Language Development

Brian Rogers MD

Expressive Language Stages

• **Guttural**: 0-2 months: crying, sneezing, burping, yawning

• **Prelinguistic**: 2-11 months: Cooing, ah-gooing, babbling, “dada” (nonspecific)

• **Linguistic**: 11 months: The use of formed identifiable words, generally begins with “Mama” and “Dada” (specifically), with the addition of another real word.

Milestones

“In the normal infant, development is methodical, orderly and timed; it goes through a gradient that can be divided into orderly sequences which can follow each other with such regularity that they are in the main predictable.”
Gesell, 1947

Prelinguistic Definitions

• **Cooing**: Long vowel sounds in a musical fashion.

• **Razzing**: Raspberry

• **Babbling**: Consonant-vowel or vowel-consonant construction.

• **Gestures**: Imitate “bye-bye” or “patty cake”

Prelinguistic Expressive Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Mean Age (mos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooing</td>
<td>3</td>
</tr>
<tr>
<td>Ah-goo</td>
<td>4</td>
</tr>
<tr>
<td>Laughing</td>
<td>5</td>
</tr>
<tr>
<td>Razzing</td>
<td>6</td>
</tr>
</tbody>
</table>

Prelinguistic Expressive Milestones

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Mean Age (mos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dada (non specific)</td>
<td>7</td>
</tr>
<tr>
<td>Mama (non specific)</td>
<td>8</td>
</tr>
<tr>
<td>Dada/Mama (specific)</td>
<td>9</td>
</tr>
<tr>
<td>Gestures</td>
<td>9</td>
</tr>
</tbody>
</table>
Linguistic Definitions

- **Words**: Credit may be given if the word(s) are used consistently, specificity, and spontaneously. Mama, dada or other family names are not counted.
- **Jargon**: Long strings of unintelligible sounds with adult-like intonations.

Expressive Language Milestones

- 11 mo: 1 word with specific “Mama” and “Dada”
- 12 mo: 2 words
- 13 mo: 3 words
- 15 mo: immature jargoning
- 16 mo: 4-6 words
- 17 mo: mature jargoning
- 18 mo: 7-10 words

Expressive Language (30-36 months)

- Four to five word sentences
- Speech understood at least 80% of the time.
- Use of plurals

Expressive Language Milestones

- 19 mo: 20 words
- 21 mo: two word phrases
- 24 mo: 50 words and 2 word sentences
- 26 mo: Pronouns
- 30 mo: 250 words, repeats 2 digits
- 36 mo: 3 word sentences, repeat 3 digits,

Expressive Language (36-42 months)

- Gives full name when asked
- Counts to three
- Appropriate use of pronouns
- Know sex (boy vs. girl)
Cautions with Expressive History

- Echolalia
- Define vocabulary
- 2 word phrases vs. single concept
- Phrases vs. Sentences
- NB: Reliability of history is likely to improve if expressive milestones are paired. (mature jargon occurs with 7-10 word vocabulary)

Receptive Language

- 1 mo: alerts to sound, soothes
- 2 mo: social smile
- 4 mo: orients to voice
- 5 mo: lateralizes to bell
- 8 mo: indirect orient to bell
- 9 mo: direct orient to bell
- 10 mo: understands “No”

Receptive Language

- 12 mo: follows one step command with gesture
- 15 mo: follows one step command without gesture
- 16 mo: points to one picture,
- 18 mo: 2 body parts
- 21 mo: points to two pictures
- 24 mo: follows 2 step command
- 30 mo: concept of “1”,
- 36 mo: 2 step prepositional command, points to 7 pictures

Receptive Language (30-36 months)

- Follows two prepositional commands (on, in)
- Identify objects or pictures based on function (“what do you hear with?”).
- Descriptive concepts (big, little, hot, cold)
Receptive Language (36-42 months)

- Can answer correctly the questions “What do you do when you are sleepy, hungry, or cold?”
- Follows 4 prepositional commands (in, on, under, behind)
- Can repeat 3 digits when asked.
- Compares length
- Able to group or sort (clothes, toys)

Cautions with Receptive History

- Clarify multi-step directions
- Pronoun use is appropriate
- Concept of “1”

Development of Social Cognition

- Increasing frequency of alternating gaze between desired object and the face of the communicative partner from 12-15 months of age.
- Increasing communicative intent of pointing for wants between 12-18 months.

