Evaluating Language Skills in Toddlers and Early Signs of ASD with the Bayley-4™

Presented by
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Disclosure

Anise Flowers is an employee of Pearson, publisher of the Bayley-4.

Topics

- Autism Spectrum Disorder

- Bayley-4 Overview

- Bayley-4 and ASD

Autism Spectrum Disorder

- Characterized by
  - Persistent deficits in social communication and interaction
  - Presence of restricted, repetitive behavior; interests; and activities
  - May have accompanying intellectual and/or language impairment
  - *Impairments not explained by intellectual disability or global developmental delay* (APA, 2013)

- According to the CDC, the incidence is 1 in 59 children
  - Prevalence 4 to 5 times greater in boys

Importance of Early Identification

- ❖ Median age of diagnosis for ASD is 52 months (4 years, 4 mos.)
  - ❖ However, 42% of children received a developmental evaluation by age 3

- ❖ Could we identify children earlier?
  - ❖ Monitor children referred for developmental evaluations
  - ❖ Conduct ASD specific screening as indicated

Importance of Early Identification

- Bayley-4 offers both
  - Broadband, detailed developmental evaluation and
  - Checklist of ASD-related behaviors
    - *"The more positive indicators observed during testing and verified by caregiver report, the greater the possibility of ASD that will need to be validated by a more detailed, ASD-specific evaluation."*
    - An item is considered "positive" if a score of "0" is obtained

Alward, G. Bayley-4 Clinical Use and Interpretation (2020).

Importance of Early Identification

❖ Considerations

  ❖ Bayley-4 ASD checklist cannot alone diagnosis

  ❖ The younger the child, the less diagnostic certainty

  ❖ Rule out other causes (hearing, language, motor)

The Bayley-4 is . . .

. . . an individually administered assessment of the **developmental functioning** of infants and young children ages 16 days to 42 months.

Five Developmental Areas

COG   LANG   MOT   SOEM   ADBE
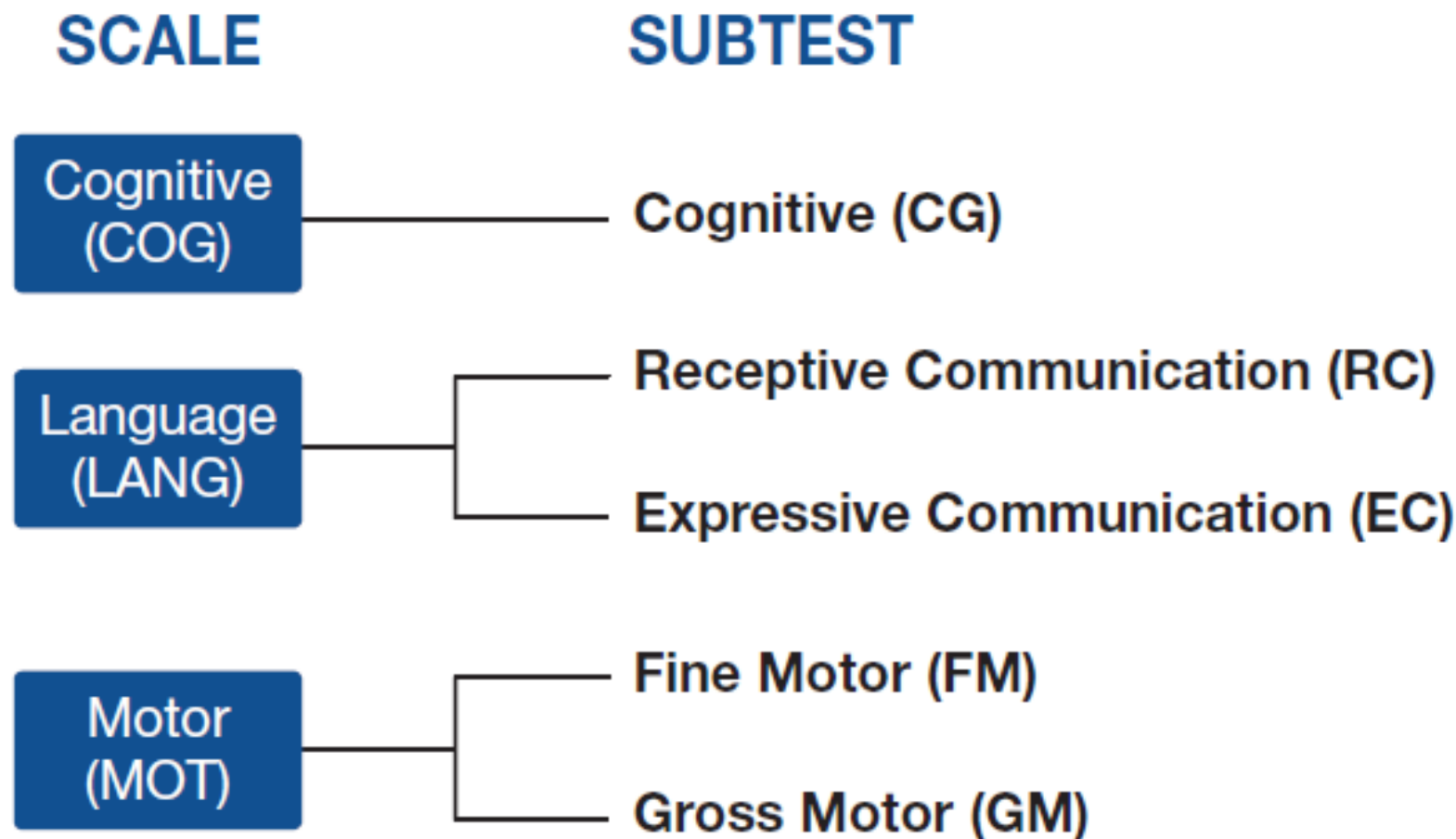
Primary Purposes of Bayley-4

