

Application of a New Measure of Activity and Participation with Children with Autism Spectrum Disorders

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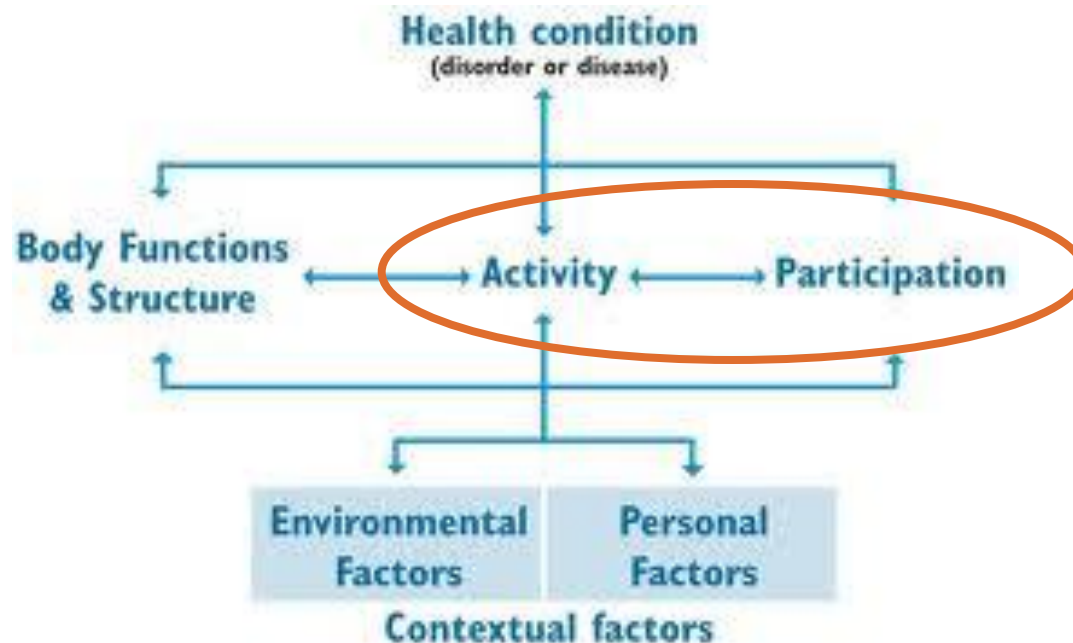
Boston University

Presentation Purpose

- Introduce the PEDI-CAT.
- Provide evidence that the PEDI-CAT can be used as a valid measure of activity and participation of children with Autism Spectrum Disorders.

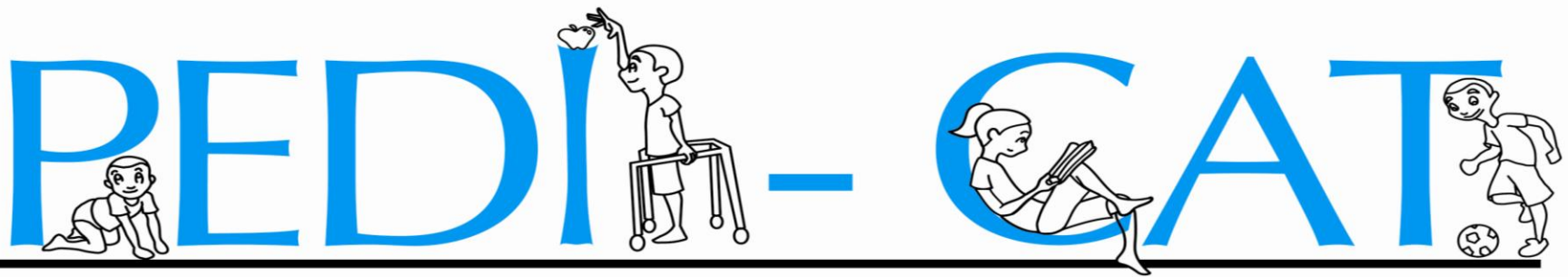
Introduction & Need

- Increased focus on the outcomes of participation for children and youth with Autism Spectrum Disorders (ASDs).



Introduction & Need

- Most assessments used in research and practice with this population:
 - Do not measure outcomes at the level of participation.
 - Are diagnostic and have limited utility for intervention planning.
 - Require trained administrator and can be lengthy.



