



**NURTURE SCIENCE PROGRAM**  
**COLUMBIA UNIVERSITY MEDICAL CENTER**

# **Autonomic Emotional Connection: Welch Emotional Connection Screen (WECS) and Supports**

*A new lens on parent-child relational health*

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# Orienting Reflex- basis of Welch Emotional Connection Screen

- Survival mechanism
  - Response to environmental cues
    - Animals
    - Humans
      - Multi-sensorial
- Valence ~ duration
  - Neutral vs. high positive or negative
- Autonomic measures of OR (and WECS)
  - Heart rate
  - Vagal tone
  - Galvanic Skin response



# Autonomic Socioemotional Reflex (ASR)



- OR sets condition for ASR
  - Positive orienting reflex → approach
  - Negative orienting reflex → avoid
- ASR sets conditions for Autonomic Co-Regulation
  - Begins in utero
  - Basis for co-calming, in turn basis for proximity seeking between mother & infant
  - Basis for co-regulating with teacher (40-60% of 5-year-olds not ready for kindergarten CANADA and USA)



# Emotional Connection



- Autonomic nervous system
  - Nervous system (NS) of heart, gut, organ
  - Info flow 80% from gut to brain, 20% top down
  - NS of heart-to-heart communication and "gut feelings"
- STATE not a trait
  - State between two people
  - Not a trait of either one
- State Changes
- Changeable
- Theory of Change: Emotional Exchange

# 4 Vital signs of Relational Health – WECS domains

- Mutual attraction
- Mutual vocal communication (inviting connection)
- Mutual facial communication (warm with mutually sustained gaze)
- Reciprocity (equal give-and-take)



# Phenotypical change in behavior



**Physical avoidance**  
**Severe withdrawal**  
**Speech delay**  
**Oppositional**  
**Developmental delays**  
**Smell**  
**aversion**

**FNI**

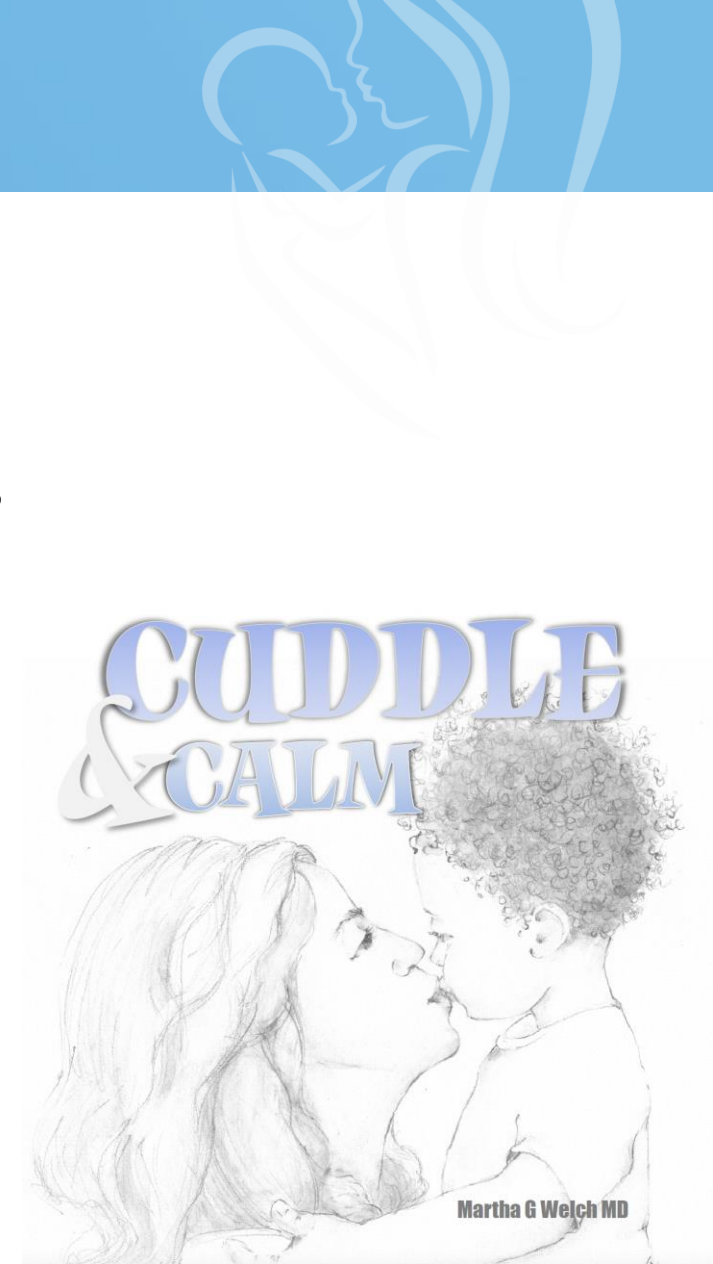


**Physical attraction**  
**Sociable**  
**Normal speech**  
**Optimal give and take**  
**typical Development**  
**No smell**  
**aversion**



# WECS development

- WECS correlates with physiology
- WECS validated with extensive coding instruments
- WECS predicts long term outcome in full and preterm infants
  - Frosch et al. (2019) *Acta Paediatrica*
  - Hane et al. (2018) *Acta Paediatrica*
- WECS takes 1-3 minutes observing parent-child face to face
- WECS calls for strategies → WECS Toolkit
  - Emotional exchange prompt card
  - Reading together parent-child poem books with tips for connecting
    - Pilot study - changed parental handling of temper tantrums
  - The Mommy Baby Book – Calm and Connected



FNI-Preschool – 4-yr old avoidant child connects with mom







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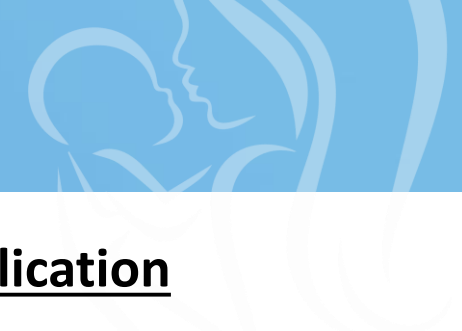
# **Family Nurture Intervention Improves Behavior and Development and Decreases Risk for Neurodevelopmental Disorders including Autism:**

## **A Randomized Controlled Trial at Columbia University Medical Center**



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# FNI Infant Outcomes Summary



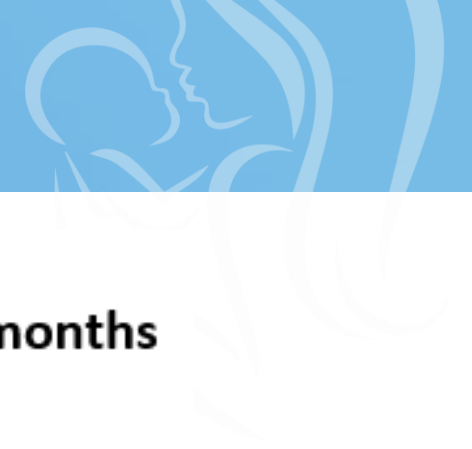
<b>Time Point</b>	<b>Outcome</b>	<b>Measure</b>	<b>Publication</b>
40 wks	Higher autonomic regulation	EKG	Porges et al, 2019
	Increased brain activity	EEG	Welch et al, 2014
4 mos	Lower heart rate under stress	EKG	Hane et al, 2019
	Better face-to-face facilitation	Microcoding	Beebe et al, 2018
18 mos	Better language	Bayley III	Welch et al, 2015
	Better cognition	Bayley III	
	Better attention	CBCL	
	Decreased risk for autism	MCHAT	
4 & 5 yr	Higher vagal tone in mother & child	EKG	Myers et al, 2020
	Cognitive empathy (Theory of Mind)	Sally Ann Task	In prep
	Better sleep		In prep