Identify Developmental Delay

Provide Information for
Intervention Planning

IDEIA Part C (2004)
Early Intervention Program for
Infants and Toddlers with Disabilities

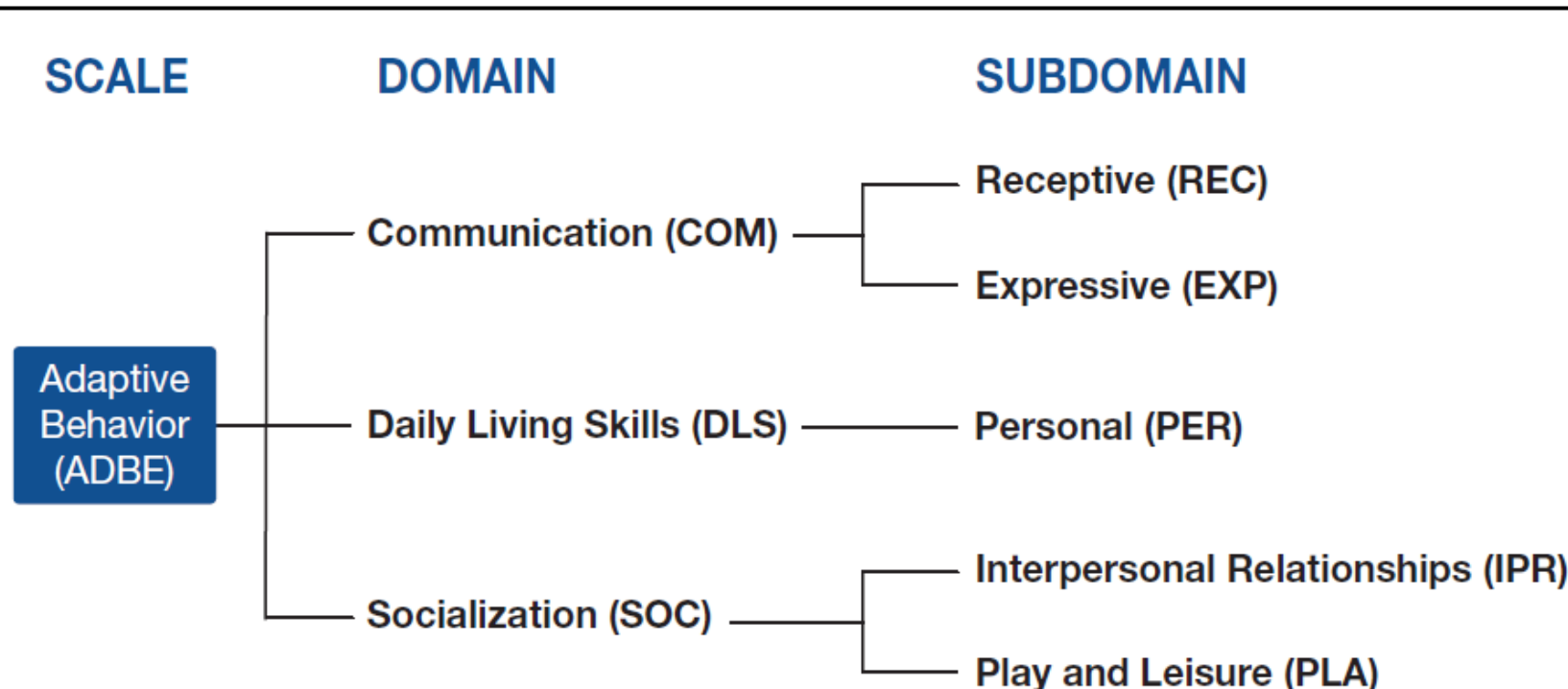# Structure of Bayley-4

SCALE	SUBTEST
Cognitive (COG)	Cognitive (CG)
Language (LANG)	Receptive Communication (RC)
	Expressive Communication (EC)
Motor (MOT)	Fine Motor (FM)
	Gross Motor (GM)

