



WARRIOR STRONG



WAYNE STATE
UNIVERSITY

PLANE: A Community-based health intervention for children with autism and their caregivers

Chandler Wentz¹, Leah Ketcheson¹, Franziska Loetzner¹



¹ Wayne State University



Introduction

- Chandler Wentz, PhD, BCBA-D, LBA:
 - BCBA-D at Carlyle Center, Grosse Pointe Woods, MI
 - Co-Host of podcast titled: Chandler&
 - Adjunct Professor of Kinesiology, Health, and Sport Studies at Wayne State University in Detroit, MI
 - Today we will discuss some of the research that has come out of the HAPPY Lab under Dr. Leah Ketcheson
- Objective for today:
 - The attendee(s) will gain new knowledge regarding two effective health interventions for children with autism spectrum disorder & understand the importance of including a caregiver component.



Physical Literacy And Nutrition Education

Child with
ASD



Primary
Caregiver



Autism Spectrum Disorder (ASD)



Why PLANE is needed for Children?

- Toddler/Preschool Aged:
 - Gross motor delays in autistic toddlers emerge as early as 1 year of age & continue to increase between 2-3 years of age (Lloyd et al., 2013)
 - By 4 years of age, autistic children achieve significantly lower gross, fine, and total motor quotients when compared to peers of similar age (Provost et al., 2007)
 - 68% of autistic children qualified for early intervention by 3 years of age based on their motor delay alone (Provost et al., 2007)
- School Aged:
 - By school age, autistic children perform fundamental motor skills with similar levels of competence as children half their chronological age (Stapled & Reid, 2010)



Why PLANE is needed for Children?

- Children with Autism Spectrum Disorder (ASD) experience greater health disparities and unmet health needs when compared to children with other disabilities and children without disabilities (Karpur et al, 2019)
- Children with ASD have:
 - Higher rates of obesity (Curtin et al., 2014)
 - Have lower levels of physical activity (PA) (Gehricke et al. 2020, MacDonald et al. 2011)
 - Lower levels of health-related physical fitness (Staples et al. 2020)



Why PLANE is needed for Caregivers?

- Caring for a child with ASD presents itself with burdens (DePape, 2015)
- Families with children on the autism spectrum consistently report high levels of parenting anxiety, psychological distress, and dysfunctional interactions (Estes et al., 2013; Lecavalier et al., 2006)
 - Also report low levels of Quality of Life (QoL) when compared to other populations (Vasilopoulou et al., 2016)



PLANE: A health promotion program



- **Objective:** To promote positive trajectories of health for autistic children and youth as well as their caregivers throughout a 2 year* longitudinal community-based program
- **Location:** Wayne State University, Detroit, MI
- **Coaches:** Health & physical education (HPE) students completing internship hours in required coursework, worked 1:1 with participants
- **Lead Coaches:** Doctoral students studying adapted physical activity (PA) and assisted with curriculum development and led program delivery

** 1 year virtual & 1 year in person*



Groups

“Gliders”- Ages 2-5 → Fundamental Motor Skills

“Propellers” – Ages 6-10 → Team Sports

“Boeings” – Ages 11-16 → Lifelong fitness

“Flight Attendants” – Caregivers → Increasing PA



Virtual Programming

Methods

- Families of autistic children in Detroit, MI participate in a 12-month virtual health program
- The focus was to promote PA among the child-caregiver dyad

Dosage

- The program included weekly PA via Zoom, 30 minutes long
- PA of the dyad was measured at 4 different time periods across the 12-month program