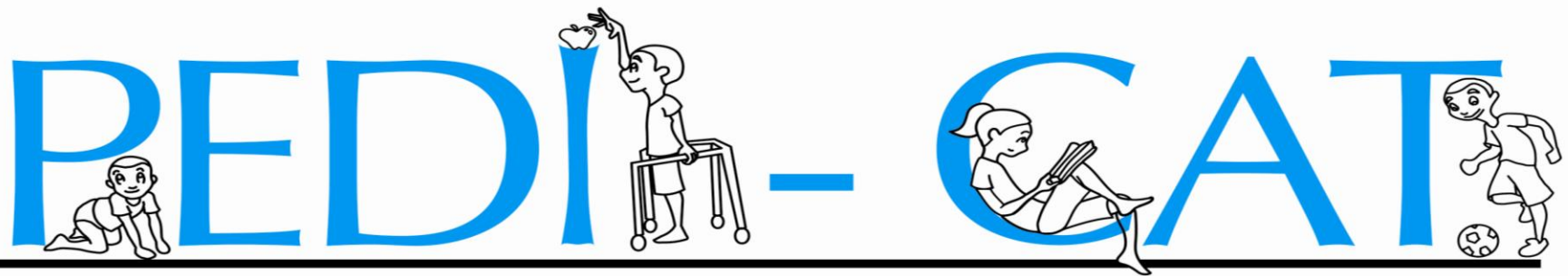
Pediatric Evaluation of Disability Inventory Computer Adaptive Test

- The Pediatric Evaluation of Disability Inventory Computer Adaptive Test (PEDI-CAT):
 - Focuses on activities and participation in life tasks.
 - Parent report.
 - Brief yet precise.

Purpose & Hypotheses

The purpose of this study was to determine if the performance of children with ASDs on the PEDI-CAT domain is similar to or different from children with other disabilities.

- Fit for children with ASDs will not be significantly different from children with other disabilities.
- PEDI-CAT scores will discriminate between children with ASD and children with other disabilities.



Pediatric Evaluation of Disability Inventory Computer Adaptive Test

- For children and youth ages 0- 20 years
- Can be used across all diagnoses, conditions and settings.
- Originally published in 1992; recognized as a gold-standard outcome measure in pediatric rehabilitation studies (Dumas et al., 2010; Haley et al., 2010).

PEDI-CAT

- Two domains aligned with ICF Activity dimension, i.e. the execution of discrete tasks:
 - Daily Activities
 - Social/ Cognitive
- Third domain aligned with ICF participation dimension, i.e. involvement in a life situation.
 - Responsibility

PEDI-CAT Domains

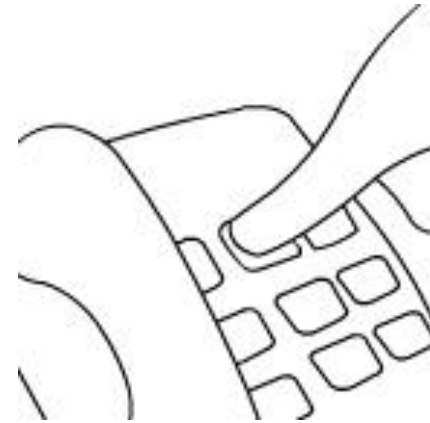
- **Daily Activities:** 68 items address basic self care and instrumental activities of daily living such as eating, grooming, dressing, and household maintenance in 4 content areas:
 - Eating & Mealtime
 - Home Tasks
 - Getting Dressed
 - Keeping Clean

PEDI-CAT Domains

- **Daily Activities Example Items**



Drinks liquids using a straw



Presses buttons to
operate a key-pad
such as phone or
ATM

PEDI-CAT Domains

- **Daily Activities Example Items**



Inserts laces into sneakers
or boots



Trims toenails on
both feet

PEDI-CAT Domains

- **Social/Cognitive:** 60 items that address communication, interaction, safety, behavior, play with toys and games, attention, and problem-solving in 4 content areas:
 - Interaction
 - Communication
 - Everyday Cognition
 - Self Management

PEDI-CAT Domains

- **Social/Cognitive Example Items**
 - Plays with one or more children of the same age for several hours on their own.
 - Maintains friendships that involve give-and-take, compromises and loyalty.
 - Uses a map to plan a route to a new place.
 - Accepts the need to wait an hour or two before a request can be met.

PEDI-CAT Domains

- **Daily Activities & Social/Cognitive Rating Scale**

Please choose which response below best describes your child's ability in the following:

- Unable = Can't do, doesn't know how or is too young.
- Hard = Does with a lot of help, extra time, or effort.
- A little hard = Does with a little help, extra time or effort.
- Easy = Does with no help, extra time or effort, or child's skills are past this level.
- I don't know.

