Food Friends Get Movin' with Mighty Moves™

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Why Preschoolers

RA SECTION • B Friday, December 31, 2004

STATE & REGION

Obesity soaring among preschoolers

Ten percent of 2- to 5-year-olds are overweight

By Jamie Stengle
Associated Press

DALLAS — The obesity epidemic is reaching down to the sandbox: More than 10 percent of U.S. children ages 2 to 5 are overweight, the American Heart Association reported Thursday.

That is up from 7 percent in 1994, according to the heart association's annual statistical report on heart disease and stroke.

The 10 percent number comes from 2002, the most recent year for which figures are available, and the situation is probably even worse now, said Dr. Robert H. Eckel, president-elect of the heart association and professor of medicine at the University of Colorado.

"These statistics are not anything but alarming," Eckel said.

The prevalence of obesity among adults is well-known, with an increase of 75 percent since 1991. So is the problem with school-age children, reaffirmed by new statistics showing that nearly 4 million children ages 6 to 11 and 5.3 million young people ages 12 to 19 were overweight or obese in 2002.

But the findings among preschoolers are a strong indication that kids' weight problems are beginning even earlier.

"I think that what we're seeing is that obesity is increasing across the board in adults, adolescents and children," Dr. Christopher O'Donnell, chairman of the heart association's statistics committee and associate director of the Framingham Heart Study, which has been following the health of generations of Massachusetts residents.

Experts blame the prevalence of junk food marketed to children, too much TV, and the decline in the number of families who sit down together to eat.

Dr. Sarah Blumenschein, an assistant professor of pediatric cardiology at the University of Texas Southwestern Medical Center at Dallas, said doctors and parents need to watch the weight of even very young children.

"We have a lot of people that think that their kids look cute plump: 'Look at her — she has all those bracelets of fat,' " she said.

Dr. William Cochran, a pediatric gastroenterologist and nutritionist for the Geisinger Clinic in Danville, Pa., said he sees many youngsters in his weight management clinic who weigh 300 to 400 pounds. He is also seeing more and more children with diabetes, high blood pressure, even liver disease.

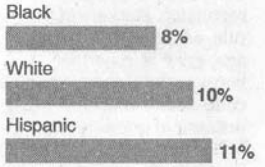
"Some kids are drinking a liter or two liters of soda a day," said Cochran, a member of the task force on obesity for the American Academy of Pediatrics. "In 10 to 30 years, the incidence of heart disease and stroke and diabetes are just going to be astronomical."

Heavy kids

A recent study found that more than 10 percent of U.S. children ages 2 to 5 are overweight – more than a three-percentage-point increase from 1994.

Overweight percentage, 2- to 5-year-olds

Among preschool children, Hispanics were more overweight than others.