Virtual Programming

Asynchronous



Synchronous



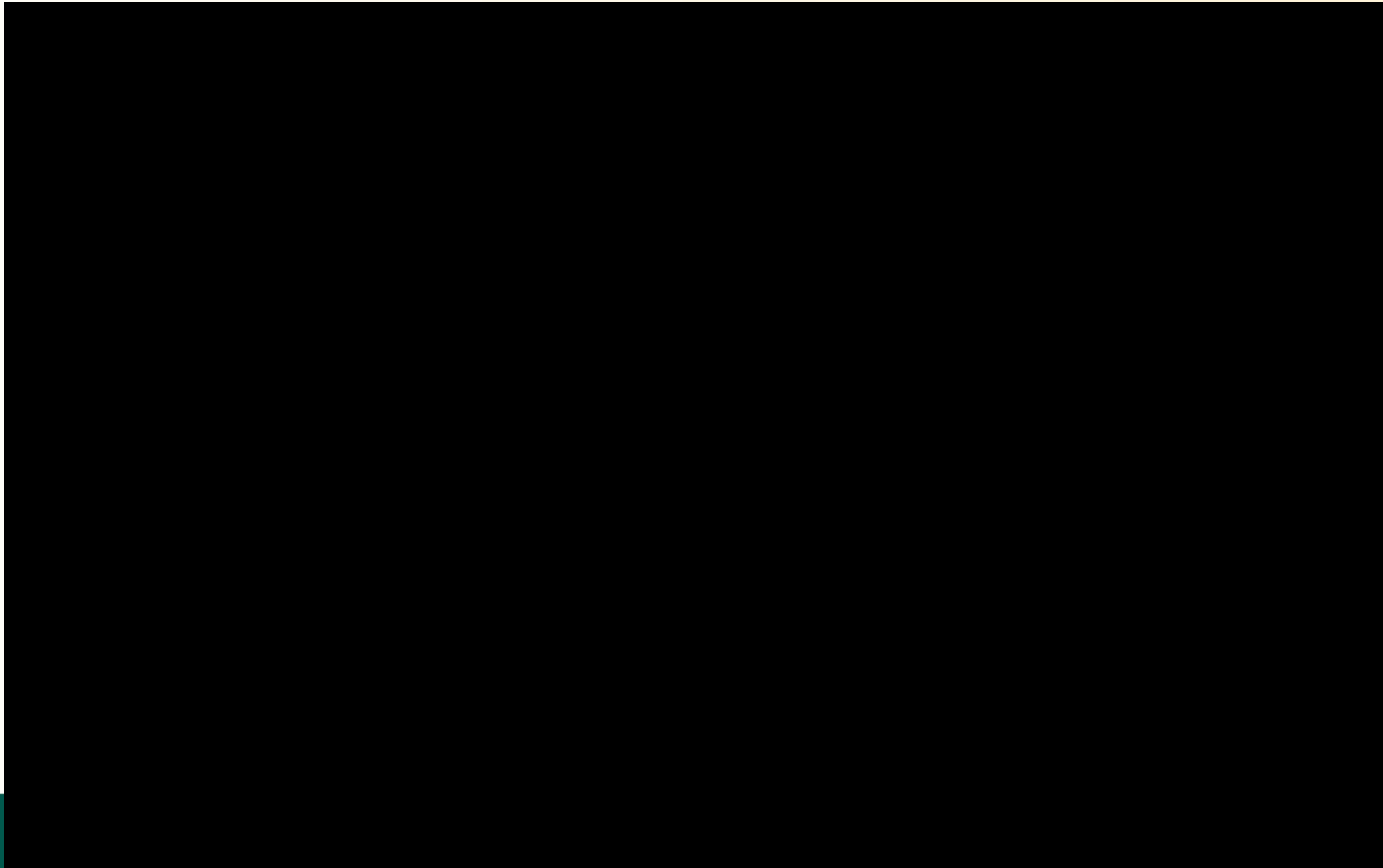
Virtual Programming: Gliders (Asynchronous)



Virtual Programming: Gliders (Synchronous)



Virtual Programming: Propellers



Results: Demographics

- 29 families participated as child-caregiver dyads
 - Children with Autism
 - 97% male
 - Age: 8.36 +/- 3.68 years
 - Primary caregiver
 - 76% female
 - Age: 40.55 +/- 9>54 years
- Weekly participation by families was 85.86%



Results: Children & Caregivers

- The virtual PA program was effective for both children and caregivers
 - Significantly increased reported PA levels and high program adherence
- Children→
 - Reported PA for children increased significantly during the program ($p=.002$)
- Caregivers→
 - Reported PA for caregivers also increased significantly during the program ($p=.002$)

* $p<.05$



In-Person Programming

Methods

- Families of autistic children in Detroit, MI
- 12-month community-based program
- The focus was to promote positive trajectories of health among the child-caregiver dyad



Dosage

- Weekly 1-hour PA session
- Weekly 30-minute nutrition education lesson



In-Person: Physical Literacy/Physical Activity





College of Education

Teaching Candidate Name: Wentz School: PLANE-Gliders Students' Grade Level: 2-5yrs Time needed: 1.5 mins
Subject/Content Area of Lesson: Fundamental Motor Skills Lesson Identifier (title/unit): Hop & Kick