PEDI-CAT Domains

- **Responsibility:** 51 items that assess the extent to which a young person is managing life tasks that enable independent living; items address daily schedules and planning, health and hygiene, and cooking and nutrition. The four content domains are:
 - Organization & Planning
 - Taking Care of Daily Needs
 - Health Management
 - Staying Safe

PEDI-CAT Domains

- **Responsibility Example Item**
 - Planning and following a weekly schedule so all activities get done when needed
 - *Includes: Identifying what needs to be done during a week; Determining how much time each activity will need and when it should be done; Carrying out plan; Making necessary adjustments due to unexpected delays or events*

PEDI-CAT Domains

- **Responsibility Example Items**

- Selecting clothing that is appropriate given the weather, daily schedule, and activities

- *Includes: Identifying dress codes or expectations for different events; Seeking information about weather for the day*

- Taking care of minor health needs

- *Includes: Caring for minor cuts and burns; Taking over the counter medication for fever, cold, and flu when appropriate*

PEDI-CAT Domains

- **Responsibility Example Item**
 - Taking precautions to protect the privacy of personal information
 - *Includes: Providing personal information (e.g. social security number, address) only when appropriate*

PEDI-CAT Domains

- **Responsibility Rating Scale**

How much responsibility does your child take for the following activities?

- Adult/caregiver has full responsibility; the child does not take any responsibility.
- Adult/caregiver has most responsibility and child takes a little responsibility.
- Adult/caregiver and child share responsibility about equally.
- Child has most responsibility with a little direction, supervision or guidance from an adult/caregiver.
- Child takes full responsibility without any direction, supervision or guidance from an adult/caregiver.

PEDI-CAT Benefits

Focus on typical performance and supports

- Items focus on the child's ability to perform each functional activity in a manner that is effective given their abilities and challenges.
- Items do not require the child to perform the activity in a standardized manner.

“Asks one or more peers to play using words or gestures”

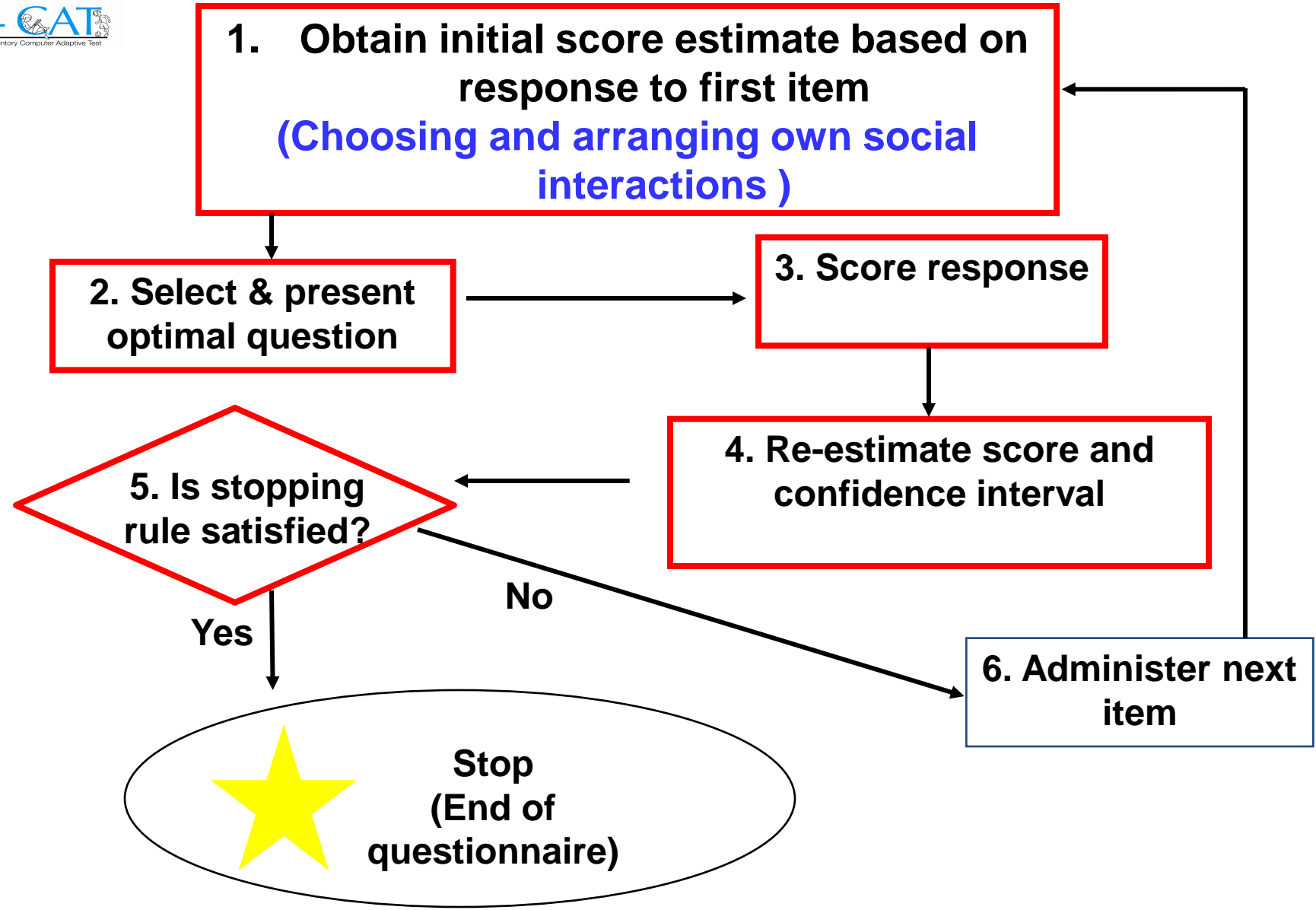
“Puts on a t-shirt”