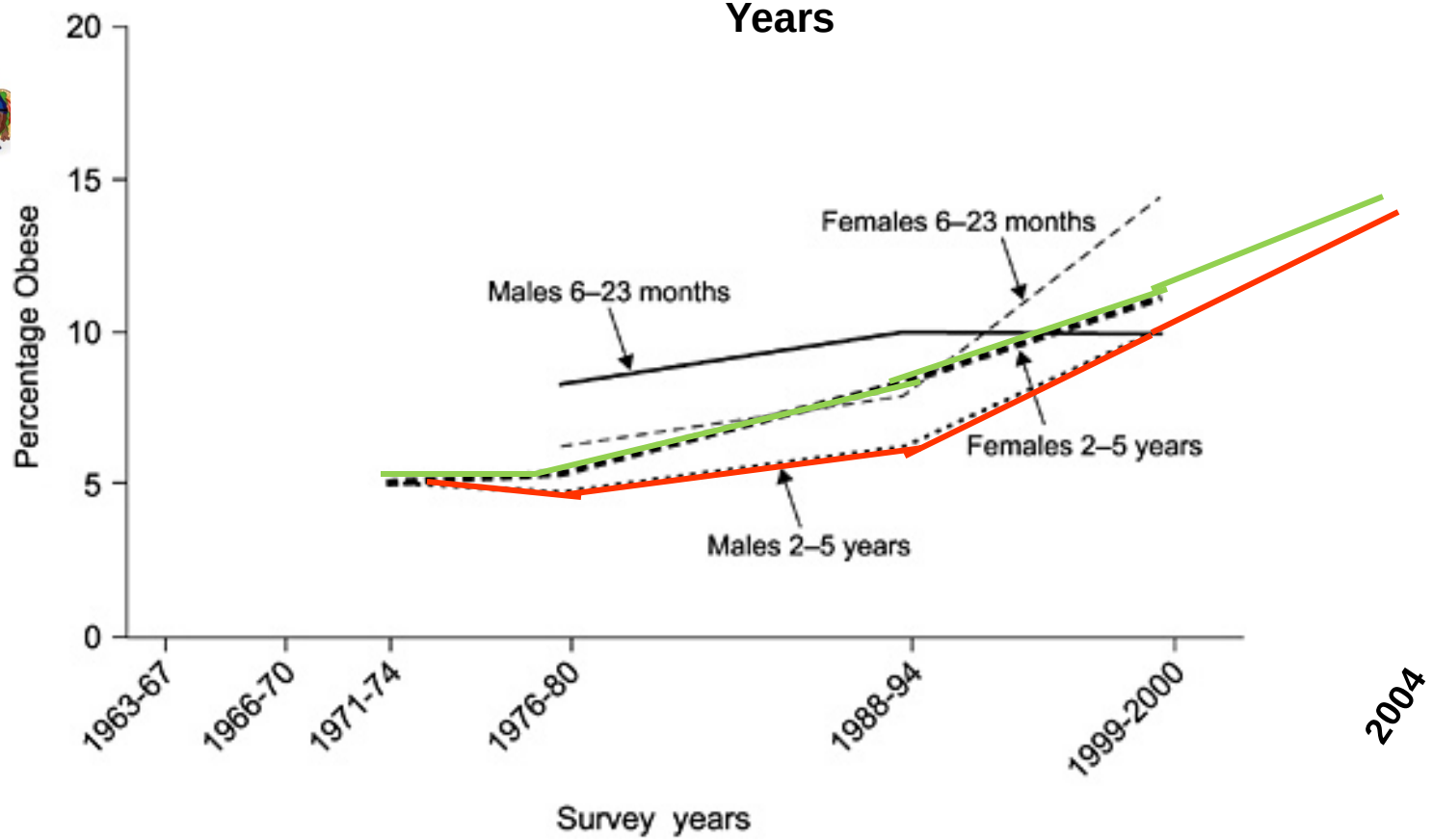


SOURCE: American Heart Association AP

Boulder Daily Camera, 12/31/04

Trends in Childhood Obesity

Trends in Infant and Child Obesity, Boys and Girls Aged 6 Months Through 5 Years



Institute of Medicine. Preventing Childhood Obesity: Health in the Balance, 2004

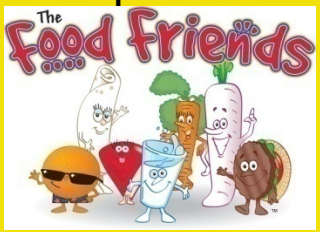
A Void Exists

"To the best of our knowledge, an intervention focusing on nutrition and physical activity to prevent overweight in young children in childcare settings has not been widely used or evaluated."