LEARNING OUTCOMES (Rubric items- & connect to INTASC/Danielson)	
STANDARDS ADDRESSED: Standard 1.1, 1.7,1.8,1.10,1.12, 1.18, 1.19, 1.21: Demonstrates competency in a variety of motor skills and movement patterns. Standard 2.1, 2.2, 2.3: Applies knowledge of concepts, principles, strategies, and tactics related to movement and performance Standard 3.2: Demonstrates the knowledge and skills to achieve and maintain a health-enhanced level of physical activity and fitness Standard 4.1-4.6: Exhibits responsible personal and social behavior that respects self and others	
OBJECTIVES & OUTCOMES	ASSESSMENTS: FORMATIVE & SUMMATIVE
<ol style="list-style-type: none">Students will be able to hop forward on each leg using correct form at least 1x (Psychomotor)Students will be able to kick the ball using correct form at least one time (Psychomotor)Students will be able to work effectively with their partner during "all hands-on deck" and complete 50% of the tasks in the time given (Affective)Students will be able to add single digits together and identify if a number is odd or even during the Even Kicks and Odd Hops activity (Cognitive) Objectives for Differentiated Instruction <ol style="list-style-type: none">Students that are unable to hop forward on each leg using correct form will be instructed to focus on practicing balancing and seeing how long they can balance for.	<ol style="list-style-type: none">The instructor (coach) will assess students' ability to hop forward using correct form at least 1x by tracking with the task card.The instructor (coach) will assess students' ability to kick the ball using correct form by tracking with the task cardThe instructor (coach) will assess students' ability to work effectively with their partner using an observation checklist.The instructor (coach) will assess students' ability to add single digits and recognize an even or odd number using an observation checklist. Assessments for Differentiated Instruction <ol style="list-style-type: none">Students that are unable to hop forward on each leg using correct form will be assessed on their ability to balance.
THE LEARNER & LEARNING ENVIRONMENT	STRATEGIES FOR STUDENT SUPPORT & SUCCESS
STUDENTS: Students are ages 2-5 with ASD of varying diagnoses. Most students are residents of the City of Detroit. All students will have completed at least 14 weeks of online programming targeting their fundamental motor skills with the lead instructor prior to the start of in-person programming. Majority of the students will have	STUDENTS: Students will be paired 1:1 with a coach in order to provide individualized support when needed. Students and coaches will have access to large group and small group instruction as well as various visuals (Task cards, whiteboard examples, instructor models) throughout the entire session. Students require extra care and

Directions

- Complete each task.
- Shade in the numbered star as you complete the task

Key Words

Flip over for key words and images

- Practice balance on left foot for 5 seconds. Repeat 3x.
- Practice balance on right foot for 5 seconds. Repeat 3x.
- How many times can you hop forward on your left foot? _____
- How many times can you hop forward on your right foot? _____
- Find a poly spot (5ft away) facing the wall. Kick ball against wall 10x
- Find a poly spot that is a farther away (10 ft) facing the wall. Kick ball against wall 10x



In-Person: Fitness (topic = balance)



In-Person: Nutrition Education & Snack



Office on the web Frame

Funded by the MICHIGAN HEALTH
ENDOWMENT FUND

VANILLA FRUIT SALAD

SERVES: 1 / PREP TIME: 10 MIN. / COOK TIME: 0

INGREDIENTS:

Strawberries
Pear
Apple
Grapes
Vanilla Instant Pudding
Lemon Juice

DIRECTIONS:

1. Cut all fruit up into bite-sized pieces.
2. Toss the fruit that browns in a little lemon juice and drain.
3. Mix all fruit together in a large bowl.
4. Gradually add 2 Tbsp of Vanilla Instant Pudding Powder on top and mix thoroughly.
5. Go outside and enjoy!

Red-coloured fruits keep your heart strong. Orange-coloured fruits tend to keep your eyes healthy. Yellow-coloured fruits prevent you from getting sick. Green-coloured fruits help in making your bones and teeth strong. Purple and blue fruits help enhance memory.