Developmental Quotient

- Provides a means of quantifying developmental rate.
- Gesell’s Definition: the proportion of normal development in a child at the time of testing.
- $DQ = \frac{\text{Language Age}}{\text{Chronological Age}} \times 100$

Differential Diagnosis of Language Delay

- Developmental Language Disorder
- Hearing Loss
- Intellectual Disability
- Autism
- Environmental deprivation
- Elective Mutism
- Non-causes: Birth order, gender, bilingualism

Development of Visual Learning

Brian Rogers MD
Four Major Streams of Development

• Motor
• Language
• Adaptive or Visual Problem Solving *
• Personal-Social

Early Postnatal Visual Development

<table>
<thead>
<tr>
<th>Visual Behavior</th>
<th>Mean Age (mos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes and head tracking</td>
<td>2-3</td>
</tr>
<tr>
<td>(smooth, not saccadic)</td>
<td></td>
</tr>
<tr>
<td>Visual Threat Response</td>
<td>3</td>
</tr>
</tbody>
</table>

Adaptive-Visual Problem Solving

• Visual Problem Solving Skills represent a complex interplay of cognition, motor development and visual acuity.

Visual Motor/Problem Solving Development

• Reduction of “primitive reflexes” and the appearance of volitional motor skills during the first 6 months of life.

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Age (mos)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head to midline (supine)</td>
<td>3</td>
</tr>
<tr>
<td>Hands to midline</td>
<td>3</td>
</tr>
<tr>
<td>Head and Trunk aligned in sitting position</td>
<td>3</td>
</tr>
<tr>
<td>Eyes, head and hand (palmar)</td>
<td>5</td>
</tr>
<tr>
<td>Sit and extended pincer grasp</td>
<td>11</td>
</tr>
</tbody>
</table>

Ring and String

• 1 mo: fixes
• 2 mo: follows horizontally and vertically
• 3 mo: follows in a circle
• 5 mo: pulls down ring, transfers
• 7 mo: inspects the ring
• 8 mo: pulls ring by the string
• 9 mo: visually follows over the edge of table
Pellet (and bottle)

- 5 mo: visually regards pellet
- 7 mo: attempts to secure pellet
- 8 mo: secures pellet
- 9 mo: demonstrates 3 finger grasp
- 11 mo: mature pincer grasp
- 14 mo: dumps pellet from bottle with demonstration
- 16 mo: spontaneously dumps pellet from bottle

Cubes, Cup, and Stick

- 6 mo: obtains cube
- 10 mo: combines cube and cup
- 11 mo: solves cube under cup
- 12 mo: releases cube in cup
- 18 mo: 10 cubes in the cup
- 21 mo: tower of 3 cubes, obtains cube with stick
- 24 mo: 4 cube horizontal train
- 30 mo: 4 cube train with chimney
- 36 mo: 3 cube bridge
Cube and Cup

Cube under cup

Bell and Glass Barrier

- 1 mo: alerts
- 5-9 mo: orients to bell
- 8 mo: inspects bell
- 9 mo: rings bell
- 10 mo: uncovers bell
- 14 mo: solves glass frustration
Crayon and Paper

- 12 mo: makes mark with crayon
- 16 mo: scribbles in imitation
- 18 mo: scribbles spontaneously
- 24 mo: imitates stroke, attempts to fold paper
- 30 mo: horizontal and vertical strokes, folds paper
- 36 mo: draws circle in imitation, draws man
**Pegboard**

- 7 mo: Pulls peg out
- 14 mo: Removes and replaces peg
- 18 mo: Pegboard completed spontaneously

**Formboard**

- 16 mo: Places round block
- 18 mo: Places round block (reversed)
- 21 mo: Places square block
- 24 mo: Places round, square and triangle blocks
- 30 mo: Completes in reversal.

**Equipment needed for Capute Scales (0-36 mos)**

- Four inch red ring with string
- Cup and ten cubes
- Pegboard (six pegs)
- Metal bell
- Crayon and paper
- Tissues
- Card with 4 pictures
- Card with six pictures
- Transparent bottle with pellets
- Round six inch stick
- Glass (Plexiglass)
- Formboard with three shapes

**Interpretation of Visual Problem Solving Skills**

**Significant Delay:**

\[
\text{V.P.S. Age (100)} < 70 \\
\text{C.A.}
\]

**Interpretation**

<table>
<thead>
<tr>
<th>LANGUAGE</th>
<th>Delayed</th>
<th>Delayed</th>
</tr>
</thead>
<tbody>
<tr>
<td>VISUAL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MOTOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID</td>
<td></td>
<td>DLD</td>
</tr>
</tbody>
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