Red Flags of Autism Spectrum Disorders in the Second Year of Life:

From Early Identification to Early Intervention

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Why is early diagnosis of autism spectrum important?

Of 1,000 children in a pediatric practice, how many would you expect to have ASD?
Between 3 and 7

The symptoms of ASD are present from the first year of life in most children. However, what is the average age for diagnosis of ASD in the U.S.?
3 to 4 years of age

When does intervention for children with ASD have the greatest impact?
If it begins before 3 _ years of age

(Filipek, Accardo, Baranek et al., 1999; Harris & Handleman, 2000)

Can ASD be diagnosed early?

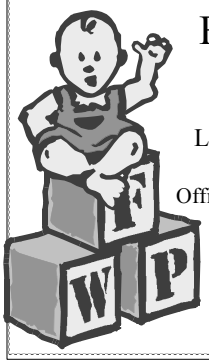
- There is no biological marker of ASD.
- ASD can be diagnosed reliably by experienced professionals down to 24 months of age.
- Over 85% of children diagnosed by experienced professionals at 2 years of age are still on the autism spectrum at 4 years of age.
  - *Social Impairments* and *Communication Impairments* were prominent at 2 years of age.
  - *Restricted Repertoire of Activities and Interests* were not prominent in some children until 3 years of age.

(Lord, 1995; Stone, Lee, Ashford, Brissie, Hepburn, Coonrod, & Weiss, 1999)

Core Social Communication Deficits of ASD: Clues for Earlier Identification

- Limited gaze shifts and lack of shared positive affect
- Lack of communicating to share attention and interests
- Lack of conventional and symbolic gestures
- Unconventional means of communicating (e.g., using person's hand as a tool; self-injurious behavior; echolalia)
- Poor coordination of gestures, sounds, and eye gaze
- Limited use of sounds and inventory of consonants
- Limited use of speech
- Poor language comprehension
- Limited conventional use of objects and lack of pretend play but good constructive play

(Stone, Ousley, Yoder, Hogan, & Hepburn, 1997; Wetherby, Prizant, & Hutchinson, 1998)



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
- Complete the CSBS DP Infant-Toddler Checklist
- Includes 24 items about developmental milestones and a question about whether the parent is concerned about the child's development

➔ Step Two: Interactive Child Evaluation
- Videotape the CSBS DP Behavior Sample
- Includes a sequence of 6 communication and play opportunities while interacting with the caregiver and clinician, which becomes an archival record

CSBS Developmental Profile

Measurement Parameters for the Behavior Sample

SOCIAL COMPOSITE
- ❖ Emotion and Eye Gaze
  - ▪ **Gaze shifts, shared positive affect, gaze/point 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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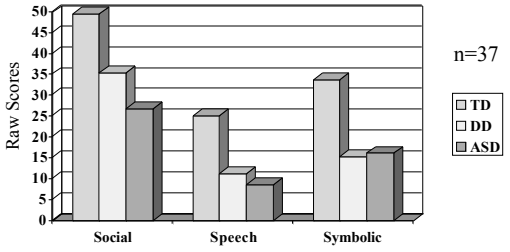
Characteristics of Older Cohort

	ASD	DD	TD
Sample Size	37	21	37
CSBS DP Age	21.4 months	20.6 months	21.0 months
Follow-up Age	35.4 months	35.9 months	36.0 months
Mullen V DQ	70.0 (31.5)	80.1 (22.9)	107.5 (13.6)
Mullen NV DQ	81.8 (24.8)	84.4 (20.1)	111.5 (13.3)

CSBS DP Behavior Sample Composites Older Cohort (>18 months)



Social Composite Items Group Differences

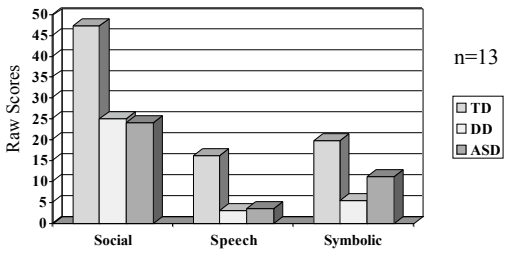
	ASD v TD	ASD v DD
Emotion and Eye Gaze		
❖Gaze Shifts	***	*
❖Shared Positive Affect	***	*
❖Gaze Follow	***	-
Communicative Functions		
❖Behavior Regulation	***	-
❖Social Interaction	***	-
❖Joint Attention	***	*
Gestures		
❖Conventional Gestures	***	-
❖Distal Gestures	***	-

