Measuring Early Childhood Outcomes
Domains of measurement

1. **Physical development.** Growth and nutrition such as stunting and wasting.

2. **Fine and gross motor skills.**

3. **Executive function and self-regulation (or domain general):** skills that support learning in math, literacy and other areas. Examples: Working memory, ability to focus attention, ignore distractions, and move from one task to another. Self-regulation refers to the ability to control behavior and emotions.

4. **Early math skills.** Examples of foundational math skills: Knowing how to name numbers; compare quantities; perform basic addition, shape and spatial awareness.

5. **Early literacy skills.** Examples of foundational literacy skills: Receptive language, expressive language, alphabet knowledge, listening comprehension and name writing.

6. **Social-emotional development.** Skills that facilitate social relationships and interactions with peers, family members, teachers, etc. Examples: Perspective taking; Understanding feelings; Self awareness; Sharing; Peer interactions;
Strategic Impact Evaluation Fund (SIEF) Workshop:

ECD and Nutrition Measurement during First 1000 days

February 4, 2015

Issues Raised – Selected Slides

For details, see full presentations at www.worldbank.org/sief
Choices & Challenges for Measurement

Lia Haskin Fernald
Professor, School of Public Health, UC Berkeley

ECD and Nutrition Measurement Workshop during First 1000 days
February 4, 2015
Specific domains are more vulnerable

- Neurologic vulnerability in brain regions (Hackman & Farah, 2009)
- Language (perisylvian) and executive function (prefrontal) regions have a more protracted course of maturation (Farah et al., 2006; Kuhl & Rivera-Gaxiola, 2008; Mezzacappa, 2004; Noble et al., 2007; Noble, Norman, & Farah, 2005)

First 1000 days

Thompson & Nelson, 2001
# Cognitive development

## Substages during the Sensorimotor Stage of Development

<table>
<thead>
<tr>
<th>Substage</th>
<th>Age (months)</th>
<th>Accomplishment</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0–1</td>
<td>Reflexes become coordinated.</td>
<td>Sucking a nipple</td>
</tr>
<tr>
<td>2</td>
<td>1–4</td>
<td>Primary circular reactions appear—an infant’s first learned reactions to the world.</td>
<td>Thumb sucking</td>
</tr>
<tr>
<td>3</td>
<td>4–8</td>
<td>Secondary circular reactions emerge, allowing infants to explore the world of objects.</td>
<td>Shaking a toy to hear a rattle</td>
</tr>
<tr>
<td>4</td>
<td>8–12</td>
<td>Means–end sequencing of schemes is seen, marking the onset of intentional behavior.</td>
<td>Moving an obstacle to reach a toy</td>
</tr>
<tr>
<td>5</td>
<td>12–18</td>
<td>Tertiary circular reactions develop, allowing children to experiment.</td>
<td>Shaking different toys to hear the sounds they make</td>
</tr>
<tr>
<td>6</td>
<td>18–24</td>
<td>Symbolic processing is revealed in language, gestures, and pretend play.</td>
<td>Eating pretend food with a pretend fork</td>
</tr>
</tbody>
</table>
Communication & Language

• 6 months
  – Vocalization with intonation
  – Responds to human voices without

• 12 months
  – Uses one or more words with meaning
  – Understands simple instructions

• 18 months
  – Has a vocabulary of approximately 20 words

• 24 months
  – Vocabulary expands greatly
  – Sentence construction
Key Questions in Selecting Instruments

• What are the *goals* of the assessment/evaluation?
• What *dimensions* expected to be affected?
• What are the *mechanisms* at work?
• What are key elements of *context* that must be considered in selecting the test? E.g. level of poverty, parent educ.
• At what *level* will effect be measured? E.g. individual
• How will the sample be *selected*? E.g. Population sample?
• What is the *analytic plan*? E.g. Are norms relevant?
Recommendations for Measures

- Psychometrically adequate, valid and reliable
- Balanced at upper and lower ends
- Enjoyable for children
- Relatively easy to adapt to various cultures
- Easy to use in low-resource settings
- Not too difficult to obtain or too expensive
- Able to be used in a wide age range
Direct tests: Examples

General scales
- Bayley Scales of Infant Development
- Locally-adapted Bayley (e.g. India, Mexico)
- Denver Developmental Screening Test
- Nationally developed screener (e.g. MDAT)

Kilifi Executive function: A not B
Parent report: Examples

- General
  - Ages and Stages Questionnaire (ASQ, EASQ, ASQ-I, demos)
  - Nationally developed test (e.g. Turkey, Mexico, Ecuador)
- Language
  - MacArthur CDI
- Behavior
  - Infant Behavior Questionnaire (Temperament)
  - ITSEA
Measuring parent/child interactions

Lia Haskin Fernald
Professor, School of Public Health, UC Berkeley

ECD and Nutrition Measurement Workshop
during first 1000 days

February 4, 2015
Intermediate outcomes and mediators for ECD

Jena Hamadani
Child Development Unit
icddr,b
Intermediate outcomes

- Maternal child interaction
- Play materials
- Learning materials
- Emotional responsivity
- Language stimulation
- Encouragement
- Punishment
Measurements of intermediate outcomes in Bangladesh

• Home Observation for Measurement of Environment (HOME)
• Family care indicators (FCI)
• Parent-child interactions e.g.
  – Nursing Child Assessment Satellite Training Feeding Scale
Assessments of Feeding Behavior

• Questionnaire
  – Dietary Diversity
  – Pressure to eat
  – Food to manage behavior
  – Positioning: seated and face-to-face
  – Modeling
  – Consistency in time and place
  – Distractions

• Observation
  – Mother & child eating
  – Position of both
  – Child self-feeding
  – Mother praising or pressuring
  – Child satiety cues
Strategic Impact Evaluation Fund (SIEF) Workshop:

Early Childhood Development 3+

May 27-28, 2015

Issues Raised – Selected Slides

For details, see full presentations at
www.worldbank.org/sief
The Preschool Years
An Overview of Development and Measurement

Tricia Kariger, World Bank SIEF Workshop, May 27, 2015
The Preschool Years

• The preschooler brain
• Risk and protective factors
• Developmental progress
  – Cognitive skills
  – Executive function
  – Language/literacy
  – Numeracy and math
  – Fine motor
  – Socio-emotional skills
• What to measure and how?
• Examples of measurement in LAMI countries
• The way forward
Malawi PECD Project

MDAT (Malawi Developmental Assessment Tool, Gladstone et al.)