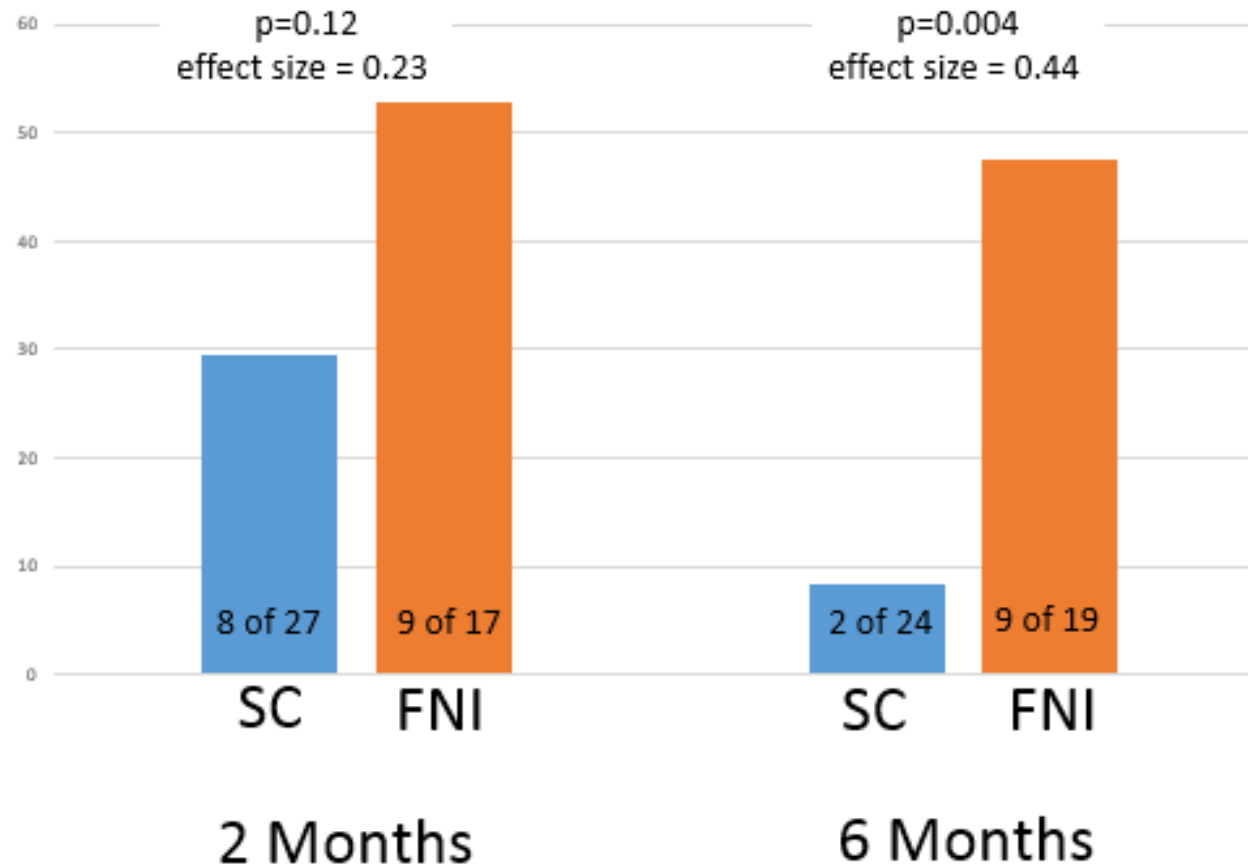
# **Family Nurture Intervention Improves Emotional Connection in Preschool Aged Children: A Randomized Controlled Trial at the Connecticut Learning Centers (CLC)**

**Trial Registration at [Clinicaltrials.gov](https://clinicaltrials.gov)  
Children's Learning Centers Group FNI  
NCT03908268**

# Change in Emotional Connection - Baseline to 6 Months

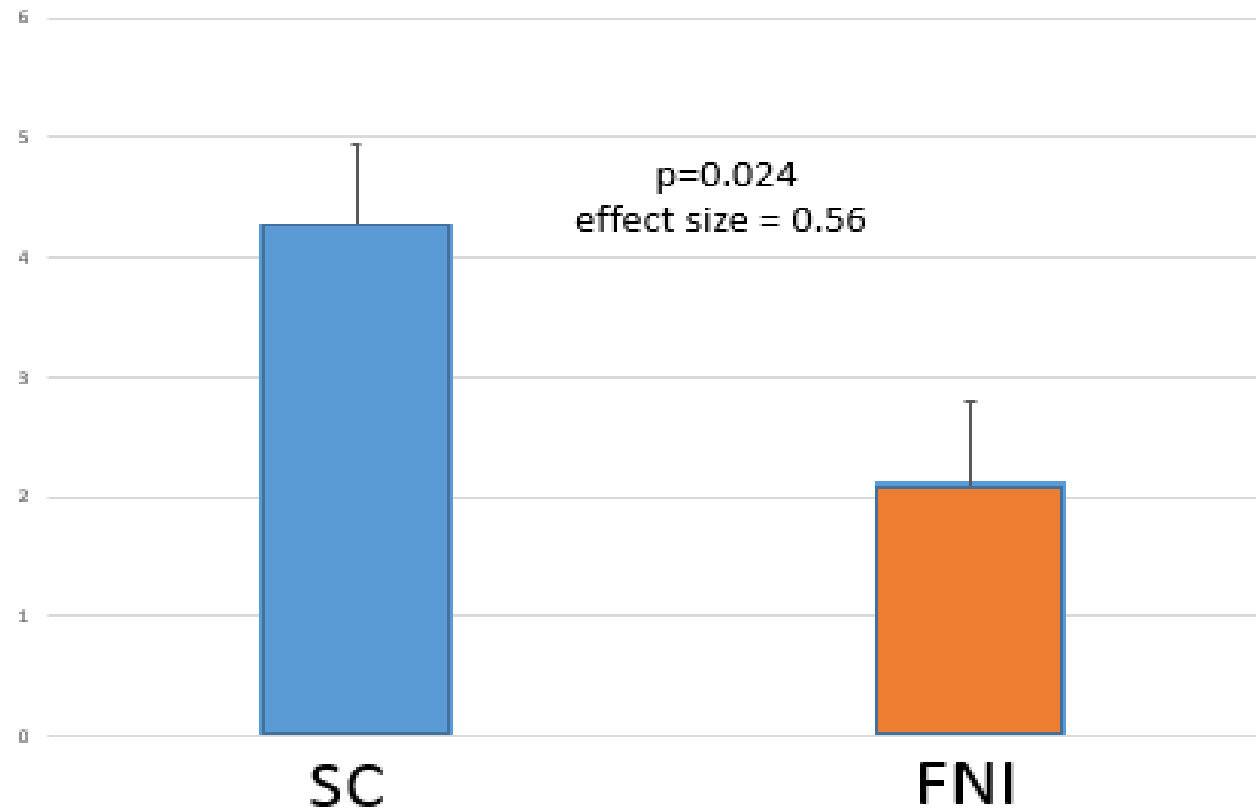


## FNI-Preschool Increases the Percent of Mothers and Children who were not Emotionally Connected at Enrollment but were at Six months

