FIRST WORDS Project: Prelinguistic Predictors of SLI and ASD

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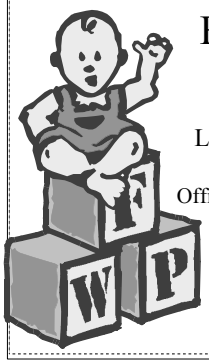

FIRST WORDS Project

Longitudinal Research Project
Funded by US DOE
Office of Special Education Programs
Institute of Education Sciences

firstwords.fsu.edu

METHOD

Children were recruited from the FIRST WORDS Project

➔ Step One: Brief Parent Report
- **CSBS DP Infant-Toddler Checklist**

➔ Step Two: Face-to-Face Evaluation
- **CSBS DP Behavior Sample of child interacting with caregiver and clinician**

CSBS Developmental Profile: Behavior Sample

- ❖ Warm-up
- ❖ Communicative Temptations (Wind-up toy, Balloon, Bubbles, Jar, and Toys in Bag)
- ❖ Sharing Books
- ❖ Symbolic Play (feeding set)
- ❖ Language Comprehension (object names, person names, and body parts)
- ❖ Constructive Play (stacking blocks)
- ❖ Caregiver Perception Form (caregiver rates how typical child's behavior is during sample)

CSBS Developmental Profile

Measurement Parameters for Checklist, CQ & BS

SOCIAL COMPOSITE
- ❖ Emotion and Eye Gaze
  - Gaze shifts, shared affect, gaze follow
- ❖ Communication
  - Behavior regulation, social interaction, joint attention
- ❖ Gestures
  - Conventional & distal gestures

SPEECH COMPOSITE
- ❖ Sounds
- ❖ Words

SYMBOLIC COMPOSITE
- ❖ Understanding
- ❖ Object Use

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Study 1: The purpose of this study was to identify early skills in the second year of life that predict later language outcomes.

Theories of language development

Early identification and prognosis

Suggest appropriate targets for early intervention

Participant Characteristics

	Early (N=129)	Late (N=184)
CSBS DP Age	14.2 mos	20.1 mos
Mullen Age	37.8 mos	38.0 mos
Nonverbal DQ	109.5 (21.7)	106.9 (23.5)
Receptive T	51.9 (11.6)	51.6 (13.6)
Expressive T	53.8 (12.5)	52.8 (13.8)
Gender (%male)	56%	60%

Research Question

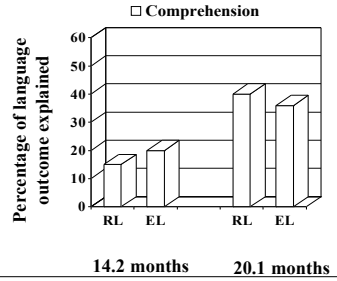
Which predictor in the second year of life has the strongest relationship with language outcome at three years of age?

Comprehension

- Predicted both receptive and expressive language outcome both early and late in the second year
- Correlations:

	Receptive Language	Expressive Language
14 months	.40 ***	.45 ***
20 months	.65 ***	.62 ***

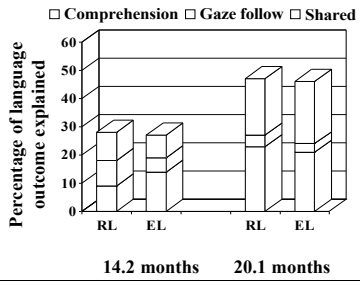
Comprehension and language outcomes



Research Question

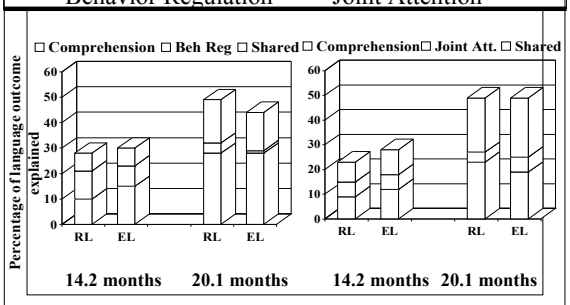
What other skills add significantly to the prediction of language outcome over and above comprehension?