PEDI-CAT Benefits

Ease of administration

- Completed by parent responses to as few as 10-15 items per domain.
- The mean time for parents to complete 60-items was 12.66 minutes (SD=4.47) (Dumas et al., in press).
- Age, gender and mobility device filters prevent irrelevant items from being presented.

How Does a CAT work?



How does the program select the next item to administer?

Response to this starting question

Starting Question:

5

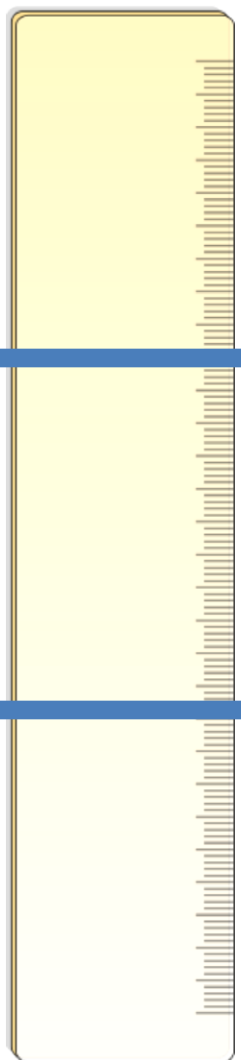


Choosing and arranging own social interactions

4 or 3



1 or 2



High



Select a "High" question

Medium



Select a "Medium" question

Low



Select a "Low" question

PEDI-CAT Benefits

Simultaneously document delay/need for service and collect information to inform program planning.

- Normative standard scores, provided as age percentiles, based on the normative standardization sample (n = 2205) are available for ages 0-20.
- Scaled scores are based on data from the normative and disability samples.
- Item maps help identify skills to target during intervention.

PEDI-CAT Assessment Report

PEDI-CAT Assessment Report

Identification Number: Case 2_Jim
 Date of Birth: 9/18/1996
 Gender: Male

Scales	Score	SE	Percentile	Fit	# items	Proxy*	Walk Device**	W/heel chair***	Date	Type****
Daily Activities	59	0.78	.5	-0.08	15	3	0	0	2/16/2011	1
Mobility	68	0.92	.5	1.13	13	3	0	0	2/16/2011	1
Social/Cognitive	66	0.78	.5	0.45	9	3	0	0	2/15/2011	1
Responsibility	49	1.15	.5	1.73	10	3	0	0	2/15/2011	1

*: 1: Parent; 2: Other Caregiver; 3: Clinician

** : 0: Does not use any device; 1: Walker; 2: Crutches; 3: Cane

*** : 0: Does not use any Wheel chair; 1: Manual Wheel chair; 2: Power Wheel chair

**** : 1: Speedy; 2: Content-Balanced

Scales	Item Content	Response
Responsibility	Choosing and arranging own social interactions	Adult has most
Responsibility	Planning and following a weekly schedule so all activities get done when needed	Adult has most
Responsibility	Following health and medical treatment requirements	Adult has full

Study Procedures

- Parents recruited through on-line survey company
- Screening questions to determine eligibility and placement in the disability or non-disability sample.
- Quota sampling:
 - Equal proportions male and female children
 - Ethnic distribution representative of 2000 US Census

Participants

- Disability Sample: $n = 617$ total
 - Parent reported ASD diagnosis: $n = 108$
 - Other disability: $n = 509$