~Centers for Disease Control, 2004

The Food Friends

Nutrition Component



Classroom

Teacher Training

Parent Component

Physical Activity Component

Mighty Moves

Classroom

Teacher Training

Parent Component

Obesity Prevention Program

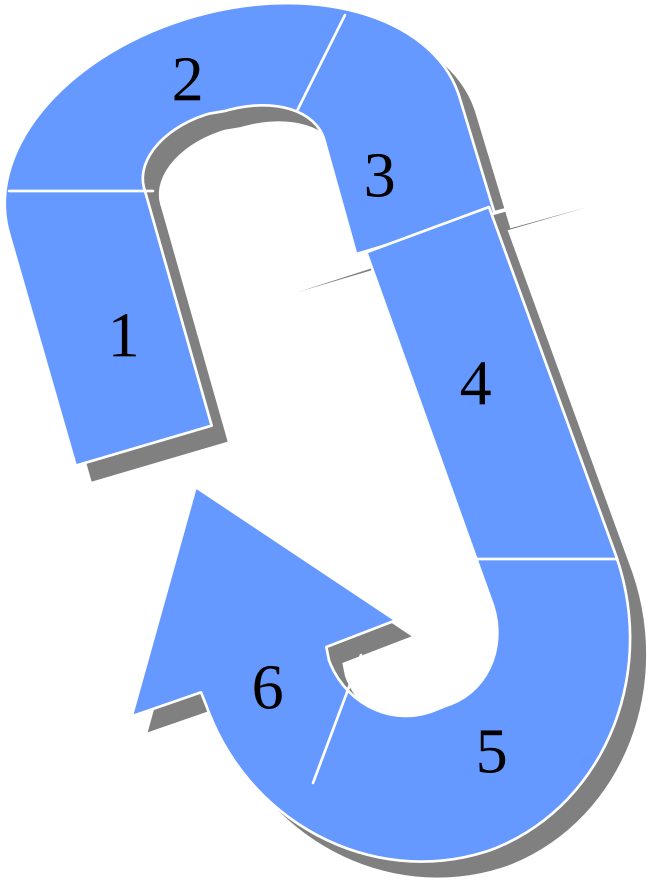
Project Objectives

- Assess if *Mighty Moves*, in conjunction with *Food Friends*, alters the upward movement of BMI in preschool children.

- Explore if *Mighty Moves* improves gross motor skills, physical fitness, and/or physical activity levels of 3- to 5-year olds enrolled in Head Start.

Social Marketing Steps

1. Initial Planning
2. Formative Research
3. Strategy Formation
4. Program Development and Pretesting
5. Program Implementation
6. Evaluation



Grier, S & Bryant, C. *Ann Rev Public Health,* 2005.

Marketing Mix

Product

- Long term
  - Reduce weight gain in young children
- Short term
  - Enhance preschoolers gross motor skills, physical fitness, and physical activity levels

Place

- Head Start classroom environment

Marketing Mix (con't)

Price

- Teachers
  - Time
  - Space
  - Equipment
- Children
  - Discomfort

Promotion

- Superhero theme
- Utilize existing *Food Friends* concepts and characters
- Engage children's imagination, dramatic play
- Design developmentally- and age-appropriate lessons
  - Head Start Child Outcomes
- Package and brand materials
- Provide hands-on teacher training

Program Development

Gross Motor Skill Progression

- Locomotor (skipping, hopping, galloping)
- Stability (balance)
- Manipulative (catching and throwing)

Social Learning Theory

- Constructs built into program lessons, activities and materials

Creative Concepts

- Superhero theme, Mighty Moves, Healthadelphia™

Mighty Moves™

Mighty Moves and Superpowers

Bella Bean

Dancing / Mind Reading

Corrine Carrot

Twisting / X-Ray Vision

Gertie Gouda

Walking / Elasticity

Ollie Orange

Skating / Lightening Quick

Marty Milk

Balance / Super strong

Howie Hamburger

Biking / Transforming

Tina Tortilla

Jumping / Flying

Rudy D Radish

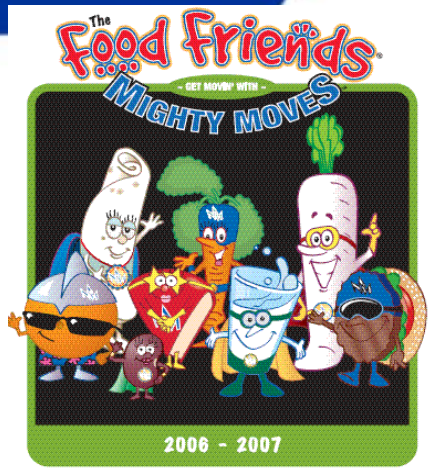
Throwing / Invisible

Creative Concepts

- Each week a character presented their Mighty Moves and Superpowers
- Motor Development activities (progression)
- Imaginary Trips throughout Healthadelphia™
- Musical Journeys
- Caping Ceremony

