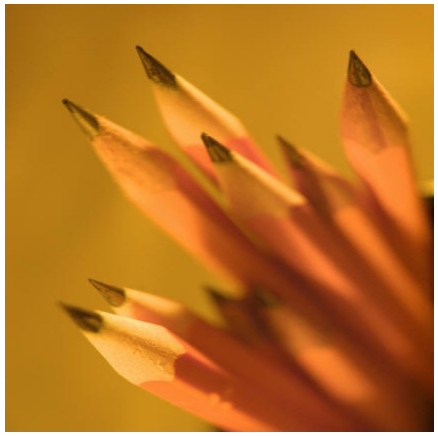

MILE: An Intervention Program for Children with FASD

BFSS Conference
1-3 May 2012, Arlington, Virginia
Molly Millians, D.Ed

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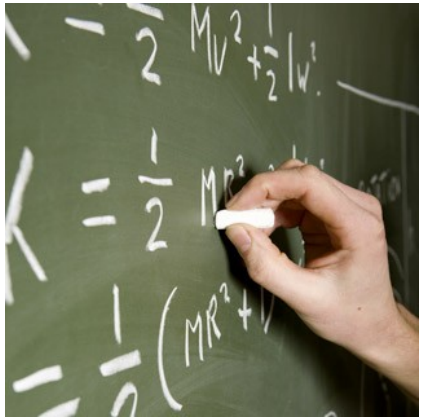
Introduction
The Math Interactive Learning Experience (MILE)

- Discuss the goals MILE
- Discuss the interventions implemented through MILE
- Discuss the efficacy of the MILE interventions



Impairments associated with the effects from prenatal alcohol exposure and MILE

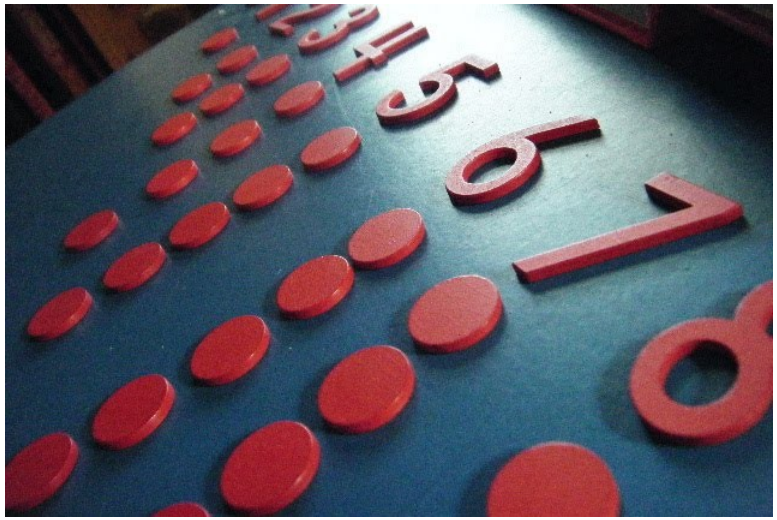
- Global cognitive delays (IQ 70-85)
- Specific Impairments
  - Speed of Processing
  - Encoding
  - Visuo-spatial Processing
  - Working Memory
  - Executive Functions
  - Numerical Processing

- Academic Problems
  - Deficits in mathematics
  - Weaknesses in metacognitive skills
  - Better with rote learning

- Arousal dysregulation
- Reported behavior problems
- Problems with social interactions

Goals of the MILE Program

- To support, educate and empower caregivers
- To achieve learning readiness (Behavior/arousal regulation)
- To Improve mathematical achievement in a known area of deficit often noted in children affected by prenatal alcohol exposure



Study Participants

Target Population

Children ages 3-10; resided with caregiver before and after participation for at least 6 months; recruited from the metropolitan Atlanta and surrounding areas; presented alcohol related dysmorphia (scores >10 on checklist); no evidence of other clinical diagnoses (e.g. PDD-NOS).

