EFFECT OF THE EDUCATE 2B YOGA AND MINDFULNESS PROGRAM ON CHILDREN WITH AUTISM SPECTRUM DISORDER IN THE SCHOOL SETTING

Presented BY:
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LEARNING OBJECTIVES
By the completion of this presentation learners will be able to:

- Define Autism spectrum disorder (ASD)
- Recognize how ASD effects childrens’ ability to function in the classroom setting
- Explain the benefits of yoga and mindfulness in the classroom setting
- Describe the Educate2B Yoga and Mindfulness Program
- Summarize the findings of this pilot study on the effects of the Educate 2B Yoga and Mindfulness program on children with ASD
- Discuss potential future directions for researching the effects of yoga and mindfulness on this population
Allison Morgan MA, OTR, E- RYT- Creator of the Educate 2B program. No relevant financial relationships to disclose.

Jill S Horbacewicz PT MA PhD: No relevant financial or non-financial relationships to disclose
The Touro College School of Health Sciences began in 1972. The School now has an enrollment of approximately 1000 and consists of the following health professional education programs:

- Nursing (BSN)
- Occupational Therapy (MS – 2 campuses)
- Physician Assistant (BS and MS- 3 campuses)
- Speech and Language Pathology (MS)
- Behavioral Health
- Doctor of Physical Therapy (2 campuses)
- All DPT students participate in faculty driven research studies
Autism Spectrum Disorder (ASD) is a general term for a group of complex disorders of brain development. Diagnostic Criteria include:

• Persistent deficits in social communication and social interaction across multiple contexts
• Restricted, repetitive patterns of behavior, interests, or activities

(DSM-5) (Autism speaks)
INTRODUCTION

BACKGROUND-ASD

ASD
Diagnosis for three neurodevelopmental disabilities:

- Autistic disorder
- Pervasive developmental disorder not otherwise specified
- Asperger syndrome
INTRODUCTION
BACKGROUND-ASD

STATISTICS: According to the CDC as of 2014, 1 in 68 children were diagnosed with ASD (1 in 42 boys and 1 in 189 girls)
INTRODUCTION
BACKGROUND-ASD

CHALLENGES WITH ASD

- **Communication** - may be non-verbal, misses auditory directions, do not recognize body language, literal, may need visual cues
- **Behavior** - ritualistic and compulsive behaviors (may be self injurious), repetitive play, poor attention
- **Motor Performance** - delays in gross/fine motor development including balance, coordination, dexterity
- **Social** - little or no eye contact, resists physical contact, difficulty reading facial expression or body language, difficulty expressing empathy, rules of conversation
- **Sensory** - hyper and hypo sensitivities
- **Academic** - range of difficulty learning basic skills to being gifted in a particular area, delayed gross and fine motor skill development, rigid thinking, difficulty with transitions, does not like changes in routine
YOGA - Form of exercise that combines various breathing techniques, body postures, meditation and relaxation
INTRODUCTION

BACKGROUND - YOGA/MINDFULNESS

RESEARCH FINDINGS:

- Enhances focus, attention, concentration, comprehension and memory Case-Smith et al., 2010; Ehud et al., 2010; Pradhan & Nagendra, 2010; Napoli et al., 2005; Manjunath & Telles, 2004; Quach et al., 2015

- Improves stress management Miller et al., 2014; Raes, F., Griffith, J. W., Van der Gucht, K., & Williams, J. M. G. (2014)

- Reduces anger, depression, and fatigue Felver et al., 2015

- Eases anxiety and tension Frank et al., 2014; Noggle et al., 2012

- Enhances resilience and coping skills Khalsa et al., 2012; Ramadoss & Bose, 2010; White, 2012

- Improves emotional and behavioral regulation Bergen-Cico et al., 2015; Razza et al., 2013

- Supports social and emotional learning Gueldner & Feuerborn, 2015

This is my "Depressed Stance"

When you're depressed, it makes a lot of difference how you stand...

The worst thing you can do is straighten up and hold your head high because then you'll start to feel better...

If you're going to get any joy out of being depressed, you've got to stand like this.
Conclusion: Yoga has positive effects on behavior and motor skills

- Powel et al, 2008
  The Self Discovery Program
  - 126 children with emotional, behavior, and learning difficulties
  - 45 minutes of yoga therapy
  - ↑ attention span, listening skills, and relaxation

- Berger et al, 2009
  The Bent on Learning Program
  - 32 children in 4th and 5th grade
  - 1 session per week
  - ↓ aggression and improved well-being

- Bubela et al, 2012
  Yoga with Preschoolers
  - 27 children between three and five years old
  - 20 minute session 1x/wk for 6 weeks
  - ↑ static balance, functional LE strength, flexibility and coordination
INTRODUCTION

REVIEW OF THE LITERATURE

Effects of yoga on children with ASD

Buckley-Reen et al, 2013
Get Ready to Learn\(^6\)
Program

Radhakrishna et al, 2008
Yoga and preschoolers\(^7\)

Conclusion: Yoga has positive effects on behavior and motor control in children with ASD

- ↑ independence, attention span and self-regulation
- ↑ in communication, behavior and motor control
Practical interventions are needed to help children with ASD in the classroom due to ↑ prevalence.

