onto letters (e.g., /m/ /i/ /x/ /e/ /d/) and blend these to form a word (mixed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recognize spelling patterns (e.g., the “-ed” family found in the word “rolled”)</td>
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<tr>
<td></td>
<td>Read fluently – about 115 words per minute</td>
</tr>
</tbody>
</table>

#### Knowledge-Based Competencies

<table>
<thead>
<tr>
<th></th>
<th>Understand the meaning of words in this context (e.g., “pinch” can be an action or a measurement)</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Make meaning of the text using relevant background knowledge (e.g., conceptual knowledge about baking)</td>
</tr>
<tr>
<td></td>
<td>Use cognitive strategies (e.g., when reading the ingredients as “this” and “that” the child must be able to use contextual clues to visualize appropriate ingredients)</td>
</tr>
</tbody>
</table>

*Lead for Literacy, 2012*
The Development of Literacy

- Sounds
- Sentences
- From Sounds to Sentences...and beyond!
Development of Speech Perception

Infant perception of /ra/-/la/

Percent Correct

American Infants
Japanese Infants

Kuhl et al., 2006
IDS Facilitates Speech Perception

A-D

I had a little bit and uhh the doctor gave me Ben-dectin for it

F0 (Hz)

I-D

Can you say ahh? Say ahhh Hey you Say hi-i-i Hi-i-i

F0 (Hz)

Time
Vowel Triangles

Kuhl et al., 1997
Vowel Area ➔ Speech Perception

Liu, Kuhl & Tsao, 2003
Speech Perception ➔ Vocabulary

- More sensitivity = faster growth
- Differences of up to 400 words

Kuhl et al., 2008
Infants Compute Statistics

Bilingual Babies

Garcia-Sierra, et al, 2011
<table>
<thead>
<tr>
<th></th>
<th>Monolingual</th>
<th>Bilingual</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6-month-olds</strong></td>
<td>Universalist</td>
<td>Universalist</td>
<td>Specialist</td>
</tr>
<tr>
<td><strong>11-month-olds</strong></td>
<td>Specialist</td>
<td>Universalist</td>
<td>Specialist</td>
</tr>
<tr>
<td><strong>14-month-olds</strong></td>
<td>Specialist</td>
<td>Specialist</td>
<td></td>
</tr>
</tbody>
</table>

Garcia-Sierra et al., 2011; Rivera-Gaxiola, Silva-Pereyra, & Kuhl, 2005; 2008
More Input = Longer Sensitive Period*

*not a ‘delay’
Summary - Sounds

- Babies are born as universalists and become specialists in their native language(s) by the end of their first year.

- Exaggerated speech facilitates speech perception which in turn yields bigger vocabulary.

- Infant brains compute statistics on the input they hear.
  - More input (bilinguals) = more statistics (longer sensitive period).
The Development of Literacy

- Sounds
- Sentences
- From Sounds to Sentences...and beyond!
I just saw my niece and she is a very pretty baby.
I just saw my niece and she is a very pretty baby.
Baby Statisticians

Could 8-month-old infants use statistics to find word boundaries in an artificial language?

Saffran, Aslin & Newport, 1996
Baby Statisticians

After 2 min., 8-month-olds discovered that

\textbf{tokibu} was a word and \textbf{latipo} was not.

Saffran, Aslin & Newport, 1996
Making Segmentation Easier

Thiessen, Hill & Saffran, 2005
Making Segmentation Easier

- Infants segment words more easily when they hear a sentence plus a single word, as opposed to just a sentence
  - ✓ “See the tiger right there? Tiger!”
  - ✗ “See the tiger right there?”
- Infants segment words more easily when they hear a familiar word mixed in with unfamiliar words
  - ✓ “Look, Lucy! See the duck?”
  - ✗ “Look! See the duck?”

Bortfeld et al., 2005; Lew-Williams & Saffran, 2011
But what is a tiger?

What is a duck?
What do you see in this scene?

- Boy
- Grass
- Dirt
- Slide
- Playground
- Yard
- Building
- Tree
- Sky
- Clouds
- Stairs
- Jacket
- Windows
- Roof
- Green door
- Railings
- Wires
- Branches
Mapping Words to Referents

Live Humans

Infant Directed Speech

Social Agents

Back-and-Forth

Eye Gaze (and gesture!)
Playful Contexts for Word Learning

- Children learn and use more spatial language (e.g., beside, under, etc.) during free play with blocks than with directed play.

- Children learn best when they are engaged, or in contexts that are meaningful to them.

Ferrara, Shallcross, Hirsh-Pasek, Golinkoff & Newcombe, 2011
Objects vs Actions

Gleitman et al., 2005
What actions do you see in this scene?