Gaze follow and language outcomes

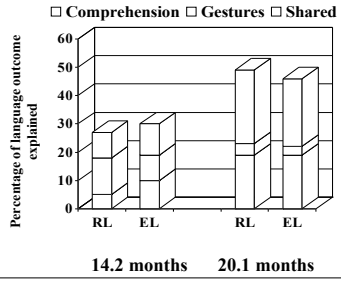


Communicative functions and language outcomes

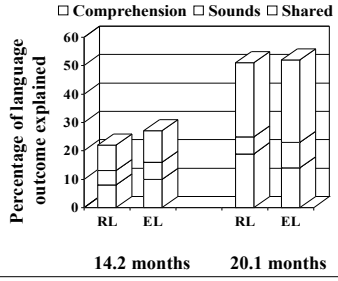
Behavior Regulation Joint Attention



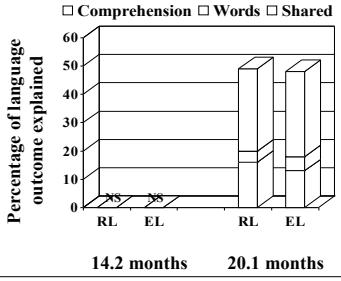
Gestures and language outcomes



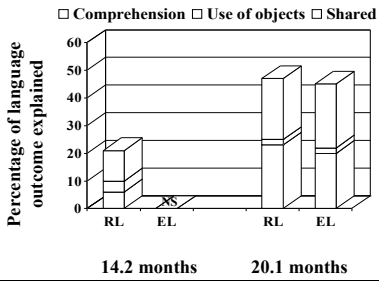
Sounds and language outcomes



Words and language outcomes



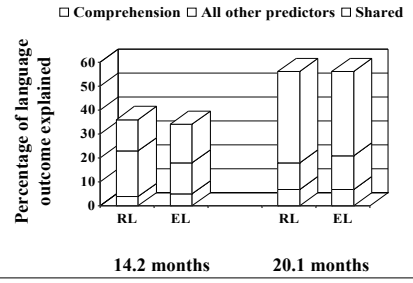
Use of objects and language outcomes



Research Question

How well can we predict language outcome when we use ALL the predictors?

All predictors and language outcomes



Early in second year
(mean age 14.20 months)

Prelinguistic skill	Receptive Language	Expressive Language
Gaze follow	***	**
Behavior regulation	***	***
Initiating joint attention	**	**
Gestures	***	**
Sounds	*	**
Words	-	-
Word combinations	-	-
Actions with objects	*	-

***p<.001, **p<.01, *p<.05

Late in second year
(mean age 20.13 months)

Prelinguistic skill	Receptive Language	Expressive Language
Gaze follow	***	**
Behavior regulation	***	*
Initiating joint attention	***	***
Gestures	**	**
Sounds	***	***
Words	**	***
Word combinations	-	-
Actions with objects	*	*

***p<.001, **p<.01, *p<.05

Conclusions

- Comprehension throughout the second year of life is an important predictor of later language outcome, both receptive and expressive
- All of the other predictors, except for word combinations, add important significant information regarding language outcome at three years beyond comprehension
- Greater accuracy in predicting language outcomes for toddlers can be achieved by including a collection of predictors as part of a test battery

Clinical Implications

- Most early language tests measure only words, but there are many prelinguistic skills one can measure in the second year to predict language outcome
- These include:
  - Comprehension
  - Gaze-point follow
  - Communicative functions: behavior regulation, joint attention
  - Gestures
  - Sounds
  - Use of objects

Clinical Implications

- Measuring these skills can give us important information about prognosis for language outcomes
- This information is invaluable for identifying delays and earlier access to intervention
- No need to "wait and see" for the child to develop words!

Study 2: Participant Characteristics

	Typical	SLI
Sample Size	23	24
CSBS DP Age	19 - 23	19 - 23
Mean	21.3 months	21.0 months
CELF-P Age	51.0 months	50.5 months
Total SS	113.8	80.5

ALLI

Assessment of Language Learning Indicators

(Morgan, Allen, & Wetherby, 2003)

- Communicative Gestures
- Language Comprehension
- Speech Complexity
- Language Production
- Book Sharing

Research Question

Are there differences in gesture use in the second year of life in children with and without specific language impairment?

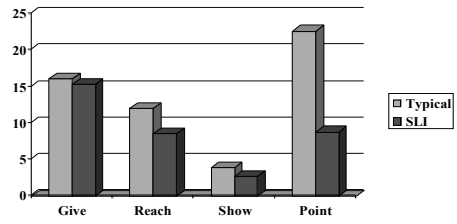
Communicative Gestures

Deictic
- Give
- Reach
- Show
- Point

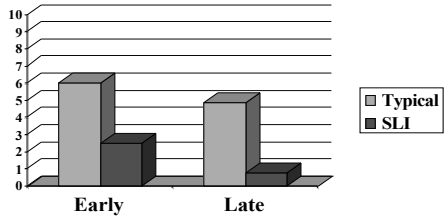
Representational
Early
- Wave
- Clap
- Head shake

Late
- Depictive/Sign
- Head nod

Group differences in deictic gestures



Group differences in representational gestures



Research Question

Are there differences in language comprehension in the second year of life in children with and without specific language impairment?