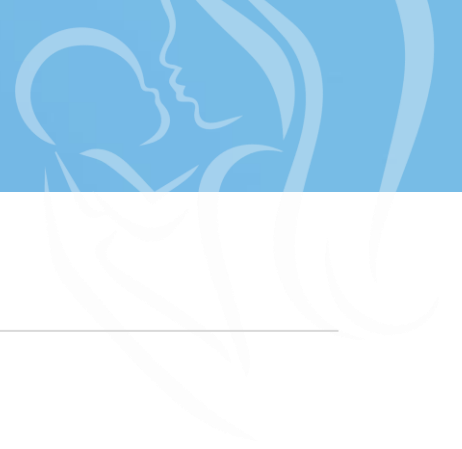


# Problem Behavior at 6 Months

## FNI-Preschool Decreases Total Child Problems Reported on the Preschool Pediatric Symptom Checklist (SWYC) at 6 Months



# FNI-Preschool Decreases Emotional Problems/Symptoms



## Strengths and Difficulties (SDQ)

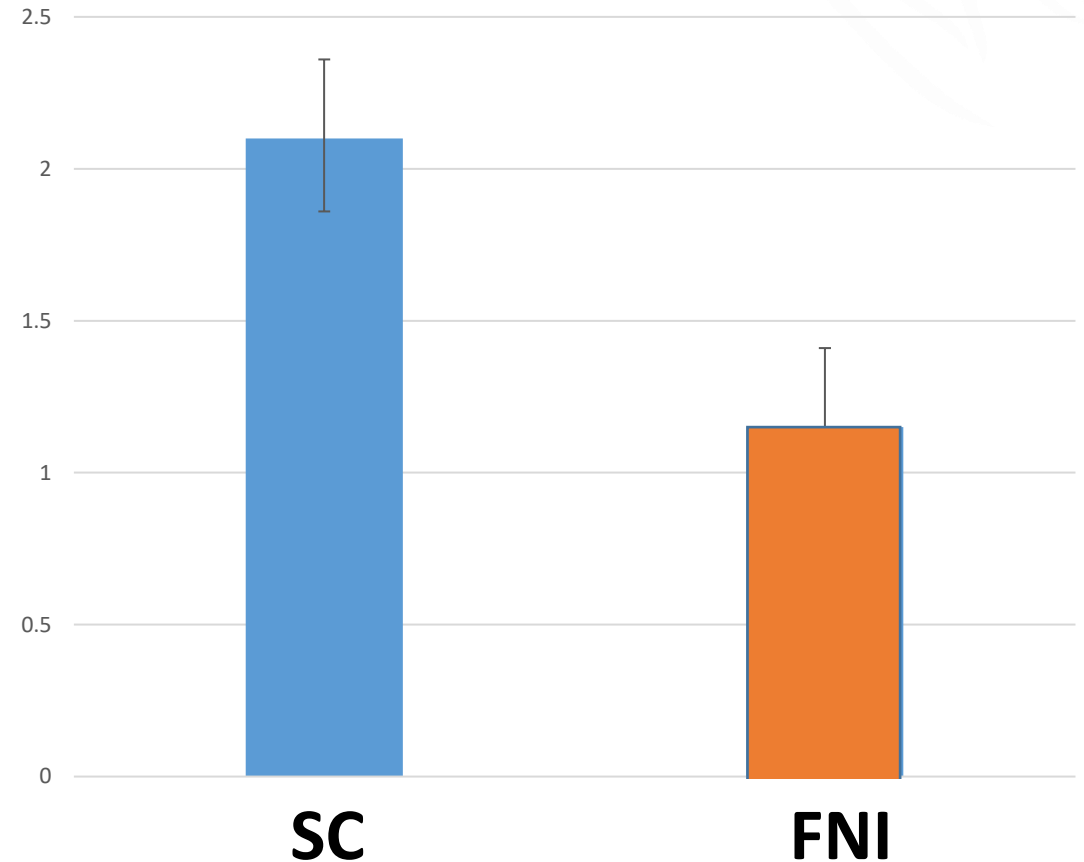
Emotional symptoms

Control (n=22)

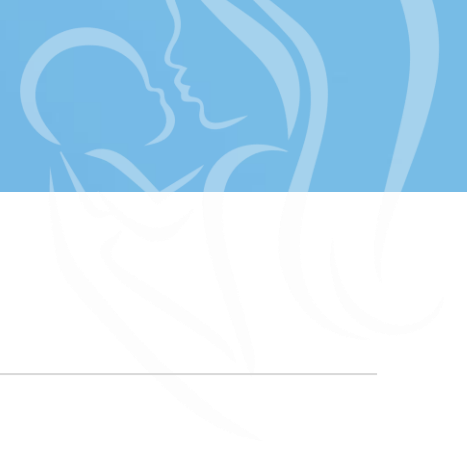
Intervention (n=25)