College of Education Teaching Candidate Name: Katie School: WSU - Gliders Students' Grade Level: 2-5 years Time needed: 30 minutes Subject/Content Area of Lesson: Nutrition Lesson Identifier (title/unit): Fantastic Food Jugglers

LEARNING OUTCOMES (Rubric items- & connect to InTASC/Danielson)	
STANDARDS ADDRESSED: NHES- Standard 1, 5,6 Michigan Health Education Expectations- Kindergarten Standard 1: 1.1,1.5	
OBJECTIVES & OUTCOMES	ASSESSMENTS: FORMATIVE & SUMMATIVE
1. Students will become familiar with many different kinds of healthy snacks. 2. Students will be able to sort foods into the different MyPlate categories.	Students will be assessed by the lead coach and individual coaches through direct observations, permanent projects (worksheets), and various types of large group discussions participation. Lead coach and 1:1 coaches will connect following the completion of each nutrition session to discuss athlete participation, understanding of the topic, and future steps (review appendix for checklist)
THE LEARNER & LEARNING ENVIRONMENT	STRATEGIES FOR STUDENT SUPPORT & SUCCESS
STUDENTS: Students are ages 2-5 years old with ASD of varying diagnoses. Most students are residents of the City of Detroit. All students will have completed at least 14 weeks of online programming targeting their fundamental motor skills with the lead instructor prior to the start of in-person programming. Majority of the students will have been enrolled in the PLANE program for one full year of online programming and 12 weeks of in-person programming.	STUDENTS: Students will be paired 1:1 with a coach in order to provide individualized support when needed. Students and coaches will have access to large group and small group instruction as well as various visuals (Task cards, whiteboard examples, instructor models) throughout the entire session. Students require extra care and vigilance when it comes to differentiated instruction due to varying ASD diagnoses. Students will be enthusiastic about being in-person and active after participating in online programming for at least 14 weeks and it is important to harness that enthusiasm. However, nutrition education is occurring following an hour of PA so athletes may be tired and starting to fade.



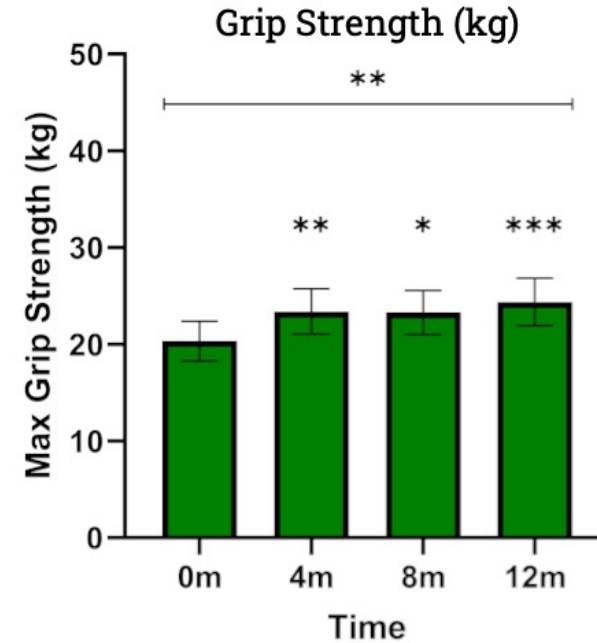
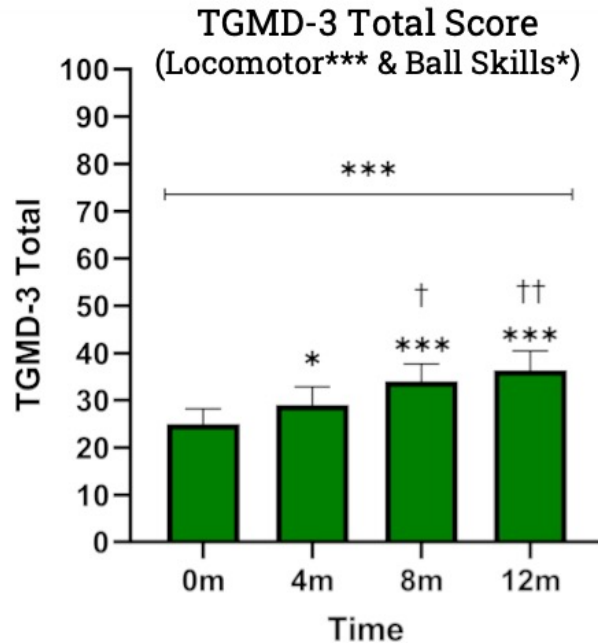
College of Education Teaching Candidate Name: Katie School: WSU - Gliders Students' Grade Level: 2-5 years Time needed: 30 minutes Subject/Content Area of Lesson: Nutrition Lesson Identifier (title/unit): Fantastic Food Jugglers