Situational versus Decontextualized Comprehension

Situational Comprehension

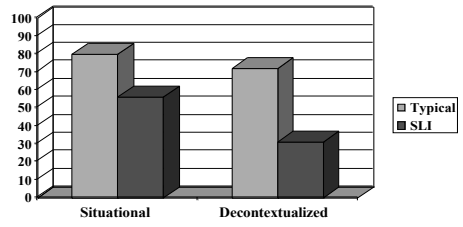
- Offer to assist child
- Requests to do to other
  - Show
  - Feed
  - Kiss
- Request to carry out a motor action
  - Give
  - Stir/pour

Situational versus Decontextualized Comprehension

Decontextualized Comprehension

- Request to locate/identify
  - "Can you find the cup?"
  - "Do you see the dog?"
  - "Give me the spoon"
  - "Show me your eyes"

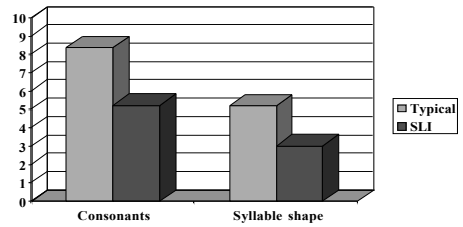
Percentage of comprehension



Research Question

Are there differences in speech complexity in the second year of life in children with and without specific language impairment?

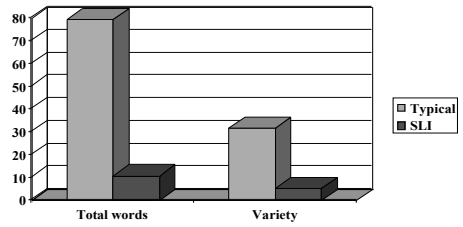
Group differences in speech complexity



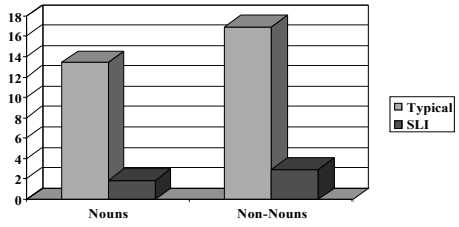
Research Question

Are there differences in language production in the second year of life in children with and without specific language impairment?

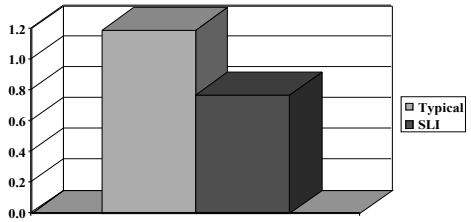
Group differences in word production



Group differences in vocabulary



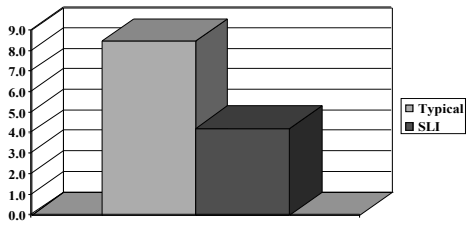
Group differences in utterance length



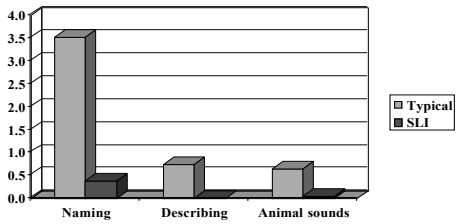
Research Question

Are there differences while sharing books in the second year of life in children with and without specific language impairment?

Pointing during book sharing



Talk during book sharing



Conclusions

- Children with SLI showed significantly poorer prelinguistic skills than children with typical language in the following areas:
  - Pointing and use of representational gestures
  - Situational and decontextualized comprehension
  - Inventory of consonants and syllable shape
  - Vocabulary production
  - Naming and describing while looking at books

Clinical Implications

- SLPs should evaluate these prelinguistic skills in the second year of life to detect children at risk for SLI
- Many prelinguistic skills can be observed during book sharing making this a useful evaluation context
- These prelinguistic skills should be considered as possible early intervention targets

Study 3: Prelinguistic Skills of Children with Autism Spectrum Disorders

- Intervention beginning prior to age 3 _ has a greater impact than later intervention.
- Average age of diagnosis in the United States is not until 3 to 4 years of age.
- Explore the characteristics of ASD in the first years of life.
  - Improve early identification
  - Provide appropriate targets for intervention