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

Characteristics of Younger Cohort

	ASD	DD	TD
Sample Size	13	13	13
CSBS DP Age	15.1 months	14.6 months	15.1 months
Follow-up Age	33.6 months	34.8 months	37.9 months
Mullen V DQ	85.7 (33.8)	87.1 (15.3)	111.6 (17.3)
Mullen NV DQ	96.4 (24.9)	90.32 (18.3)	113.6 (13.2)

CSBS DP Behavior Sample Composites Younger Cohort (<18 months)



Social Communication & Language Outcomes in ASD

Measure	Older Cohort (n=28)	Younger Cohort (n=10)
Gaze Shifts	-.16	.00
Shared Pos Affect	-.04	.06
Gaze/Pt Following	.33	.59
Behavior Reg	.45**	.49
Social Interaction	.34	.74 *
Joint Attention	.58**	.61
Gestures	.52**	.57
Sounds	.55 **	.52
Words	.58 **	-
Understanding	.73 ***	.60
Play	.44 *	.52

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

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)

Prospective Study of ASD

Prospective Longitudinal Sample

- ❖3,021 completed a CSBS DP Infant Toddler Checklist between 12 and 24 months
- ❖350 were videotaped during a Behavior Sample of child's communication and play

Three Groups of 18 Children

ASD Group: children later diagnosed with ASD

DD Group: children with developmental delay in which ASD was ruled out

TD Group: children with typical development

(Wetherby, Woods, Allen, Cleary, Dickinson, & Lord, 2004)

9 Red Flags differentiated children with ASD from children with DD and TD

Lack of Typical Behaviors

- ❖ Lack of showing
- ❖ Lack of appropriate gaze
- ❖ Lack of warm, joyful expressions
- ❖ Lack of sharing interest or enjoyment
- ❖ Lack of response to name
- ❖ Lack of coordination of nonverbal communication

Atypical Behaviors

- ❖ Repetitive movements with objects
- ❖ Repetitive movements or posturing of body
- ❖ Unusual prosody

4 Red Flags differentiated children with ASD from children with TD but not children with DD

Lack of Typical Behaviors

- ❖ Lack of pointing
- ❖ Lack of playing with a variety of toys
- ❖ Lack of response to contextual cues
- ❖ Lack of communicative vocalizations with consonants

Subjects Classified Correctly from Discriminant Analysis using 13 Red Flags

	Predicted Group Membership		
Actual Group Membership	ASD	DD	TD
ASD	18 (100%)	0 (0%)	0 (0%)
DD	0 (0%)	15 (83%)	3 (17%)
TD	0 (0%)	0 (0%)	18 (100%)

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

Best Practices for Infants and Toddlers with ASD

- Little research specific to children 0-3 years with ASD – infer from NRC report and DAP
- Involve families in teaching their child
- Natural environments
- Embedded intervention in daily routines

Intensity of Services for 0-3

- Optimal intensity for infants and toddlers is not yet determined
- Following principles of natural environments, we must make the best use of the intervention time we have with families and teachers so that intervention occurs throughout the child's day

Ask not ...

How can we provide 25 hours of traditional therapy services or special instruction?

Ask …

How can we support the caregiver's competence using intervention strategies throughout the day?

Natural Environments - **How** is More Important than Where

- Intervention at home or child care meets the letter of the law but not the spirit
- Intended to change the focus of intervention from working directly with the child to supporting caregiver's ability to enhance the child's development
- Daily caregivers, parents and teachers, have many more opportunities to impact a child's development

Early Social Interaction Project

Amy Wetherby & Juliann Woods, Co-Directors

esi.fsu.edu

- Family education, supports, and participation
- Individualized curriculum emphasizing social communication and play in a developmental framework
- Family-guided, routine based intervention
- Specialized services with intensity matching needs of child and family
- Community based programs in natural environments
- Positive behavioral support
- Methods and intensity modified every 3 months as needed based on child's progress
- Comprehensive, coordinated services guided by IFSP

Funded by OSEP, US DOE

Weekly Intervention Hours

Andy May, 2004

	Mon	Tues	Wed	Thur	Fri	Sat/Sun
ESI	Home 1 _ hr				Home 1 _ hr	
Com	Speech 30 min	MMO 3 hrs	Speech 30 min	MMO 3 hrs		
Home	2 hrs Breakfast, getting dressed, play, lunch, outside, bath, stories, tumbling, pick up	1 hr Breakfast, car travel, lunch, outside, bath, stories, pick up	2 hrs Breakfast, getting dressed, play, lunch, outside, bath, stories, tumbling, pick up	1 hr Breakfast, car travel, lunch, outside, bath, stories, pick up	2 hrs Breakfast, getting dressed, play, lunch, outside, bath, stories, tumbling, pick up	3 hrs Breakfast, lunch, outside, Dad time, pick up