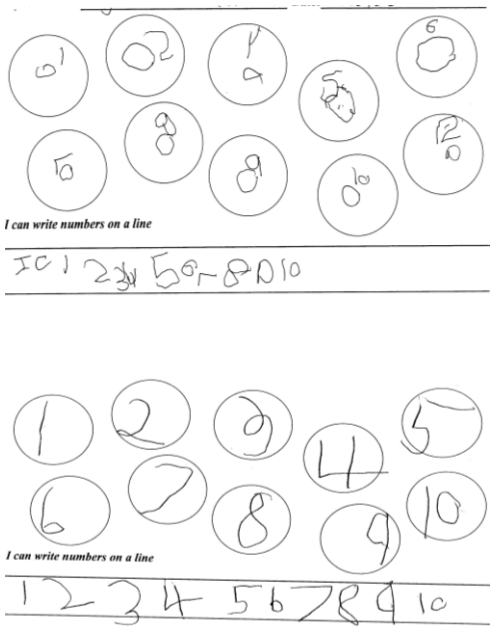
Participants **Number: 61 randomized; 56 completed post-test #1; 53 completed post-test#2**	**Math**	**No Math**
% Male*	51.7	65.4
Age at Enrollment*	6.5 (2.0)	6.2 (2.1)
% African American*	34.5	42.3
Rank Estimating Gross Household Income (6=35,000-49,999)*	6.3 (2.6)	6.08 (2.1)
Pedscore (total dysmorphia)*	16.0 (6.6)	15.1 (7.1)

**p*-value=ns

MILE Study Procedures

- **Children were assigned randomly to one of two groups**
  - Math Intervention
  - Psychoeducational contrast group (no math intervention)

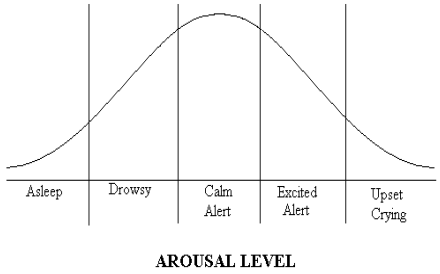
- **Administration of Pre-test/Post-test to measure effects**
  - Academics: parallel measures of the Key Math –R/NU; TEMA-2; math components of the Bracken Basic Concept Scale; Number Writing Measure
  - Behavior: Achenbach Child Behavior Checklist, Parent Form and the Teacher Report Form
  - Satisfaction Survey
  - Post-test administered 4 weeks after intervention completion and at 6 months for follow-up



Number Writing Measure
Post-test example
Child: 6 year, 1 month of age

MILE
Parent Training and Case Management

- **All caregivers attended 2 workshops providing**
  - Information about neurodevelopmental compromise associated with the effects from prenatal alcohol exposure
  - Information on the social learning principals of behavior including:
    - Strategies on ways to decrease behavior problems and increase desired behaviors
    - Strategies to support children's arousal regulation
  - Instruction on how to advocate for services for their children
- **All caregivers received**
  - Access to psychiatric consultations
  - Case management
  - Special Education consultation and support at Individualized Education Program meetings



Math Intervention

- **Math Intervention Group**
  - Curriculum based upon High Scope Program(K-3rd grade)
  - 6 weeks of 1:1 tutoring
  - Parent training and weekly coordinated homework activities
  - Presentations about FASD to children's teachers
  - Special educator consultations

MILE Curriculum Activity Page

MILE

Sorting, Categorizing

Math domain: Number and Operations Level: P Math page 1

Session # _____ Date: _____ Student _____ Tutor _____

Supplies

A box with various things such as pretend fruit and vegetables, household tools, transportation vehicles, little dolls, articles of clothing, and other small toys.

Something to hold the sorted categories, such as manila folders opened up, paper plates or boxes.

Math fun

Sorting and Categorizing

The student will sort the objects according to some category that the two of you will decide upon, for instance, "things we eat," "things we wear," "things we use in the kitchen," or "things we play with."

Variations

Cut (or have the student cut) pictures of different items such as household appliances, tools, toys, or clothing from old catalogs or magazines. The student can make collages by gluing different categories of pictures on a sheet of colored craft paper.

Focus and plan—Act—Reflect

F: Encourage the student to focus his/her attention on the task at hand. Allow the student to get acquainted with the objects by touching and discussing what they are. Then explain that these things need to get sorted. Discuss what "to sort" means. Formulate a plan with the student

Questions: What do we have here? Can you tell me what this is? What does it do? What is it used for? Can you find something that would go with it?