Structure of Bayley-4

SCALE   **SUBTEST**

- Social-Emotional (SOEM) ——— Social-Emotional (SE)

SCALE   **DOMAIN**   **SUBDOMAIN**

- Adaptive Behavior (ADBE)
  - Communication (COM)
    - Receptive (REC)
    - Expressive (EXP)
  - Daily Living Skills (DLS)
    - Personal (PER)
  - Socialization (SOC)
    - Interpersonal Relationships (IPR)
    - Play and Leisure (PLA)

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Bayley-4

Incorporate Three Interrelated Elements in Assessing Developmental Delay

Administration of structured test items

Direct observation of behaviors and milestones

Active participation of parent or caregiver in the evaluation process

Cognitive, Language, and Motor Scales

4ᵗʰ Edition Enhancements

- Caregiver questions for some items

- Polytomous scoring

- Flexible item administration

      (Related, Series, Observation items)

- Digital Administration options

Bayley-4 Scores

Scale subtest	Scaled score	Standard score	Percentile rank	Confidence interval	Age equivalent	Growth scale value
Cognitive (COG)		✓	✓	✓		
Cognitive (CG)	✓				✓	✓
Language (LANG)		✓	✓	✓		
Receptive Communication (RC)	✓				✓	✓
Expressive Communication (EC)	✓				✓	✓
Motor (MOT)		✓	✓	✓		
Fine Motor (FM)	✓				✓	✓
Gross Motor (GM)	✓				✓	✓
Social-Emotional (SOEM)		✓	✓	✓		
Social-Emotional (SE)	✓					

Scale domain subdomain	Scaled score	Standard score	Percentile rank	Confidence interval	Age equivalent	Growth scale value
Adaptive Behavior (ADBE)		✓	✓	✓		
Communication (COM)		✓	✓	✓		
Receptive (REC)	✓				✓	✓
Expressive (EXP)	✓				✓	✓
Daily Living Skills (DLS)		✓	✓	✓		
Personal (PER)	✓				✓	✓
Socialization (SOC)		✓	✓	✓		
Interpersonal Relationships (IPR)	✓				✓	✓
Play and Leisure (PLA)	✓				✓	✓

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(See p. 6 Bayley-4 Administration Manual)

Bayley-4

Interpretation:
Diagnosing Developmental Delay

Several different criteria used:

Percent (%) Delay

Standard Deviation

Performing a certain number of
months below chronological age

Bayley-4

Interpretation:
Bayley-4 Indicators of Developmental Problems

Indicators of motor and movement abnormalities

- Movement and muscle tone indicators

- Eye movement and coordination

- Hand movements

Indicators of Attention/Executive Function Deficit

Indicators of Autism Spectrum Disorder

Bayley-4 and ASD

Bayley-4 Validity

Special Group Studies	
Conditions that place children at **developmental risk** (e.g., extremely preterm and very preterm infants).	Children with **clinical diagnoses** (e.g., Autism Spectrum Disorder, Down syndrome, language impairment, motor impairment).

Evidence Based on Special Group Studies
Autism Spectrum Disorder

Autism Spectrum Disorder Compared to Matched Control					
Score	ASD Mean	Matched Control Mean	Diff.	p value	Std. Dff.
CG	4.4	9.4	4.97	<.01	1.60
RC	3.4	9.2	5.77	<.01	1.75
EC	3.7	10.0	6.23	<.01	2.01
FM	4.6	9.3	4.68	<.01	1.43
GM	5.5	9.0	3.58	<.01	1.10
LANG	62.8	97.9	35.10	<.01	1.99
MOT	71.4	94.9	23.48	<.01	1.40

ASD Checklist

➢Indicators of Autism Spectrum Disorder

➢List of items across Cognitive and Communication scales

➢ An item is considered "positive" if a score of "0" is obtained

Cognitive Subtest (81 items)

Cognitive: looks at how the child thinks, reacts, and learns about the world around him or her.	
Infants	Tasks measure their interest in new things, their attention to familiar and unfamiliar objects, and how they play with different kinds of toys.
Toddlers	Items examine how they explore new toys and experiences, how they solve problems, and their ability to complete puzzles.
Preschoolers	Items measure pretend play and activities such as learning concepts, building with blocks, color matching, counting, and solving more complex puzzles.