Gap in the literature regarding the effects of yoga on behavior and motor skills in children with ASD.

Current yoga programs are not practical for the classroom setting either due to time, space, and/or knowledge of teacher.

Studies thus far have small sample sizes and no control groups.
30 BREATHE, MOVEMENT and MINDFULNESS exercises to help students develop:
self regulation, focus and resilience

Completed as short 2 minute breaks throughout the school day (seated or standing – no mats needed)
INTRODUCTION

BACKGROUND-EDUCATE 2B

Calm, Energized, Focused, Connected and Ready to Learn
**CENTER (BELLY) BREATH**

**How it Works**

When we breathe into our belly, the lower lobes of our lungs expand. The lower lobes activate our parasympathetic nervous system and engage a "relaxation response." Our brain receives a message that "all is well, so relax and be calm." That message then gets sent to the rest of the body. When we are stressed or worried, our breath becomes trapped in the upper lobes of the lungs, only filling the upper chest/upper region of the chest. When this occurs, our primitive brain (right brain) turns on. Our reactions become reflexive and habitual. When the body is relaxed, the thinking part of our brain (pre-frontal cortex) is activated, allowing us to create, plan and organize in a rational and reflective way.

**States of Being**

- Calm
- Connected

**What to do**

- Sit up tall, stand, or lay on your back keeping your spine long and straight.
- Place your hands on your belly. If you are laying on the floor, you can also place something on your belly such as a stuffed animal, toy bag, small weightbook, etc. just to add a little resistance to help you "feel" the movement of your belly as you breathe.
- As you breathe in through your nose, feel the center of your body fill with air. If you are laying on your back, your belly will rise towards the ceiling. If you are standing or sitting, your belly moves away from your spine.
- As you exhale through your nose, feel the center of your body pull together. If you are laying down on your back, your belly sinks into the ground. If you are standing or sitting, your belly pulls in towards your spine.

You may wish to add an affirmation to your breath. As you **INHALE**, say to yourself, "I am." As you **EXHALE**, say an alternative word to yourself such as, "calm, safe, happy, confident".

Try counting your inhales for a full minute.

How many times did you inhale? Can you show it down?

"As you breathe in, cherish yourself. As you breathe out, cherish all beings." — Dalai Lama XIII

**Notes:**
To examine the effect of two minute yoga and mindfulness based sessions within the classroom setting on motor performance and social-emotional skills on elementary school children with ASD
PRESENTATION OVERVIEW

INTRODUCTION

METHODS
Subjects
Functional Outcome measures
Procedures
Data Analysis

RESULTS

DISCUSSION
METHODS

SUBJECTS

Inclusion Criteria
• Diagnosed with ASD
• Grades 2-6

Exclusion Criteria
• Unable to participate in physical activity based on school criteria
• Over age 12
• No parental consent
METHODS
FUNCTIONAL OUTCOME MEASURES: DESSA-MINI

Measures Socio-emotional Intelligence of Children. 8 measures.
METHODS

FUNCTIONAL OUTCOME MEASURES: DESSA-MINI

Excellent internal reliability (range = .924) and is good construct validity\(^9\)
METHODS
FUNCTIONAL OUTCOME MEASURES: MABC-2

Measures fine and gross motor function in children ages 3-17
The second age band (ages 7-10) was used in this study

•Eight items categorized into 3 subsets:
  - Manual Dexterity
  - Catching and Aiming
  - Balance
METHODS
FUNCTIONAL OUTCOME MEASURES: MABC-2

Test-retest Reliability:
Interclass Correlation Coefficient of 0.97\textsuperscript{10}

The second age band (ages 7-10) was used in this study

In therapeutic practice, the second age band of the MABC-2 has construct validity\textsuperscript{11}
METHODS
PROCEDURES

- IRB approval (HSIRB1509)
- Informed consent from:
  - The superintendent of the Bergen County, NJ school system
  - Teachers
  - Parents, along with demographic questionnaire
- Verbal assent from children
- Approval from school attorneys
METHODS
PROCEDURES

- Two classes were assigned to each group:
  - 9 students in experimental group
  - 11 in control group

- Teachers of experimental group were Trained in the Educate 2B program by participating in a full day Educate 2B course
METHODS
PROCEDURES

- Teachers were instructed to select from a pool of 15 of the Educate 2B techniques- 5 breath, 5 movement and 5 mindfulness

- Each activity lasted 2 minutes, and was given 3x/day with a 6 minute commitment per day

- Kept a log of which strategies they chose to use each day
## METHODS

### PROTOCOLS

Worksheet for teachers to document which techniques were utilized with the students receiving the Educate 2B Yoga and mindfulness intervention.