MATERIALS & CLASSROOM: SmartBoard, Assessment, 5 paper bags (write food groups on bags), Variety of food cards (foods from all 5 food groups), Music	ENVIRONMENT: All doors need to be closed to eliminate the risk of elopements from the gym area. Social-distancing protocols will be in placed to reduce risk of COVID-19.
INSTRUCTIONAL PRACTICE	
Utilize HLP , incorporate principles for SEL , UDL as appropriate	
A. Introduction 1. Introduction (sequence of the day) 2. Fantastic Food Jugglers 3. In student friendly terms, identify objectives and how students will be assessed: Today we will be sorting food into the different groups found on the MyPlate Poster. 4. Hook (Get the students interested in the lesson and link it to their life/culture): Does anyone know what a food group is? <i>Review what the 5 food groups are</i>	3 minutes needed
B. Instructional Sequence: 1. Fantastic Food Jugglers: Set Up --> Have each paper grocery bag represent a food group. Write the name of the group on the bag and paste an appropriate food picture on it, i.e. grains = picture of bread. Place the bags around the room. How to Play --> Explain that juggling means to skillfully handle something. Give each athlete a handful of food pictures. Play some lively music. Have athletes march around the perimeter of the room, placing the food pictures in the appropriate bags. Follow up once everyone has sorted all of their cards, by removing the pictures in each bag and discussing why the pictures does or does not fit the food group.	25 minutes needed
Variations: <ul style="list-style-type: none"> Collect an assortment of clean, empty food containers such as a cereal box, a soup can, a peanut butter jar, etc. Have children sort them into the appropriate bag. Discuss with students how many foods contain more than one food group. When you pull foods out of the bag, discuss how some foods are foods that we should eat often, such as fruit, vegetables, and milk, while other foods are foods we should eat only once in awhile, such as cookies or candy. These are called "sometimes" foods, not everyday foods. 	
C. Closure –Summarizing and Synthesizing Students' Learning Review 5 food groups found on the MyPlate Posters	2 minutes needed
PROFESSIONAL RESPONSIBILITY (Teacher Reflection)	
Use Appendix A as a guide to complete the reflection	



Results: Children & Caregivers

- Children →
 - Improved **fundamental motor skills** (Test of Gross Motor Development—3; Ulrich, 2019) and **muscular fitness** (maximal grip strength, kg)



Difference from baseline (0m): * $p < .05$; ** $p < .01$; *** $p < .001$
 Difference from 4m: † $p < .05$; †† $p < .01$; ††† $p < .001$



Locomotor Skills: HOP

Pre-Intervention



Post-Intervention



Ball Skills: TWO-HANDED CATCH

Pre-Intervention

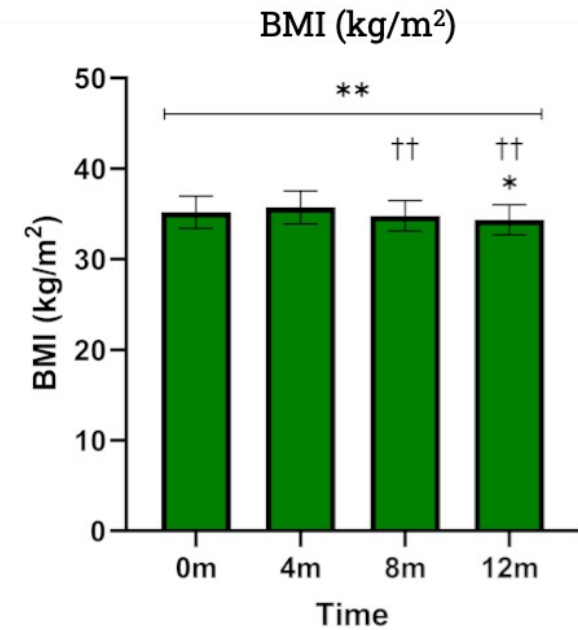
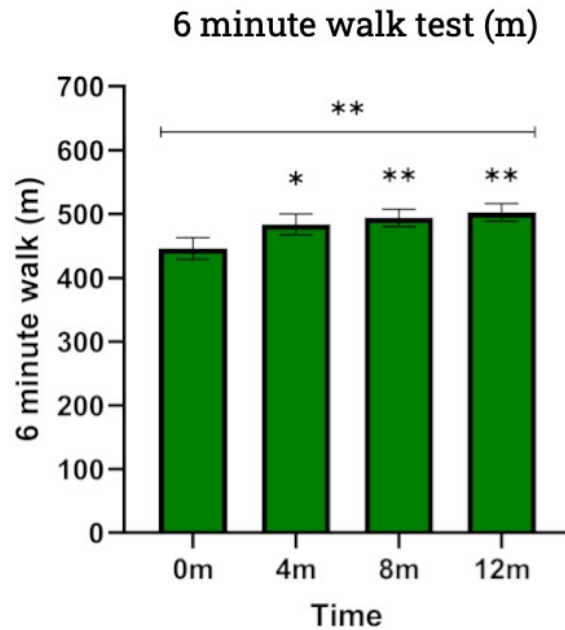