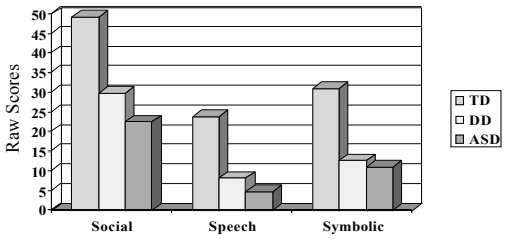
Participant Characteristics

	TD	DD	ASD
Sample Size	35	21	35
CSBS DP Age	20.0 months	18.8 months	20.2 months
Follow-up Age	36.7 months	35.9 months	37.0 months
Mullen V DQ	106.0 (14.0)	80.1 (22.9)	75.9 (30.8)
Mullen NV DQ	111.1 (14.6)	84.4 (20.1)	85.3 (24.3)

Research Question

Are there differences in prelinguistic skills in the second year of life among children with autism spectrum disorders, developmental delay, and typical development?

CSBS DP Behavior Sample
Composites



Research Question

Are there differences in specific items of the social composite among children with autism spectrum disorders, developmental delay, and typical development?

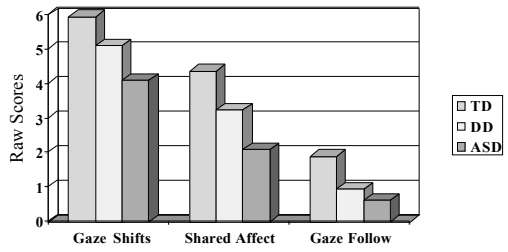
CSBS DP Behavior Sample
Social Composite

Emotion and Eye Gaze
- ❖Gaze Shifts
- ❖Shared Positive Affect
- ❖Gaze/Point Follow

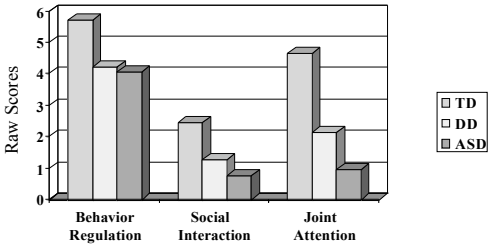
Communicative Functions
- ❖Behavior Regulation
- ❖Social Interaction
- ❖Joint Attention

Gestures
- ❖Conventional Gestures
- ❖Distal Gestures

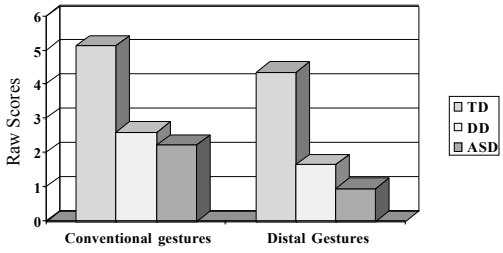
CSBS DP Behavior Sample
Emotion and Eye Gaze



CSBS DP Behavior Sample
Communicative Functions



CSBS DP Behavior Sample
Gestures



Social Composite Items
Group Differences

	ASD v TD	ASD v DD
Emotion and Eye Gaze		
❖Gaze Shifts	***	*
❖Shared Positive Affect	***	*
❖Gaze Follow	***	-
Communicative Functions		
❖Behavior Regulation	***	-
❖Social Interaction	***	-
❖Joint Attention	***	*
Gestures		
❖Conventional Gestures	***	-
❖Distal Gestures	***	-

***p<.001, **p<.01, *p<.05

Conclusions

- ❖Children with ASD differed significantly from both DD and TD in the second year of life in the following areas:
  - Gaze shifts
  - Shared positive affect
  - Joint attention
- ❖Prelinguistic skills were low but not necessarily absent in children with ASD

Clinical Implications

- ❖Identify children with ASD in the second year of life
  - SLP plays an important role
  - Critical to evaluate prelinguistic skills, particularly gaze shifts, shared affect, and joint attention
- ❖Enable children to access intervention earlier
  - Importance of measuring social communication outcomes in intervention with very young children

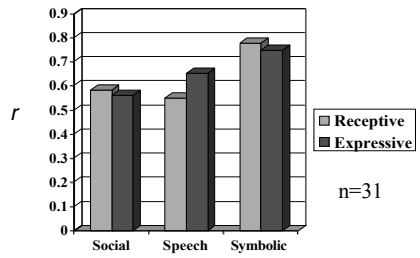
Research Question

Do prelinguistic skills measured between 18 and 24 months in children with ASD predict receptive and expressive language outcomes at 3 years?