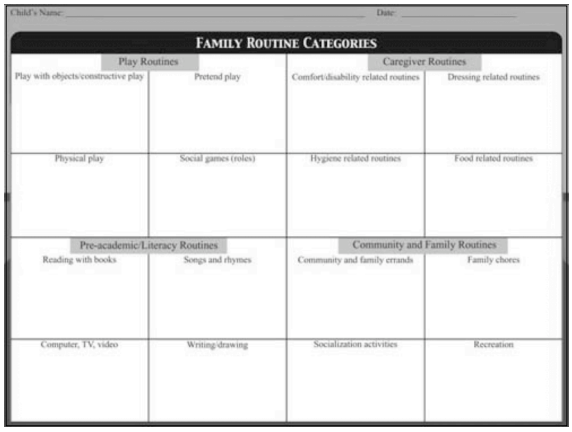
TOTAL: 20 Hours / Week

Keisha's Day

	Snack	Playdoh	Books	Songs	Other
Mon	☐	☐	☐	☐	☐
Tues	☐	☐	☐	☐	☐
Wed	☐	☐	☐	☐	☐
Thurs	☐	☐	☐	☐	☐
Fri	☐	☐	☐	☐	☐

Types of Routines

- Play Routines
  - Construction, pretend, physical, social games
- Caregiving Routines
  - Dressing, hygiene, eating, comfort
- Pre-academic/Literacy Routines
  - Books, songs, rhymes, computer, video, drawing
- Community and Family Routines
  - Errands, chores, socialization, recreation



Child's Name: _____ Date: _____

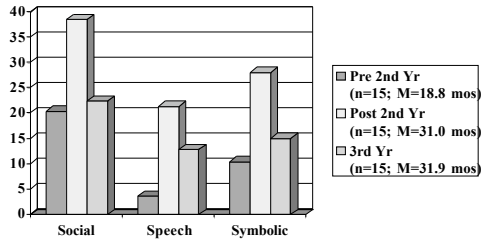
FAMILY ROUTINE CATEGORIES

Play Routines		Caregiver Routines	
Play with objects/constructive play	Pretend play	Comfort/disability related routines	Dressing related routines
Physical play	Social games (roles)	Hygiene related routines	Food related routines
Pre-academic/Literacy Routines		**Community and Family Routines**	
Reading with books	Songs and rhymes	Community and family errands	Family chores
Computer, TV, video	Writing/drawing	Socialization activities	Recreation

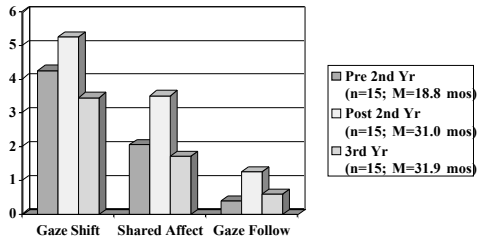
Participant Characteristics

	2nd Yr Entry		3rd Yr
	Pre	**Post**	**Entry**
Sample Size	15		15
CSBS DP Age	18.8 months	31.0 months	31.9 months
BS Total Raw	34.6 (17.2)	88.0 (37.7)	50.4 (39.6)
Follow-up Age		33.2 months	39.6 months
Mullen V DQ		72.9 (28.4)	48.6 (27.8)
Mullen NV DQ		82.6 (25.0)	58.7 (18.3)

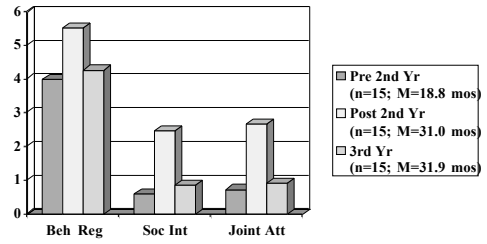
CSBS DP Behavior Sample
Composites



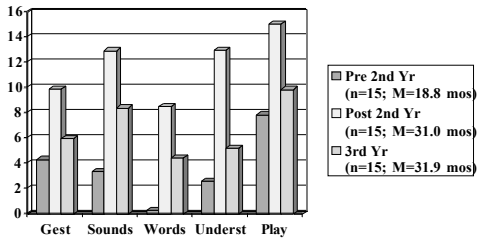
CSBS DP Behavior Sample
Emotion & Eye Gaze



CSBS DP Behavior Sample
Communicative Functions



CSBS DP Behavior Sample
Comm Means & Symbolic Capacity



CONCLUSIONS

- Providing early intervention to children with ASD in the second year of life appears to lead to better outcomes than waiting until the third year.
- Providing parent-implemented, routine-based intervention in natural environments can minimize professional time and maximize intensity of intervention.
- Using a developmental approach can lead to improvements in social communication in children with ASD.

Embedded Intervention in the Natural Environment

http://pbs.fsu.edu