A: The student sorts the items into different groups. While the student does this, observe how he/she sorts and ask him/her to tell you about it.

Questions: How come you put this ..... in the group for ....? How do these go together? What if I put this one over here? Tell me what you are doing? Can you find all the things that ..... and put them in this box? How many are in here? Which one has the most?

R: During and after the activity reflect on what the student is doing/has done.

Questions: How did you sort the different items? What were some of your favorite things to sort? What can you sort at home? What kinds of things does your mom/dad sort at home? Why do you think they do that?

Math Observation Checklist

This activity will give insight into the student's skills of sorting, categorizing, and counting.

Fun Work Activity Page

Parent Review Activity 10

_____ worked on the attached activity today. Today your child worked on his/her visual spatial, working memory, and graphomotor skills by identifying and repeating 2- object patterns using a variety of objects.

Words for the week: Pattern, First, Next.

Plan Allow your child to choose the objects needed to create a 2-object pattern.
Do Your child will create a 2-object pattern.
Review Use same line of questioning as activity sheet.

To reinforce this skill at home, invite your child to help you sort the objects into different groups. Patterns can be made out of such things as blocks, crayons, vegetables, paper, clothes, hair accessories (etc. barrettes, pony tail holders), and anything else you and your child can find in your home. Introduce the word **pattern** and model the task of placing one object on the table or floor followed by a second different one, emphasizing pattern. When an object of the first category is placed ***next,*** have the child guess what object shall be ***next.*** Allow your child to place the object he/she feels will make a repeat pattern. Repeat this with several different objects. Also, ask your child to look at it for a short time and remember the way it looks. Remove the display and ask your child to make the same pattern.

Throughout the rest of the week point out and discuss the different groups of objects in the home. For example, you may emphasize that all furniture go together, clothing, bathroom or kitchen accessories, vegetables, meats, vehicles, etc. Discuss with your child the specific objects that make up the different patterns or groups. Remember to also encourage your child to count the various objects that make each group.

MILE Instructional Approaches in Relation to Deficits Associated with Prenatal Alcohol Exposure

Area of Deficit	Instructional Approach
Speed of Processing	•Individualized pacing and rate of instruction
Visuo-spatial Processing	•Manipulatives to support mental representation with limited interference; concept formation
Integration of Information	•Use of verbal mediation to link discrete visuals with language to support concept formation
Visual-motor Integration	• Number writing using "Handwriting without Tears" (Olsen and Knapton, 2008)
Attention, Working Memory, Encoding	•Frequent review and repetition of information •Instruction on identifying relevant information
Executive Functioning, Metacognitive Skills	•Mediated learning •Use of modified Plan-Do- Review

Outcomes: Readiness to Learn

Comparison of Caregivers' Responses at Pre-test and Post-Test

Variable	Groups		
	Pretest	**Post-test**	***p*-value**
Knowledge of FAS and Advocacy [a]	25.3	26.3	<0.05
Knowledge of behavioral regulation [a]	15.5	17.7	<0.000
CBCL [b-] Total Problems	65.4	62.0	<0.000
CBCL [b-] Internalizing Problems	60.3	56.6	<0.000
CBCL [b-]Externalizing Problems	65.0	60.6	<0.000

[a] Average number of correct choices on multiple choice knowledge questionnaires;
[b]Average T-scores from the Achenbach Child Behavior Checklist(CBCL);Achenbach and Rescorla, 2001)

Kable, Coles, & Taddeo , 2007, p.1413

Outcomes: Comparison of Parent and Teacher Rating at Pretest and Post 2 Testing

Behavioral Measure	Pretest T-Score	Post 2 T-Score
Parent-CBCL		
Internalizing	60.8 (11.1)	56.0 (11.3)
Externalizing	65.5 (10.1)	59.6 (10.0)
Total Problem	66.2 (9.3)	60.8 (9.9)
Teacher-TRF		
Internalizing	55.7 (11.7)	52.6 (11.4)
Externalizing	61.0 (9.4)	59.7 (10.1)
Total Problem	62.6 (9.2)	60.7 (10.3)

Parental responses on the CBCL, resulted in a significant multivariate reduction in behavioral disturbance across age groups and behavioral measures ($F(1,44)=33.7$, $p < .000$; eta-squared=.428). Teacher responses on the TRF, resulted in significant reduction in behavioral disturbances across age groups and behavioral measures ($F(1,40)=5.85$, $p < .020$, eta-squared-.128). A significant multivariate interaction effect was found between time and age group ($F(1,40)=4.23$, $p < .046$, eta-squared=.096). Post-hoc comparisons suggested that the children between 3-5 had a greater reduction in behavioral disturbance than did those in the older age group(5.7 vs 0.5).