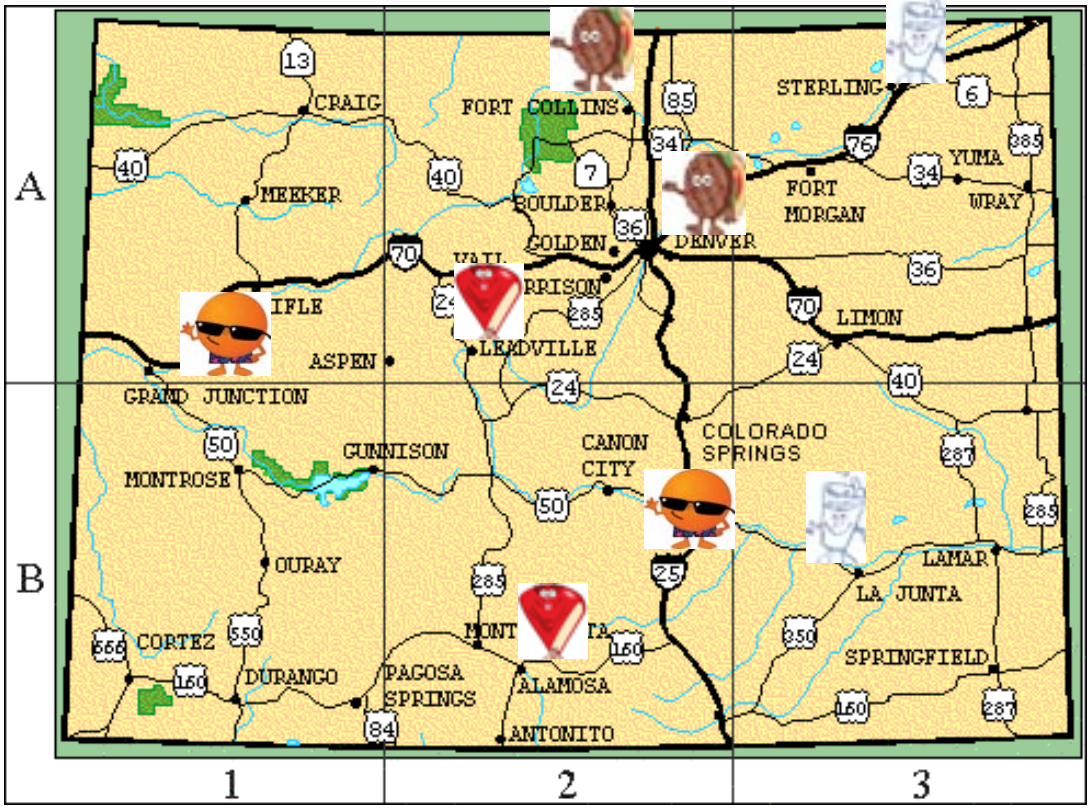
Materials

Music, Polyspots, Curriculum, Flashcards



Study Sites

2x2 Factorial Design



Experimental, Urban Head Start Centers

- RM SER Pueblo Head Start; RM SER Western Slope Head Start

Experimental, Rural Head Start Centers

- The Center (Leadville); CDI Head Start (Alamosa)

Control, Urban Head Start Centers

- Poudre Early Childhood Program (fort Collins); RM SER Denver Head Start

Control, Rural Head Start Centers

- Iliff Head Start; Otero Jr. College Child Development

Program Implementation

- 2006-2007 School Year
- Recruitment & Teacher Training
  - September – October
- Baseline Measures
  - October - November
- Intervention
  - November – April
  - 18 Weeks
- Post-test Measures
  - April - May

Outcome Measures

- Children
  - Height/Weight
  - Motor Skills
  - Physical Fitness
  - Physical Activity – Pedometers
- Parents
  - Height/Weight (self report)
  - Physical Activity – Pedometers
  - Activity Logs and Survey
- Teachers
  - Height/Weight (self report)
  - Physical Activity – Pedometers

On-Site Outcome Measures

Weight Status

- Height (cm) - Portable stadiometer
- Weight (lbs) - Electronic scale

Physical Fitness

- Sit-n-Reach (flexibility)
  - Measured in inches; Best of 3 attempts used in analysis
- Sit-Ups (trunk strength)
  - Number of sit-ups completed in 30 sec
- Shuttle Run (speed and agility)
  - 4 x 30 feet; Time in seconds recorded
- 3-Minute Run (endurance)
  - Number of laps (30 feet) completed in 3 minutes

Oja L, Jurimae,, T. *American Journal of Human Biology.* 1997;9:659-664.

On-Site Outcome Measures (con't)

Gross Motor Skills

- Peabody Developmental Motor Scales
  - 3 Gross Motor Subtests
    - Stability (30 total items: 10 items tested)
    - Locomotor (89 items: 29 items tested)
    - Object Manipulation (24 items: 16 items tested)
- Criterion-based test
    - 2=meets all stated criteria;
      1=partially meets criteria;
      0=does not meet criteria
- Normative-based test
    - Raw scores converted to standard scores & quotient
- Average test time/child = 25 minutes

Folio MR, Fewell RR. *Peabody Developmental Motor Scales, Second Edition.*, 2000.

Physical Activity Evaluation Home Packet

Physical Activity

- Packet included
  - Instructions
  - 2 Walk4Life Classic Pedometers (child and parent)
  - 2 Pedometer logs (child and parent)
  - Physical Activity Survey
- Available in both English and Spanish
- Parents asked to record daily step counts for 6 days (4 weekday, 2 weekend)
- Families compensated $20 for completed packets

Trost SG. *Exerc Sport Sci Rev.* 2001;29(1):326.