<table>
<thead>
<tr>
<th>TOOL / ACTIVITY</th>
<th>M</th>
<th>T</th>
<th>W</th>
<th>TH</th>
<th>F</th>
<th>BEHAVIORAL OBSERVATIONS</th>
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<tbody>
<tr>
<td>Center (belly) Breath</td>
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<td>Sun Breath</td>
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<td>Power Breath</td>
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<td>Dragon Breath</td>
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<td>Candle Breath</td>
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<td>Twisters</td>
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<td>I AM swings with affirmations</td>
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<td>Balance: Tree or Airplane</td>
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<td>Folding Star</td>
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<td>Warrior with affirmations</td>
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<tr>
<td>Melting Butter</td>
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<tr>
<td>I AM meditation with an affirmation</td>
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<tr>
<td>Healing Heart</td>
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<td>Amazing Me</td>
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<tr>
<td>Floating Balloon</td>
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METHODS
PROCEDURES

• Participants were assessed twice using the DESSA-mini and MABC-2
  • Pre-test at beginning of school year
  • Post-test 11 weeks later
METHODS
PROCEDURES

• DESSA-mini graded by participants’ teachers
  • Teachers blinded to DESSA-mini being part of study
• MABC-2 graded by physical therapist
  • PT was blind to control vs. experimental group
METHODS
DATA ANALYSIS

- Descriptive statistics to describe and analyze demographic data and variables
- SPSS Version 22
- All data was analyzed at the .05 level of significance.
- Mann-Whitney U test: determined differences between groups
- Wilcoxon-signed rank test: determined differences within groups
RESULTS

- 18 M 2 F

Level of Autism

- 3 SEVERE
- 6 MILD
- 11 MODERATE
RESULTS

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Count</th>
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<tbody>
<tr>
<td>African American</td>
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</tr>
<tr>
<td>Asian</td>
<td>4</td>
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<tr>
<td>Caucasian</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>3</td>
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</tbody>
</table>
RESULTS

AGE

7 8 9 10 11 12

1 1 3 4 2 1
No significant difference between the experimental group and control group ($p > 0.05$)
RESULTS: DESSA-MINI

- Significant difference within the experimental group from pre- to post-test DESSA-mini (p = 0.034)
RESULTS: MABC-2

- Significant difference between groups post-test ($p = .035$)
DISCUSSION
KEY FINDINGS-MOTOR CONTROL

- There was a significant difference between groups when comparing the control and experimental groups in pre test and then in post test.
- The experimental group had no significant difference from pre to post.
- The control group experienced a decrease in score.
DISCUSSION

KEY FINDINGS-SOCIAL-EMOTIONAL BEHAVIOR

• There was no significant difference between groups when comparing the control and experimental groups in pre test and then in post test.

• When looking at the scores of the experimental group from pre to post, there was a significant difference with an increase in DESSA scores.
RESULTS

Significant difference between control and experimental groups post intervention for the MABC-2 with decrease in control

Radhakrishna et al, 2010, found a significant increase in gross motor skills.
RESULTS

- Significant improvement within experimental group for the DESSA-mini

Significant increase in the attention, social behavior, and emotional stability of children who received a yoga intervention

- Rosenblatt et al, 2011
- Radhakrishna et al, 2010
- Buckley-Reen et al, 2013
MABC-2 instructions are difficult for children with severe ASD to follow

Sample of convenience

Small sample size

Teachers were not blinded to which group received the intervention

Teachers did not return activity logs

There was no control of the therapies the participants received in and out of school
DISCUSSION
FUTURE STUDIES

- Control for level of severity so groups are more equivalent
- Larger sample size
- MABC-2 best for children able to follow instructions
DISCUSSION: CLINICAL RELEVANCE

Existing yoga interventions for children with ASD are not conducive to the classroom setting.

Children with ASD have cognitive impairments that impede their ability to learn in the classroom.

- Educate 2B Yoga and Mindfulness Program is a practical intervention.
- This intervention may improve behavior and motor function to optimize learning.
REFERENCES


Morgan A, Zensational Kids. Educate 2B Yoga and Mindfulness Program.


REFERENCES

THANK YOU

questions?