$p=0.011$

Effect size=0.76



# FNI-Preschool Decreases Autism-related Symptoms



## Autism Treatment Evaluation Checklist (ATEC)

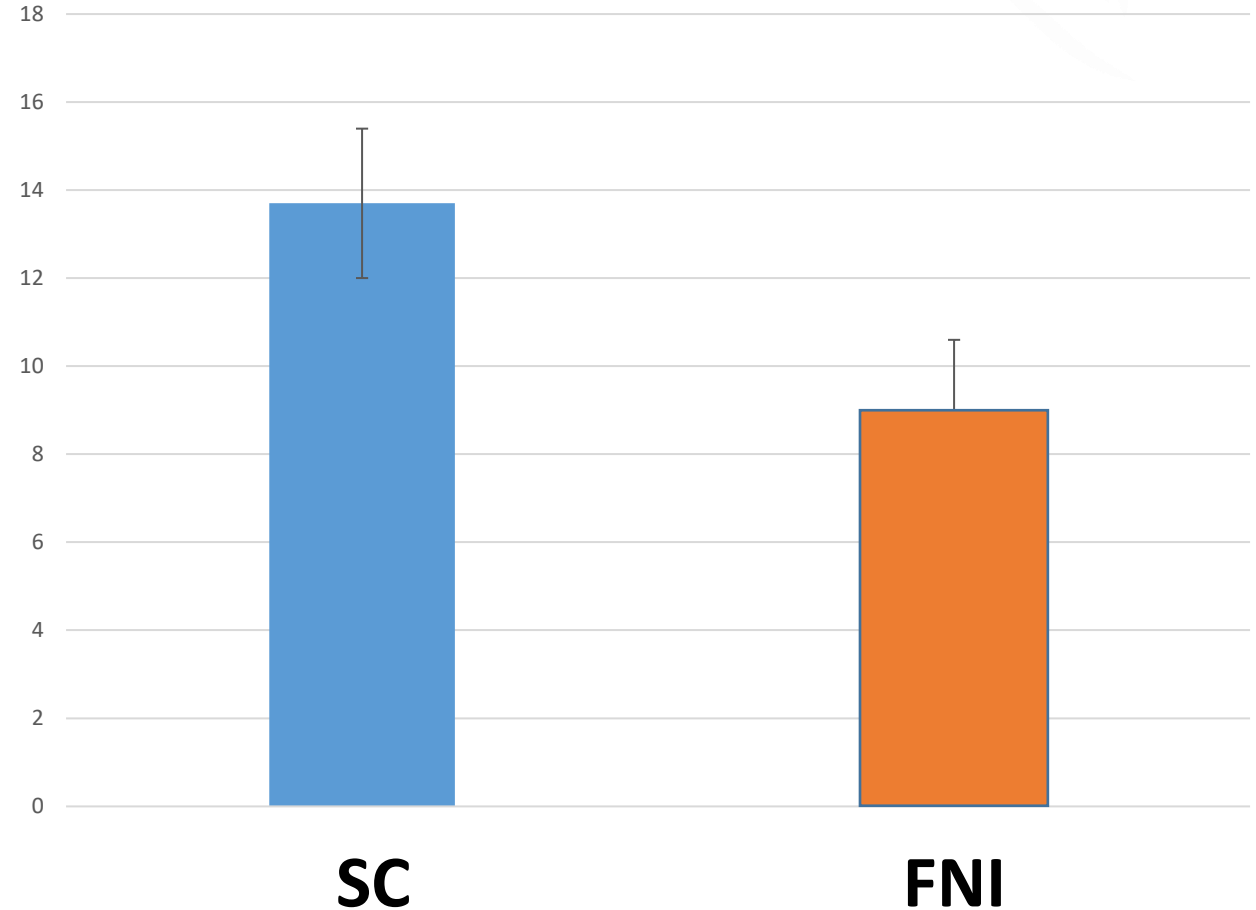
Total Score

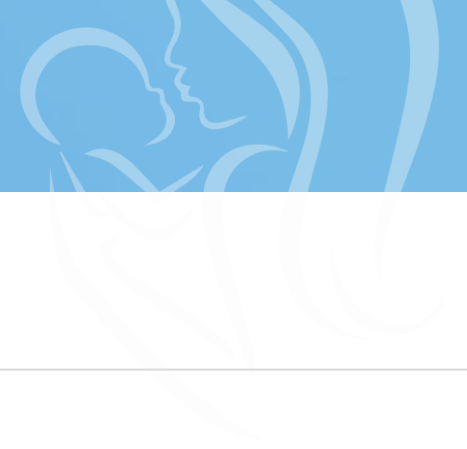
Control (n=28)

Intervention (n=32)

$p=0.048$

Effect size=0.53





## Ages and Stages Questionnaire (ASQ)

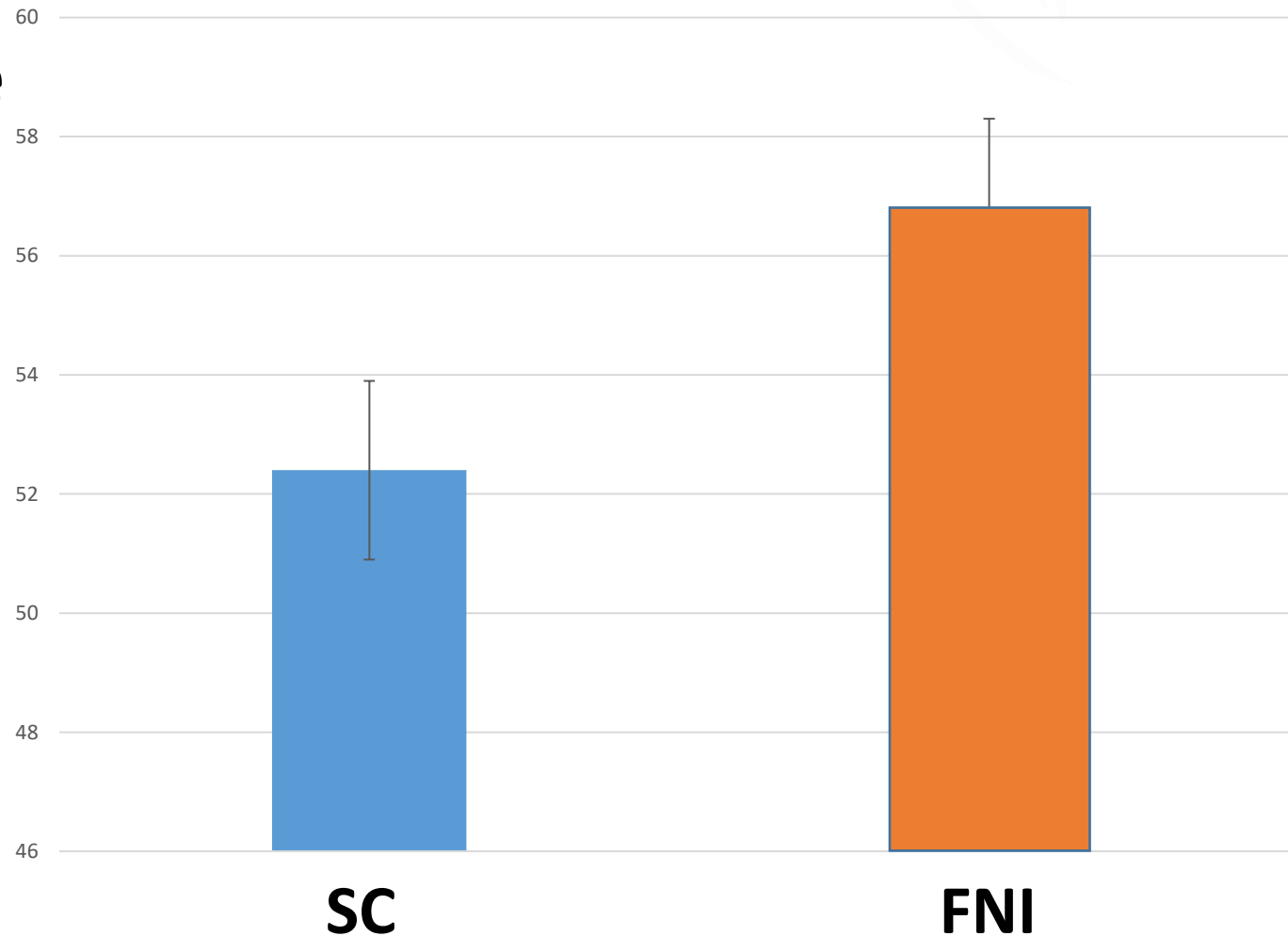
Personal-Social

Control (n=29)

Intervention (n=30)