Outcomes: Mathematical Skills

Clinically Significant Gains at Post-test 1

	No Math (n=26)	**Math (n=29)**
No Gain	76.9%	41.1%
Gain *	23.1%	58.6%

*(>1 standard deviation on at least 1 measure); $X^2=7.1$, p<.008

Clinically Significant Gains at Post-test 1 and 2

	Psychoeducational Contrast Group	**Math Tutoring**
Post Test 1 Gain [1]	23.1%	58.6%
Post Test 2 Gain [2]	35.8%	64.3%

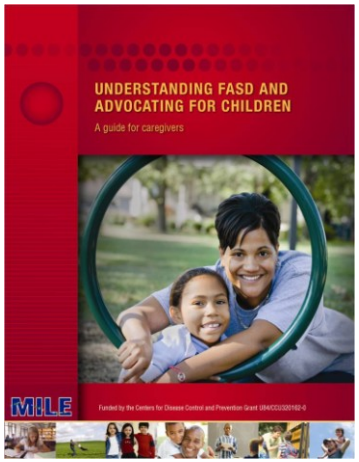
[1] $X^2=7.1$, p<.008; [2] (=3.6, p < .05)

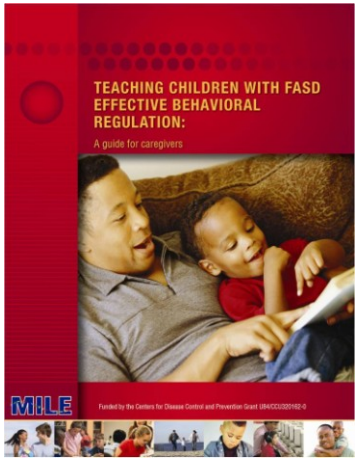
Conclusions

Children with FASD are able to make improvements in learning readiness and behavior when provided interventions that encompass -

- Parent training that provides information about the neurodevelopmental delays associated with prenatal alcohol exposure and the impact on arousal regulation, behavior, learning, and general functioning.

- Parent training to understand the social learning principals of behavior and specific strategies to address challenging behavior.

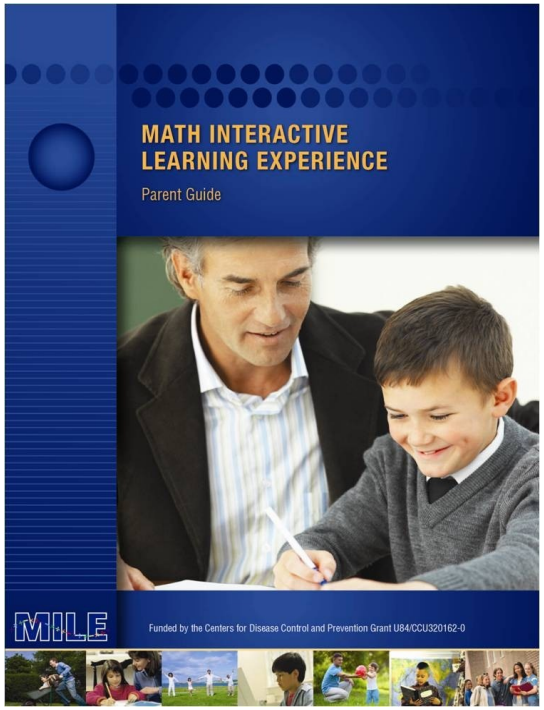




Conclusions

Additionally, children with FASD are able to make improvements in mathematics when interventions include-

- Educational plans that are scaffold according to the children's learning needs.
- Instruction presented in ways to support the underlying deficits associated with the effects from prenatal alcohol exposure.
- Instruction that incorporates metacognitive strategies, ways to integrate information, and frequent review and repetition.



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