- Playing
- Running
- Sliding
- Climbing
- Stepping
- Ascending
- Descending
- Crossing
- Frolicking
- Grabbing
- Sitting
- Standing
- Leaving
- Dismounting
- Hurrying
Statistics...Again

Climbing  Descending  Dismounting

SLIDING

Roseberry et al., 2011
Describe the Scene

The [boy, child, kid, person, individual] is [playing, sliding, climbing, descending, running, crossing] (on) the [playground, slide, yard, area, grass].
Summary - Sentences

- Babies pick words out of the language stream by identifying statistical probabilities
  - IDS, isolated words, and familiar words facilitate speech segmentation

- Children use social cues and statistics to map words onto their referents
  - Social cues (especially in meaningful contexts!): live speakers, IDS, eye gaze and gesture, back-and-forth patterns, and social agents
  - Statistics: finding series of actions that go together
The Development of Literacy

- Sounds
- Sentences
- From Sounds to Sentences...and beyond!
Sounds to Sentences...and beyond!

Birth

0-8 mo.
- Baby Universalists
- coos, gurgles, babbling

1 yr.

9-12 mo.
- Sound Specialists
- Baby Statisticians
- points, first words

2 yrs.

12-18 mo.
- ~2 words per week

3 yrs.

18-24 mo.
- Word explosion
- loves to hear stories over & over

4 yrs.

2-3 yrs.
- Complete sentences
- Wh- questions

5 yrs.

3-4 yrs.
- Follows story plot
- contractions, time words, full questions

6 yrs.

4-5 yrs.
- Makes up stories

5-7 yrs.
- Retells stories
- Participates in discussions
Caregivers build vocabulary by...

- Talk A LOT
- Share more information
- Ask more open-ended questions
- Issue fewer commands
- Offer more choices
- Are more responsive
- Engage children in playful conversation
- Use more rare or unusual words
Leveling the Playing Field

‘30 million word gap’ by Kindergarten.

Words Per Hour Heard

Hart & Risley, 1995
More Words = More Sounds

- neat
- happy
- frog
- market
- see
- clean
- loose
- sight
- rat
- container
- make
- computer
- opposites
- Jan
- Jump, jumped
- bank
- bark
- lark
- throw
- might
- seen
- fat
Be a Personal Sportscaster

- Use lots of running commentary to narrate what the child is doing
- Notice what they are focused on at the moment, especially for kids who are not talkative

  - Label actions as they occur, in words that match their level
  - Put words to what they might be thinking at the moment
  - Label emotions during tantrums or frustration (this teaches children to recognize and regulate their own emotional reactions)
Share Books

- Book sharing helps level the playing field with rich language

Lebadeva, Bhagat, Raizada & Kuhl, 2009
Scaffolding = Dialogic Reading

Do you remember going to the doctor like Caillou?

What do you think Caillou will do at the doctor’s office?

That’s a tongue depressor! Can you stick out your tongue like Caillou?
Scaffolding = Dialogic Reading

- Ask questions about the story/experience
- Relate the story/experience to the child’s unique experiences
- Offer expansions, corrections and praise and demonstrate new vocabulary
- Encourage children’s active participation in telling the story

![caillou](image)
Ways to Share Books with Babies & Toddlers

Make Sharing Books Part Of Every Day
Read or share stories at bedtime or on the bus.

Show Children the Words
Run your finger along the words as you read them, from left to right.

Have Fun
Children can learn from you that books are fun, which is an important ingredient in learning to read.

Make the Story Come Alive
Create voices for the story characters and use your body to tell the story.

A Few Minutes is OK—Don’t Worry if You Don’t Finish the Story
Young children can only sit for a few minutes for a story, but as they grow, they will be able to sit longer.

Make It Personal
Talk about your own family, pets, or community when you are reading about others in a story.

Talk or Sing About the Pictures
You do not have to read the words to tell a story.

Ask Questions About the Story, and Let Children Ask Questions Too!
Use the story to engage in conversation and to talk about familiar activities and objects.

Let Children Turn the Pages
Babies need board books and help turning pages, but a three-year-old can do it alone. Remember, it's OK to skip pages!

Let Children Tell the Story
Children as young as three years old can memorize a story, and many children love to be creative through storytelling.

Show Children the Cover Page
Explain what the story is about.
Summary – Sounds to Sentences

- Children learn language and literacy through social interactions

- Caregivers can facilitate language and literacy development by talking a lot, using a diverse vocabulary, and by reading books
Early Experience Sets the Stage

Infant  Toddler  Preschooler

- Early Vocabulary & Grammar
- Understanding & Expressing Language
- Speech Perception
- Sound Awareness
- Emergent/Early Reading Skill
By the 2,000\textsuperscript{th} Day...

\textit{Reading Readiness}

- Read his name
- Recite the alphabet
- Recognize most letters
- Letter-sound correspondence
- Make rhymes
- Hold a book correctly
- ‘Read’ left to right, top to bottom
- Retell a story
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- The Human Frontiers Science Program
- Cure Autism Now

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Topics for Discussion

- What is one piece of information from today’s presentation that reinforced how you currently support language and literacy development with children?
- What is one piece of information that will help you support language-learning children?
- How can you facilitate language and literacy development?
- What questions can researchers ask that would help you in your role in the early childhood community?