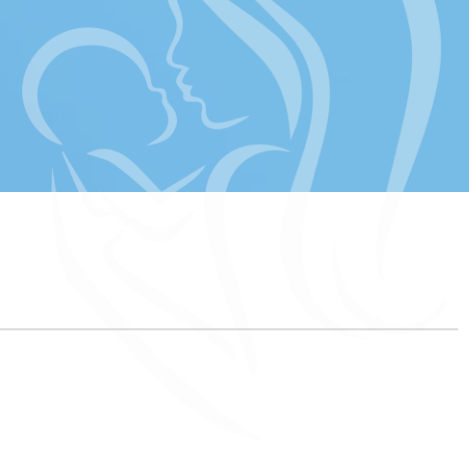
$p=0.045$

Effect size=0.51





# FNI-Preschool Improves Flexible Thinking



## Brief-P (executive function)

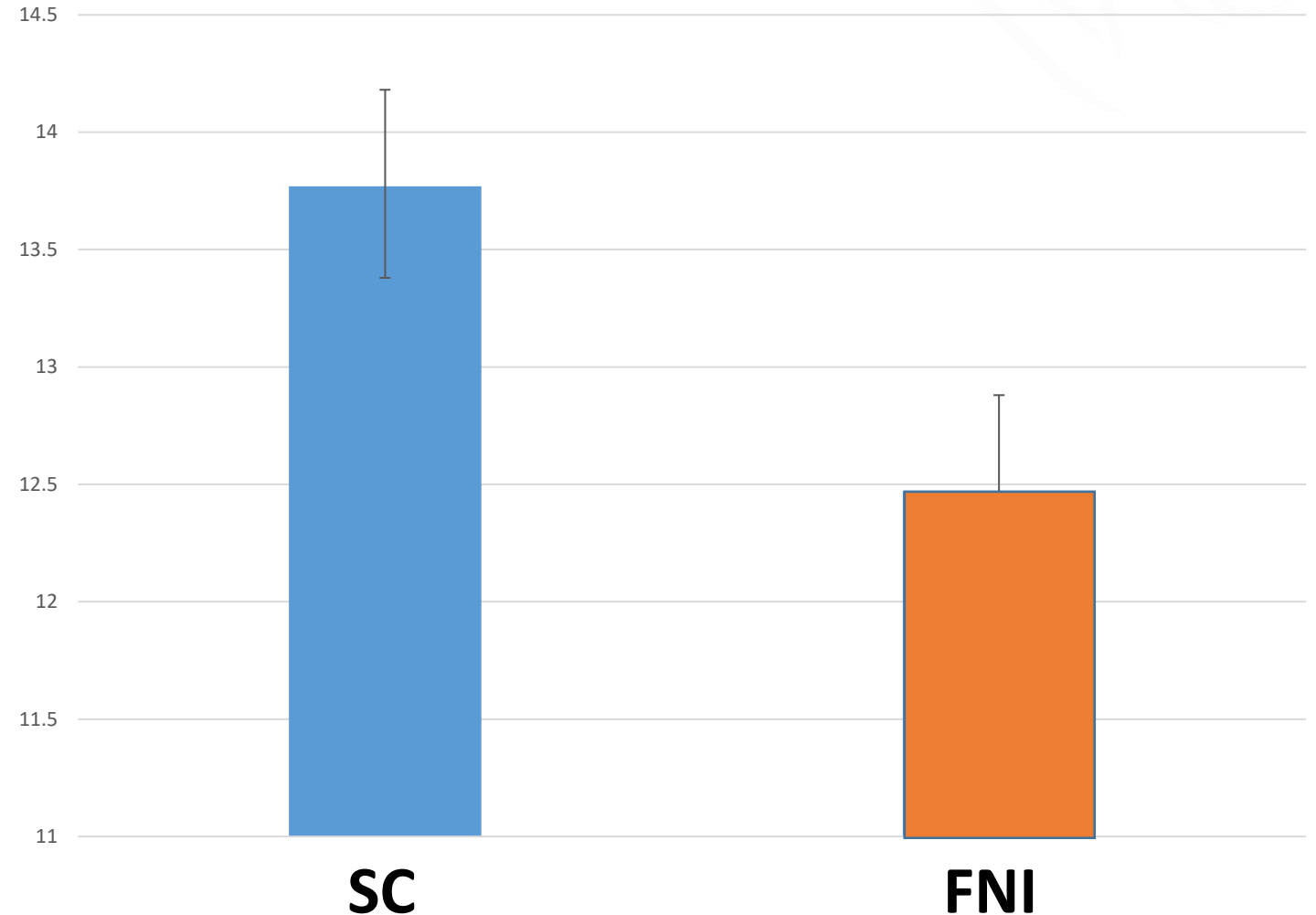
Set shifting

Control (n=29)

Intervention (n=32)

$p=0.032$

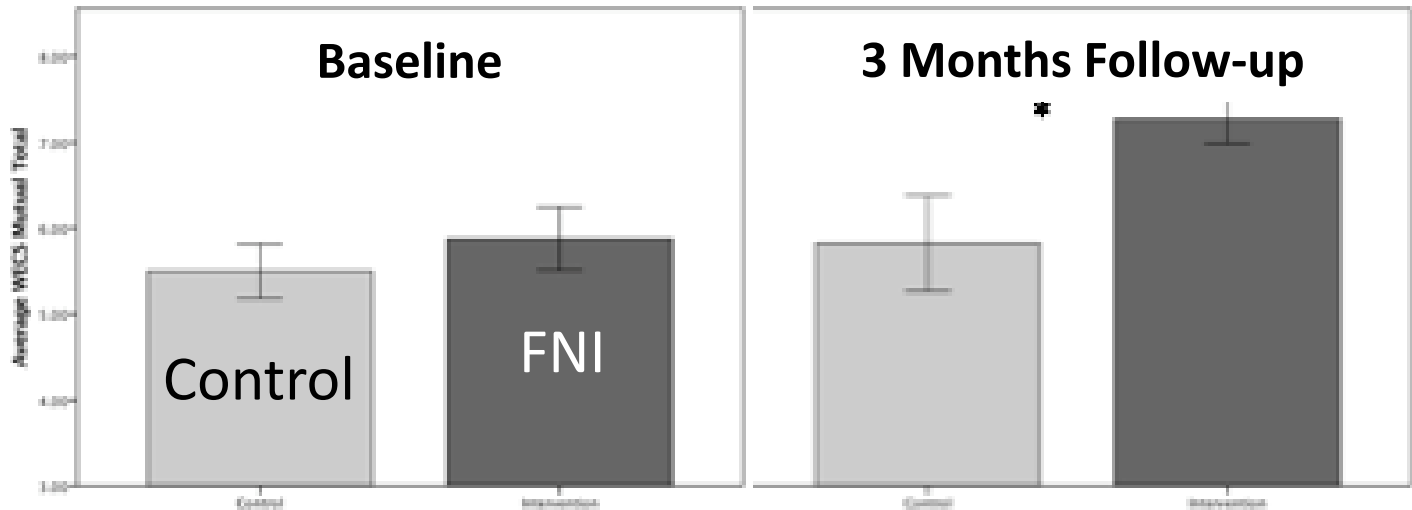
Effect size=0.59



# Efficacy of FNI-Preschool for Families Receiving Public Assistance

FNI-Preschool led to higher levels of mutual emotional connection

WECS Total Score



# Results of Preschool Trial

FNI-Preschool group session intervention improves mother/child emotional connection and decreases child behavioral problems.

\*\*\*

FNI group sessions are a new and practicable approach to improving mother/child relational health.