Demographics

- N = 263
- Age: ~53 months
- Gender: 55% male / 45% female
- Ethnicity: 60% Hispanic / 30% White
- Rural / Urban: 51% Urban / 49% Rural

Weight Status
Baseline

CDC Weight Classification (%)	Experimental (n=132)		Control (n=131)	
	n	%	n	%
Overweight (>95%)	19	14.4	16	12.2
At risk for Overweight (85.0-94.9%)	34	25.8	29	22.1
Normal Weight	76	57.6	85	64.9
Underweight (<5%)	3	2.2	1	0.8

Motor Skills, Fitness, Physical Activity at Baseline

- No Difference between groups
- No Difference by location
- Motor Skills fell within Average Range
  - Except object Manipulation
- Fitness Tests
  - Difference in Sit-ups
- Physical Activity
  - Daily step counts = 9,509
  - Difference between Weekday and Weekend steps
  - 1 hour MVPA = 13,874 steps
  - 7% of children reaching recommended level of Physical Activity

Cardon & De Bourdeaudhuij, *Pediatric Exercise Science*. 2007;19(2):205

Pre-Post Changes

Controlling for Age, Ethnicity, Gender, BMI, Classroom

Measures	Intervention Group		Control Group		Difference by Treatment	
	n	Post Mean ± SD	n	Post Mean ± SD	*F* value	*p* value
Weight Status						
BMI	96	16.74 ± 1.96	105	16.45 ± 1.73	0.47	0.49
BMI z-score	96	.742 ± .93	105	.662 ± .99	0.34	0.56
Gross Motor Skills						
Gross Motor Quotient*	89	99.31 ± 9.07	98	93.24 ± 9.02	10.58	0.001
Stability Skills**	94	10.8 ± 1.96	101	9.53 ± 2.09	15.58	<.0005
Locomotor Skills**	94	10.4 ± 1.90	101	9.61 ± 1.95	4.12	0.04
Object Manip Skills**	89	8.54 ± 1.80	98	7.55 ± 1.61	1.76	0.19
Physical Fitness						
Sit-n-Reach (inches) †	95	29.02 ± 5.21	104	28.74 ± 4.33	4.72	0.03
Shuttle Run (time)	94	19.65 ± 3.36	102	18.45 ± 2.61	37.45	<.0005
3-Minute Run (laps) †	92	26.71 ± 4.86	102	25.38 ± 5.03	7.33	0.01

2-way ANOVA with covariates. No significant differences existed between groups at pre-test, thus post-test only was used in ANOVA tests.

† Higher scores are desired

*Quotient Normative Score (mean ± SD) = 100 ± 15

** Standard Scores; Subtest Normative Score (mean ± SD) = 10 ± 3

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Covariate Significance

Measures	Covariate Significance (p-values)				
	Class-room	Ethnic-ity	Gender	Age	BMI z-score
Weight Status					
BMI	0.81	0.67	0.40	0.24	
BMI z-score	0.86	0.60			
Gross Motor Skills					
Gross Motor Quotient	0.58	0.70	0.68	<.0005	0.002
Stability Skills	0.15	0.85	0.22	<.0005	<.0005
Locomotor Skills	0.59	0.14	0.86	0.02	0.03
Object Manip Skills	0.42	0.34	0.01	0.21	0.81
Physical Fitness					
Sit-n-Reach (inches)	0.03	0.29	<.0005	0.34	0.43
Shuttle Run (time)	<.0005	0.95	0.12	<.0005	0.04
3-Minute Run (laps)	<.0005	0.71	0.14	<.0005	0.001
Physical Activity					
Mean Step Count - All	0.29	0.44	0.82	0.79	0.31
Mean Step Count - Week	0.17	0.46	0.98	0.54	0.19
Mean Step Count - Weekend	0.84	0.44	0.83	0.90	0.59