- Language, Fine and Gross Motor, Socio-emotional
- Items sourced from other tests, some original
- Suitable for use from 0-7 years
- Detected differences due to nutritional status, cerebral malaria
- Used locally resourced materials
- Translated to Chichewa, manual and norms available

Gladstone et al 2010
New Universal Measures

• IDELA (Save the Children)
• UNESCO’s 3-8 project
  – Literacy, math, socio-emotional, executive function
  – Parent/teacher report + direct administration
  – Currently being piloted
• PRIDI (IDB)
  – 2.5 – 5 years
  – Countries in Central, South America
  – Cognitive, literacy, vocabulary, math
  – Parent report + direct administration
  – Norms developed
  – Available on IDB website
• Biological Measures?
  – MRI, functional MRI, evoked potentials, cortisol
Measuring Development and Early Learning Globally

The International Development and Early Learning Assessment (IDELA)

Ivelina Borisova, Director ECCD, Impact and Innovations

Save the Children
Global use of IDELA

- IDELA complete
- IDELA planned
- IDELA+ (MELQO)

25+ countries
IDEILA in a nutshell

• Play-based assessment tool designed for children in the 3-6 age group
• Takes about 30 minutes per child
• Includes 24 core items that cover 5 developmental domains + aspects of executive function
• Available in English, Spanish, French, Arabic, and many other languages
• Emphasizes continuous scoring over yes/no responses
What does IDELA measure?

**Motor Development**
- Fine and gross motor skills: Hopping; Copying shape; Folding paper; Drawing

**Emergent Language and Literacy**
- Print Awareness; Oral Language; Letters; Phonological Awareness; Listening Comprehension

**Emergent Math/ Numeracy**
- Number Sense; Shapes & Spatial Relations; Sorting; Problem Solving; Measurement & Comparison

**Socio-Emotional Development**
- Perspective taking; Understanding feelings; Self awareness; Sharing; Peer interactions;
<table>
<thead>
<tr>
<th>Gross and Fine Motor Development</th>
<th>Emergent Literacy and Language</th>
<th>Emergent Numeracy</th>
<th>Socio-emotional Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hopping on one foot</td>
<td>Print awareness</td>
<td>Measurement and comparison</td>
<td>Peer relations</td>
</tr>
<tr>
<td>Copying a shape</td>
<td>Expressive vocabulary</td>
<td>Classification/Sorting</td>
<td>Emotional awareness</td>
</tr>
<tr>
<td>Drawing a human figure</td>
<td>Letter identification</td>
<td>Number identification</td>
<td>Empathy</td>
</tr>
<tr>
<td>Folding Paper</td>
<td>Emergent writing</td>
<td>Shape identification</td>
<td>Conflict resolution</td>
</tr>
<tr>
<td></td>
<td>Initial sound discrimination</td>
<td>One-to-one correspondence</td>
<td>Self-awareness</td>
</tr>
<tr>
<td>Listening comprehension</td>
<td></td>
<td>Simple operations</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Simple problem solving</td>
<td></td>
</tr>
</tbody>
</table>

**Approaches to Learning**: Persistence, motivation and engagement
Simple Administration

- Minimal administration materials - a book, pencil, paper, and rocks/buttons for counting, 8 picture cards, a laminated puzzle
- Can be administered by ECD teachers, enumerators, program staff or other trained staff
- Can be administered at homes, ECD centers, schools, community common spaces
- Training manual helps standardize the administration between countries
Preschool Quality, Home Environments & Child Outcomes

Ivelina Borisova, Director, ECCD Impact and Innovations

May 2015
Adapting the content of the ECERS

• Retained the sub-scales most relevant and practical (in red)
  – Space and Furnishings
  – Activities
  – Interactions
  – Program Structure
  – Literacy and language
  – Math
  – Personal care routines
  – Language-reasoning
  – Parents and Staff
  – Science
  – Diversity

• Selected the most relevant items, adapted language (in some cases added) to ensure applicability across low resource settings
Measuring Early Learning Quality and Outcomes (MELQO)

Process and Lessons Learned
May 27, 2015

Amanda Devercelli, Abbie Raikes, Kate Anderson
What do the MELQO instruments cover?

• Child Development
  • Parent/Teacher report and direct assessment
  • Constructs
    • social-emotional
    • domain specific (early literacy and math)
    • executive functioning/approaches to learning

• Quality of Settings
  • Looking at setting and systems
  • Trying to find the middle ground
Steering Committee (UNESCO, UNICEF, World Bank, Brookings)

- UNESCO (Maki Hayashikawa, Abbie Raikes)
- UNICEF (Jo Bourne, Pia Britto)
- World Bank (Luis Benveniste, Amanda Devercelli)
- Center for Universal Education at Brookings (Tamar Manyuelyyan Atinc, Kate Anderson)
- GPE (Karen Mundy)
- UIS (Silvia Montoya, Albert Motivans)