\*\*\*

After FNI-Preschool, teachers reported improved behavior in FNI children but not in children who did not have FNI.

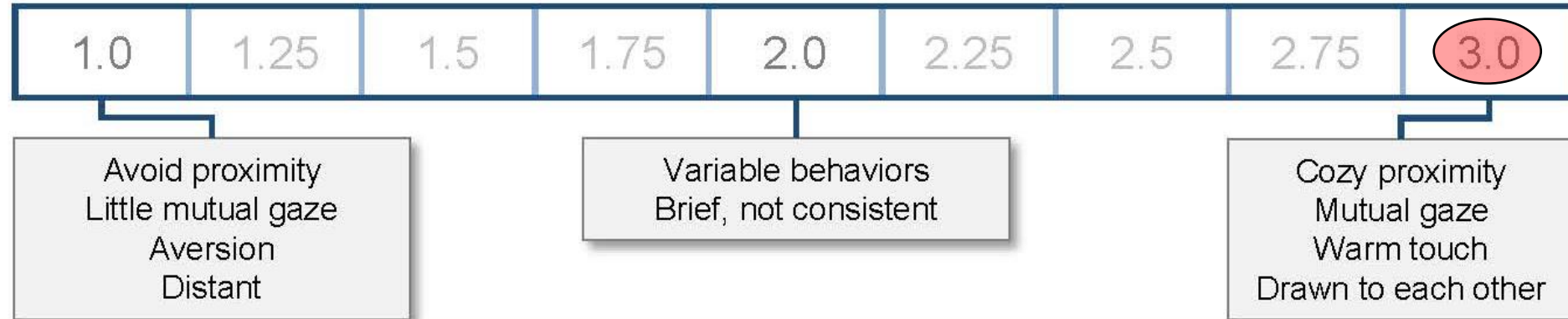
\*\*\*

89% of the teachers wanted to make FNI-Preschool permanent.

# Try rating the WECS yourself



## ATTRACTION



## VOCAL COMMUNICATION

1.0

1.25

1.5

1.75

2.0

2.25

2.5

2.75

3.0

Negative, Infrequent  
Not reciprocal  
Not responsive

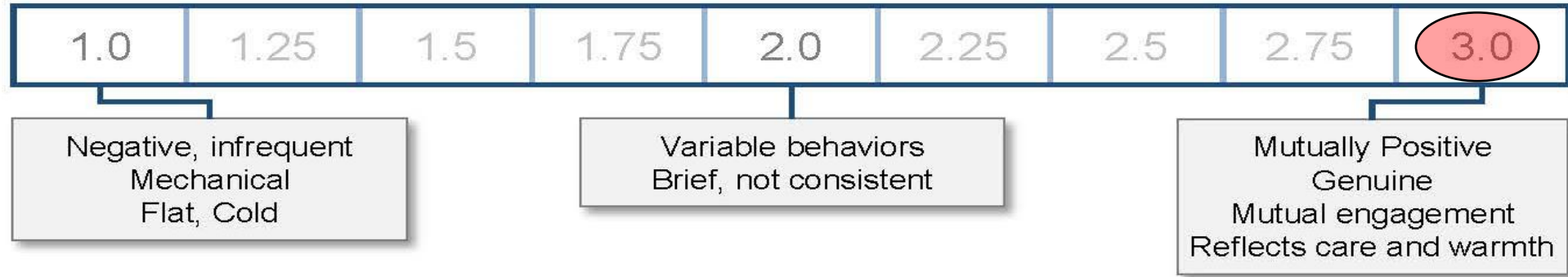
Variable behaviors  
Brief, not consistent

Warm, positive  
Genuine  
Responsive behaviorally /  
vocally to other





## FACIAL EXPRESSIVENESS



## SENSITIVITY / RECIPROCITY

1.0

1.25

1.5

1.75

2.0

2.25

2.5

2.75

3.0

Asynchronous  
Misreading each other  
Inappropriate actions  
Little to no repair

Mixed responses  
Aware or not, but  
not always appropriate

Well-timed, in sync  
Attuned to each other  
Seamlessly repair  
breaks





## NEED ANY HELP?

☐

**YES**

**NO**

☒

# Try rating the WECS yourself



## ATTRACTION

1.0

1.25

1.5

1.75

2.0

2.25

2.5

2.75

3.0

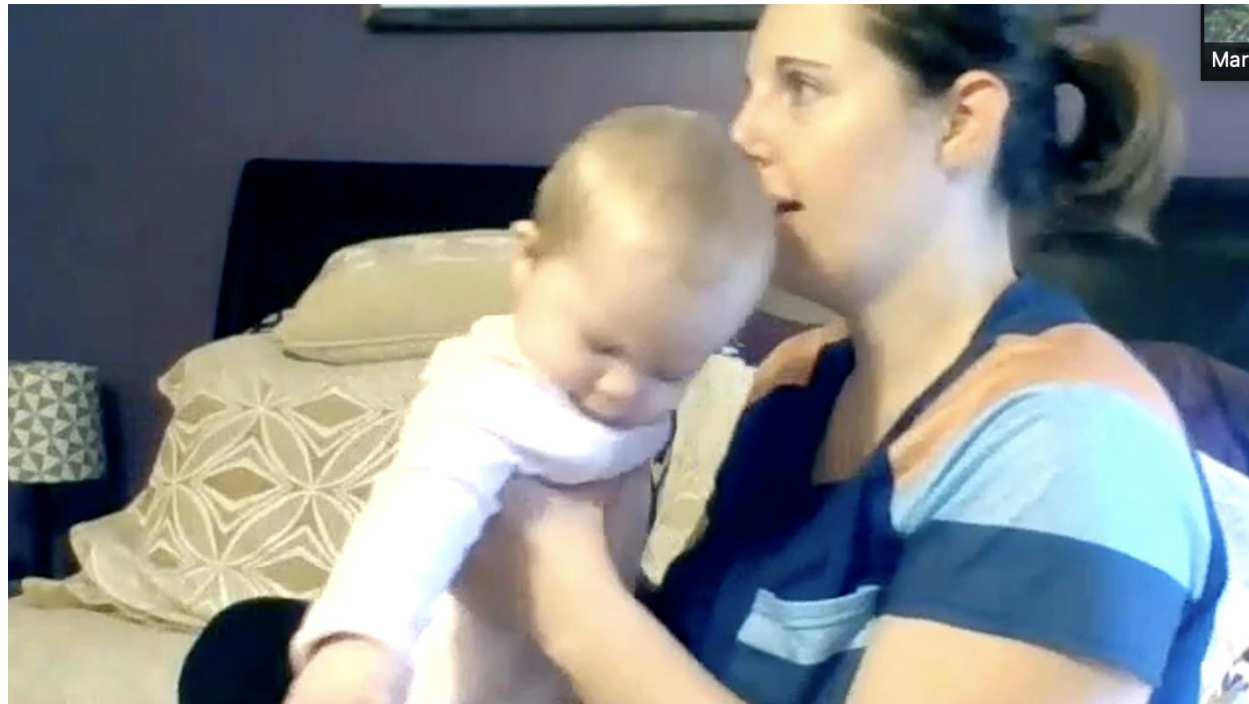
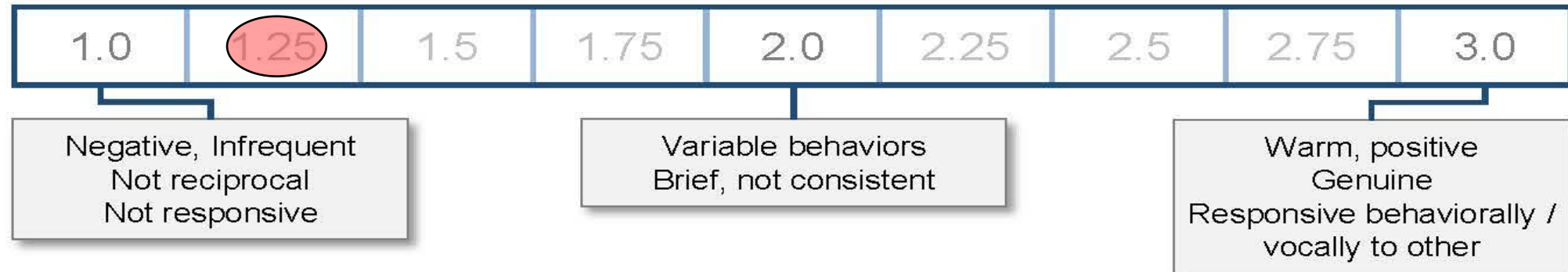
Avoid proximity  
Little mutual gaze  
Aversion  
Distant