Post-Intervention



Results: Children & Caregivers

- Caregivers →
 - Improved **aerobic fitness** (6-minute walk test) and **weight status** (BMI kg/m²)



Difference from baseline (0m): * $p < .05$; ** $p < .01$; *** $p < .001$
Difference from 4m: † $p < .05$; †† $p < .01$; ††† $p < .001$



Discussion

- Preliminary effectiveness of a community-based health intervention for the primary caregivers of children with ASD
- Provides support for the need to longitudinal health programming for dyads
 - Urban Settings
 - Caregivers need support too
 - Vulnerable Populations
- This bring us to.....



Funding



This work was supported by the Michigan Health Endowment Fund
grant number [ID # G-2004-146232].



Published Literature

- Ketcheson, L. R., & Pitchford, E. A. (2021). Promoting physical activity participation and nutrition education through a telehealth intervention for children on the autism spectrum and their caregivers. *Contemporary Clinical Trials*, 107, 106496.
- Ketcheson, L. R., Pitchford, E. A., Wentz, C. F., & Loetzner, F. (2024). Trajectories of physical activity among autistic children and their caregivers: Outcomes of a virtual 1-year longitudinal intervention. *Disability and Health Journal*, 17(1), 101538.
- Ketcheson, L. R., Barcelona, J. M., Pitchford, E. A., Loetzner, F., Miller, S., & Hauck, J. L. (2023). Perceptions of a Virtual Health Promotion Program for Children on the Autism Spectrum and their Primary Caregiver: A Qualitative Analysis. *Child & Family Behavior Therapy*, 1-22.
- Wentz, C. F., Bode, B., Mallare, J., & Ketcheson, L. R. (2023). Brief Report: Feasibility of a Virtual Program for Caregivers with Children on the Autism Spectrum: A Mixed Methods Study. *Child & Family Behavior Therapy*, 1-16.
- More forthcoming as well!



Questions?



Abstract

- Autism Spectrum Disorder (ASD) is the fastest growing developmental disability in the U.S. In fact, over the past two decades, rates have increased 150% (Baio et al., 2014). While developmental deficits typically present in social engagement, evidence now suggests that children with ASD also experience significant health disparities. For example, by 2 – 4 years of age, children with ASD are 40% more likely than their neurotypical peers to be overweight or obese (Curtin et al., 2014). They also engage in less physical activity, play fewer sports, and are more sedentary (Zwaigenbaum et al., 2015). One key contributor to the presence of these health disparities is the well-documented lack of accessible health, sport, and exercise programs, especially in low-income and under-resourced communities. For instance, there are no out-of-school-time programs in the city of Detroit, despite the fact that 11% of city children have a developmental disability like ASD (Council of the Great City Schools, 2018). **Therefore, the primary goal of this program was to promote positive health trajectories in children with ASD and their families through comprehensive Physical Literacy and Nutrition Education (PLANE).** We offered developmentally-appropriate programs for children with ASD and their families in three age groups, ages 2 – 5, 6 – 12 and 13 – 18. PLANE had several domains of programming: a) age-appropriate physical activities for children and parents, b) nutrition education for both groups, and c) parent training in Autism legislation, social services, advocacy, water safety, and social support.