Cognitive Skills Assessed by Bayley-4

Sensory and Attention to Novelty

Habituation

Object Use and Imitation

Problem Solving

Visual Motor and Perceptual

Memory

Play

Classification and Concepts

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Autism Spectrum Disorder Indicator Items

Subtest	Item	
Cognitive	5.	Recognizes Caregiver Note. Also included in Receptive Communication Item 4.
	6.	Reaction to Caregiver Note. Also included in Receptive Communication Item 6.
	7.	Reacts to Departure of Caregiver
	16.	Interacts With Image
	20.	Pats Table
	29.	Stirs Spoon
	36.	Squeezes Object
	57.	Imitates 2-Step Action
	59.	Imaginary Play

Receptive Communication (42 items)

	Receptive Communication (RC) evaluates how the child responds to gestures and sounds; and recognizes the words and directions that are presented	
Infants	Items measure infant's recognition of sounds, objects, and people in the environment.	
Toddlers	Items ask them to identify pictures and objects, follow simple directions, and perform social routines such as wave bye-bye or play peek-a-boo.	
Preschoolers	Items ask the child to follow more complex directions, identify action pictures, and show understanding of basic grammar.	

Bayley-4

Receptive Communication Skills Assessed by Bayley-4

Attention
(Pre-Verbal Behaviors)

Vocabulary Development
(Language Content)

Vocabulary Development
(Concept Knowledge)

Language Structure

Social Referencing

Auditory
Comprehension

Autism Spectrum Disorder Indicator Items

Subtest	Item	
Receptive Communication	2.	Calms When Spoken To
	12.	Responds to Name
	15.	Attends to Play Routine
	29.	Understands Pronouns (Her, Me, You, My, Your)
	35.	Understands Pronouns (They, She, Me)

Expressive Communication (37 items)

	Expressive Communication (EC) looks at how well the child communicates using sounds, gestures in various communicative situations; and words & phrases in various word combinations	
Infants	Items are observational and look at infant's nonverbal expressions such as smiling, jabbering expressively, and laughing.	
Toddlers	Items look at toddler's ability to use words by naming objects or pictures and answering questions.	
Preschoolers	Items look at ability to use words and to answer more complex questions.	

Expressive Communication Skills Assessed by Bayley-4

Attention
(Pre-Verbal Behaviors)

Vocabulary Development
(Language Content)

Vocabulary Development
(Concept Knowledge)

Language Structure

Social Referencing

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Autism Spectrum Disorder Indicator Items

Subtest	Item	
Expressive Communication	2.	Social Smile
	4.	Social Vocalizing/Laughing
	6.	Solicits Attention/Interaction
	9.	Uses Gestures
	10.	Jabbers Expressively
	12.	Directs Attention of Adult to Object
	13.	Imitates Word
	14.	Initiates Play
	19.	Combines Gesture and Words
	26.	Uses Pronouns
	28.	Poses Questions
	32.	Answers Questions

Social-Emotional Scale (SOEM)

Adaptation of *Greenspan Social-Emotional Growth Chart: A Screening Questionnaire for Infants and Young Children.*

- Items unmodified from Bayley-III.

- Items assess child's mastery of functional emotional skills.

SOEM and ASD

Social Communication

- Poor self-regulation

- Inability to socially communicate

- Lack of emotional signals

- Inability to establish relationships

- Sensory processing section
  - Restricted/repetitive behavior criteria of DSM-5

Adaptive Behavior Scale (ADBE)

Composed of select items and skill areas derived from the Comprehensive Parent/Caregiver Form of the Vineland-3.

- Communication

- Daily Living Skills

- Socialization

- **Adaptive Behavior**

(Vineland Adaptive Behavior Scales, Third Edition (Vineland—3, 2016).

Conducting Remote Assessments for ASD Using the Vineland-3 Webinar (Recording)

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ASD and Bayley-4
Additional Observational Behaviors

- Child uses examiner's or caregiver's hands as a tool during testing

- Atypical vocalizations

- Produces unusual syllable strings

- Prosody issues

- Echolalia/repetitive use of words

ASD and Bayley-4
Additional Observational Behaviors con't

- Repetitive or stereotyped use of Bayley test materials

- Licks, smells, scratches manipulatives

- Unusual, often intense distress responses

- Does not transition easily through test tasks

- Stares blankly on multiple occasions during testing

Behaviors Inconsistent with ASD

- Seeks interactions with others

- Displays a wide range of affect, appropriate to the situation.

- Sustained, meaningful eye contact

- Frequent imitation of the examiner and/or caregiver

- Verbalizations and gestures are used for communication

- Easily gives back test materials upon request

- Initiates interactive social games

References

Alward, G. (2020). Bayley-4 Clinical Use and Interpretation. Academic Press

Bayley, N. & Alward, G. (2019) Bayley Scales of Infant and Toddler Development, 4th edition. NCS Pearson: Bloomington, MN.

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