Variable behaviors  
Brief, not consistent

Cozy proximity  
Mutual gaze  
Warm touch  
Drawn to each other

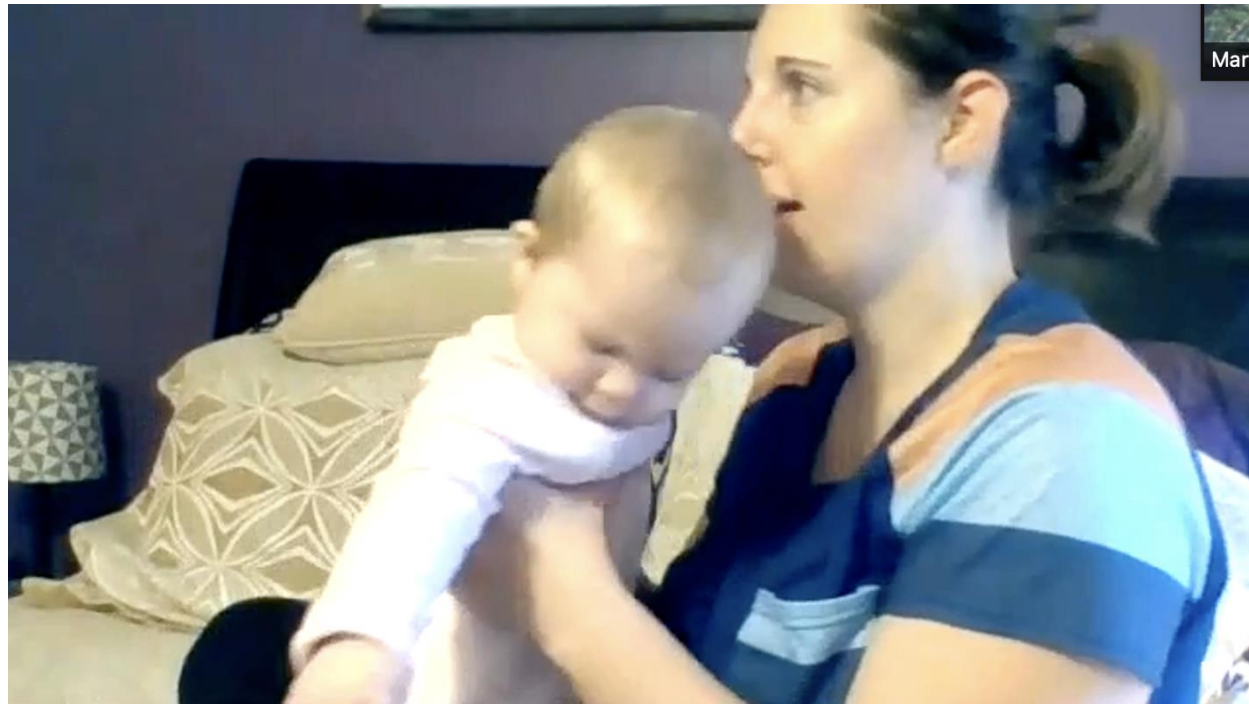
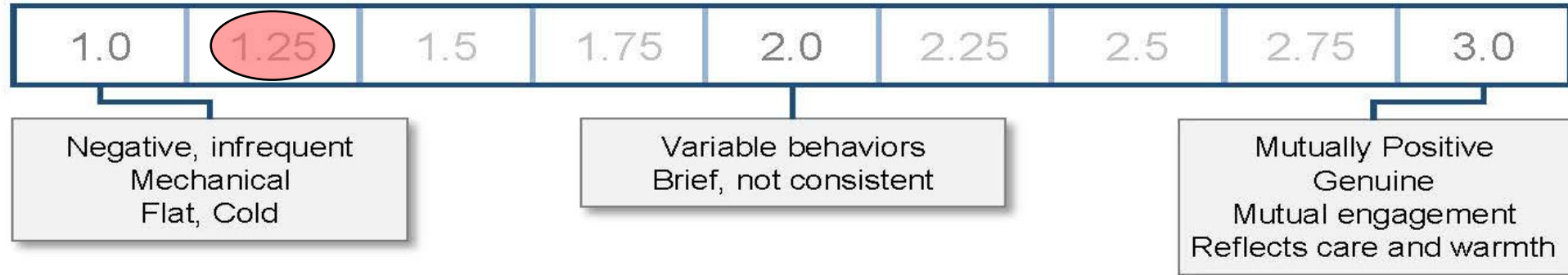