2-way ANOVA with covariates

Outcomes by Age

Treatment Group only

Measures	Age					
	3 year olds (n=28)		4 year olds (n=51)		5 year olds (n=15)	
	Mean Difference ±SD	p-value	Mean Difference ±SD	p-value	Mean Difference ±SD	p-value
Weight Status						
BMI	-.29 ± .93	0.11	.34 ± .59	<.0005	.62 ± .71	0.005
BMI z-score	-.12 ± .60	0.3	.25 ± .50	0.001	.21 ± .37	0.05
Gross Motor Skills						
Gross Motor Quotient	9.08 ± 9.54	<.0005	6.65 ± 8.73	<.0005	-2.87 ± 8.37	0.21
Stability Skills	2.43 ± 2.81	<.0005	.47 ± 1.99	0.10	-.53 ± 2.48	0.42
Locomotor Skills	1.71 ± 2.07	<.0005	1.26 ± 2.21	<.0005	-.07 ± 1.49	0.87
Object Manip Skills	.64 ± 1.96	0.12	1.51 ± 1.99	<.0005	-.73 ± 2.63	0.30
Physical Fitness						
Sit-n-Reach (inches)	1.64 ± 6.04	0.16	.15 ± 3.44	0.75	.40 ± 3.70	0.68
Shuttle Run (time)	-4.27 ± 7.13	0.004	-2.05 ± 3.06	<.0005	-2.06 ± 2.98	0.02
3-Minute Run (laps)	2.34 ± 5.3	0.03	2.08 ± 6.35	0.03	-1.54 ± 5.47	0.31

Paired t-tests controlling for treatment and age at baseline

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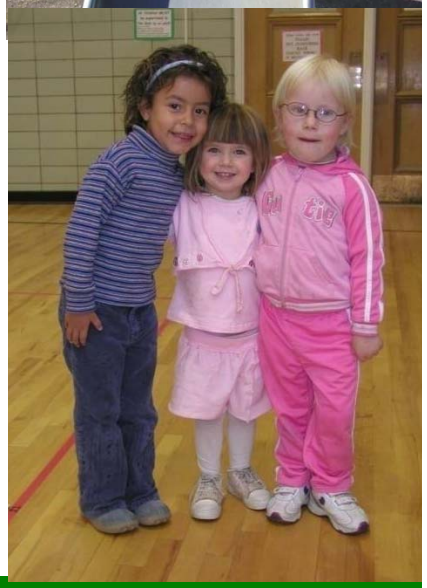
Outcomes by Weight Status

Measures	Weight Status†			
	normal weight (n=56)		overweight (n=46)	
	Mean Difference±SD	p-value	Mean Difference±SD	p-value
Weight Status				
BMI	.16 ± .58	0.04	0.06 ± 1.04	0.71
BMI z-score	.18 ± .44	<.001	.07 ± .27	0.24
Gross Motor Skills				
Gross Motor Quotient	7.09 ± 10.01	<.0005	1.55 ± 9.02	0.26
Stability Skills	1.18 ± 2.84	<.001	-.17 ± 2.44	0.64
Locomotor Skills	1.34 ± 2.34	<.0005	.77 ± 1.7	0.003
Object Manip Skills	1.13 ± 1.86	<.0005	.36 ± 2.53	0.35
Physical Fitness				
Sit-n-Reach (inches)	1.29 ± 4.44	0.03	-.21 ± 4.03	0.73
Shuttle Run (time)	-3.17 ± 5.04	<.0005	-3.33 ± 5.62	<.0005
3-Minute Run (laps)	1.68 ± 5.57	0.03	1.39 ± 6.26	0.14

Paired t-tests controlling for treatment and weight status at baseline

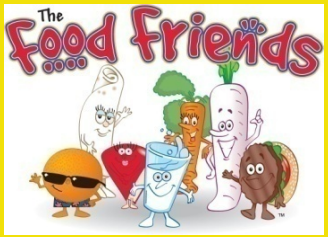
Discussion

- Mighty Moves™ well accepted by teachers and kids
- Target audience input at each stage critical to success
- Dose adequate for increasing motor skills and fitness but not physical activity
- 18 weeks not long enough to see significant changes in weight (BMI)



Conclusion

Food Friends



Mighty Moves

Increase Willingness to Try New Foods

Increase Gross Motor Skills and Physical Fitness

Establish Healthy Habits to Prevent Future Weight Gain

Future Recommendations

- Communicate findings to target audience
- Continue data analysis
  - Teacher and parent influence on child outcomes
- Longitudinal Study
- Enhance teacher training
- Modify Lessons

Funding

- USDA CSREES NRI Grant # 2005-35215-15386

- DHHS Administration for Children and Families, Office of Head Start, Doctoral Student Scholarship

Acknowledgments

Research Team

- Jennifer Anderson, PhD, RD
- Cathy Kennedy, PhD
- Patti Davies, PhD, OTR
- Leslie Beckstrom
- Alena Clark
- Sue Gould
- Naomi Jimenez
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Questions