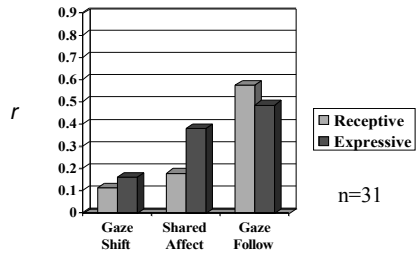
Participant Characteristics

	ASD
Sample Size	31
CSBS DP Age	21.5 months
BS Total SS	76.0 (14.3)
Follow-up Age	36.2 months
Mullen V DQ	69.6 (33.6)
Mullen NV DQ	81.7 (25.8)
NV DQ >80	48%

CSBS DP Composites and Language Outcomes



Emotion & Eye Gaze and Language Outcomes



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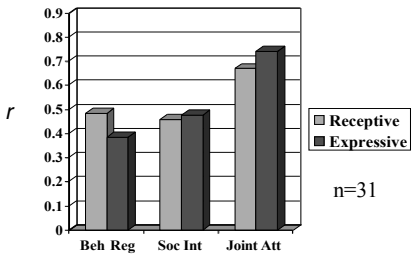
Communicative Functions and Language Outcomes



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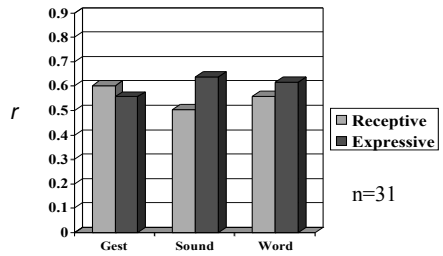
Communicative Means and Language Outcomes



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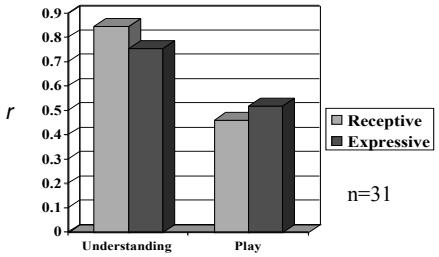
Symbolic Abilities and Language Outcomes



n=31

Conclusions

The following predictors measured from 18 to 24 months in children with ASD show large correlations with receptive and expressive language outcomes at 3 years :

- ❖ Gaze / Point follow
- ❖ Initiating Joint Attention
- ❖ Conventional and Distal Gestures
- ❖ Inventory of Sounds
- ❖ Inventory of Words
- ❖ Understanding
- ❖ Play

Systematic Observation of Red Flags (SORF) for ASD in Young Children (Wetherby & Woods, 2002)

- ❖Reciprocal Social Interaction (RSI)
- ❖Unconventional Gestures (UG)
- ❖Unconventional Sounds and Words (USW)
- ❖Repetitive Behaviors and Restricted Interests (RBRI)

(Wetherby & Woods, 2002)

Research Question

What percentage of children show RED FLAGS of ASD in the second year of life using the SORF scoring with the CSBS DP?

Percentage of Children with ASD (n=30) and DD (n=18) showing the 13 *Red Flags*

		ASD	DD
RSI	Lack of appropriate gaze	80%	22%
	Lack of shared positive affect	87%	33%
	Lack of initiating joint attention	97%	56%
	Lack of response to contextual cues	87%	67%
	Lack of response to name	100%	94%
	Lack of coordination of nonverbal communication	97%	61%
UG	Lack of pointing	93%	78%
	Lack of showing	97%	61%
USW	Unusual prosody	47%	0%
	Lack of consonants	87%	77%
RBRI	Repetitive movements of body	60%	17%
	Repetitive movements with objects	77%	11%
	Lack of playing with a variety of toys	77%	78%

Conclusions

- Red flags of ASD in the second year of life are a combination of lack of typical behaviors and presence of atypical behaviors.
- Red flags that are common to children with ASD and DD include a lack of gestures, sounds, words, understanding, and play
- Red flags that are more specific to ASD are lack of gaze, shared affect, and initiating joint attention, as well as unusual prosody and repetitive behaviors

Clinical Implications

- A child who shows a lack of gestures, sounds, words, understanding, or play in the second year is at risk for ASD or DD/SLI
- More precise risk indicators for ASD include: lack of gaze, shared affect, and joint attention
- Unusual intonation and repetitive behaviors in combination with a lack of appropriate sounds and play should be recognized as high risk indicators of ASD

Session Summary

- A collection of prelinguistic skills in the second year of life are predictors of language outcomes
- More precise information on comprehension, gestures, sounds and words is important for identifying children with SLI
- More precise information on gaze, shared affect, initiating joint attention, intonation, and repetitive behaviors is important for identifying children with ASD