## VOCAL COMMUNICATION

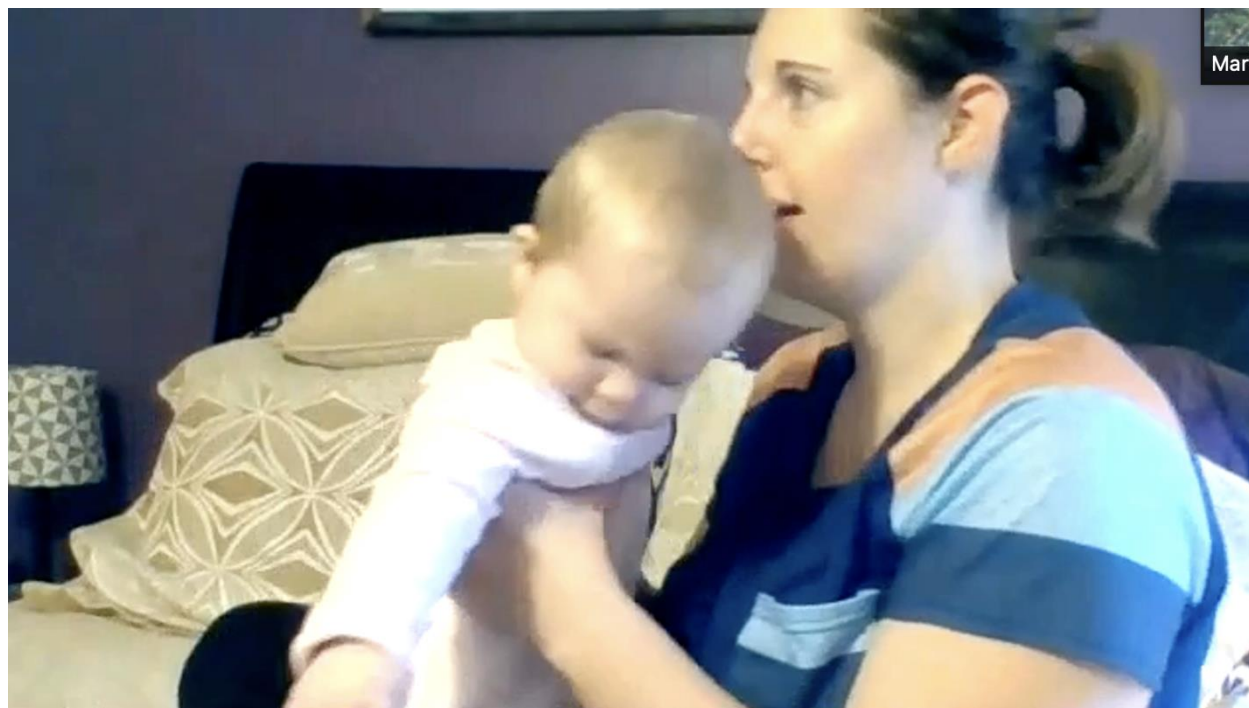
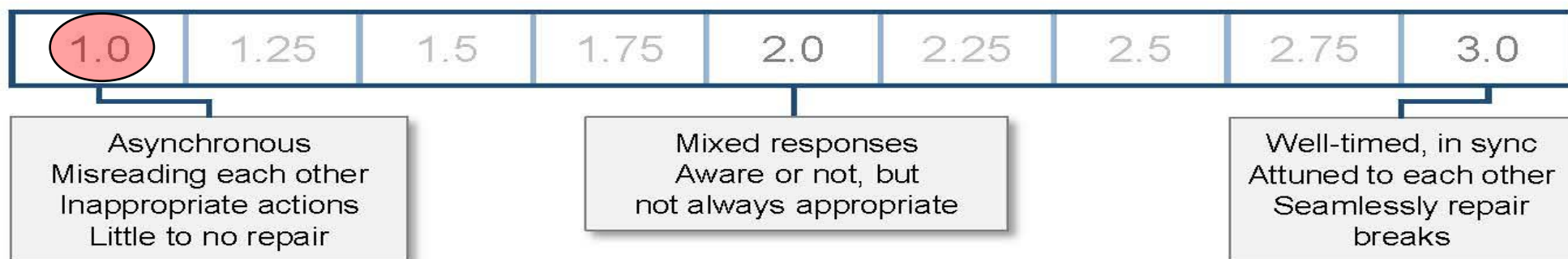




## FACIAL EXPRESSIVENESS



## SENSITIVITY / RECIPROCITY

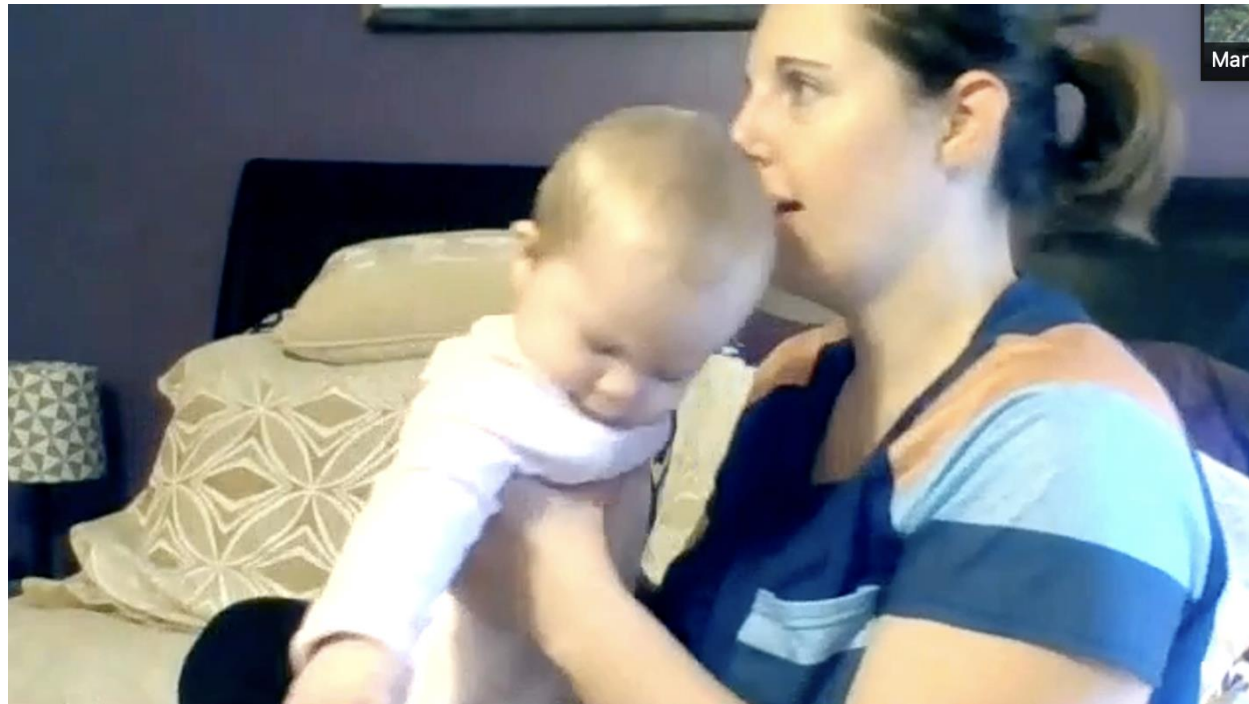


## NEED ANY HELP?



**YES**

**NO**



# What Melissa wants everyone to know about





# Where We Stand After 50 Years of Clinical Practice and Research

## **A theory of change**

- Autonomic conditioning via emotional exchange to emotional connection

## **Rigorous testing of the theory**

- From molecules to animal models to children and mothers

## **New assessment tool**

- Welch Emotional Connection Screen (WECS) – brief 1-3 minutes

## **Brief light touch practicable intervention**

- Emotional exchange and WECS supports toolkit



# The rest of the story.....



2016



2018



2021





# Nurture Science Program in Pediatrics Columbia University

## Behavioral Coding

Amie Hane, Director

## Neonatology

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Philip Grieve

Joseph Isler

## Pathology & Cell Biology

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## Funding

Einhorn Family Charitable Trust

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Fleur Fairman Family

Morgan Rutman Family

Kathy Emmett and David Golub

## Developmental Neuroscience

Myron A. Hofer

## WECS Consortium

Robert Needlman

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Leslie Ann Dietrich

Fatima Malik

## U of Texas San Antonio

Alice Gong

Umber Darileck

## Emory University

David O'Banion

Catherine Abrams

## Strategic Partners

Einhorn Family Charitable Trust

Childrens' Learning Centers, Stamford, CT

Reach Out and Read





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**THANK YOU**

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