Disability Sample	N= 617 (%)
Mean Age (SD)	11.67(4.7)
Gender (Female%)	230 (37.3)
Race and Ethnicity	
White	420 (68.1)
Black	59 (9.6)
Hispanic	59 (9.6)
Asian	12(1.9)
Other	67 (10.8)
School Placement	
Preschool/Kindergarten	71(11.5)
Elementary/Middle/High school	476 (77.2)
Undergraduate/College	18 (2.9)
Not in school	52 (8.4)
Parent/Respondent Education Level*	
No High School	18 (2.9)
High school Graduate	117 (19)
Some College	185 (30)
College Graduate/ Advanced Degree	297(48.2)

Diagnostic History	N= 617 (%)
Developmental Delay	192 (31.1)
Intellectual Disability	50 (8.1)
Hearing Impairment	30 (4.9)
Speech/Language Impairment	171 (27.7)
Vision Impairment	46 (7.5)
Serious Emotional Disturbance	50 (8.1)
Orthopedic/Movement Impairment	23 (3.7)
Autism Spectrum Disorder (ASD)	108 (17.5)
Attention Deficit Disorder (ADD)	232 (37.6)
Traumatic Brain Injury	9 (1.5)
Specific Learning Disability	78 (12.6)
Health Impairment	58 (9.4)
Multiple Disabilities	28 (4.5)
Other Impairments/Problem	96 (15.6)

Analysis

- Rasch Rating Scale Model using WINSTEPS
 - Benefits: Parsimonious model, able to investigate individual response patterns.*
 - Evaluated person fit: Does the pattern of responses for this child match what you would predict based on the whole group?
 - Poor fit of one particular subgroup may indicate a unique constellation of strengths & difficulties.

Analysis

- Two-parameter logistic Graded Response Model (GRM) with PARSCALE

Benefits: Accounts for error in response patterns, more accurate estimate of person ability.

- Obtained person scores for each domain: Scaled domain scores are interval level measures.

Results

- Person Fit: Daily Activities**

- Children with ASD were less likely to have poor fit on the daily activities domain than children with other disabilities ($\chi^2 = 7.2, df = 1, p = .007$).

ASD Diagnosis	Good Fit	Poor Fit
Yes	98 (Std Residual: 1.0)	10 (Std Residual: -2.2)
No	406 (Std Residual: -.05)	103 (Std Residual: 1.0)

Results

- **Person Fit: Social/ Cognitive**

- Children with ASD were not more likely to have poor fit on the social/ cognitive domain than children with other disabilities ($\chi^2 = 3.1, df = 1, p = .08$).

ASD Diagnosis	Good Fit	Poor Fit
Yes	84 (Std Residual: -0.6)	24 (Std Residual: 1.5)
No	431 (Std Residual: 0.3)	78 (Std Residual: -0.7)

Results

- **Person Fit: Responsibility**

- Children with ASD were not more likely to have poor fit on the responsibility domain than children with other disabilities ($\chi^2 = 2.8$, $df = 1$, $p = .09$).

ASD Diagnosis	Good Fit	Poor Fit
Yes	92 (Std Residual: 0.7)	16 (Std Residual: -1.4)
No	397 (Std Residual: -0.3)	112 (Std Residual: 0.6)

Results

- Scaled Scores: Daily Activities
 - Daily Activities scaled score is significantly lower for children with ASDs than children with other disabilities ($t = -4.09$, $df = 615$, $p = .00$)

Group	Mean Scaled Score (sd)
Children with ASDs	-0.22 (.76)
Children with other disabilities	0.11 (.86)

Results

- Scaled Scores: Social/ Cognitive
 - Social/Cognitive scaled score is significantly lower for children with ASDs than children with other disabilities ($t = -3.78, df = 615, p = .00$)

Group	Mean Scaled Score (sd)
Children with ASDs	-0.29 (.68)
Children with other disabilities	0.01 (.78)

Results

- Scaled Scores: Responsibility
 - Responsibility scaled score is significantly lower for children with ASDs than children with other disabilities ($t = -2.86$, $df = 615$, $p = .00$)

Group	Mean Scaled Score (sd)
Children with ASDs	-0.20 (.86)
Children with other disabilities	0.06 (.88)

Limitations

- Smaller sample sizes than ideal for this analysis.
- Majority of parents in the sample had at least some college education.
- Severity of ASD diagnosis and communication abilities unknown.

Conclusion

- Children with an ASD have lower levels of activity and participation than children with other disabilities.
 - Children with an ASD had significantly lower scaled scores on all PEDI-CAT domains.
 - Highlights the need to develop interventions that target these outcomes for this population.

Conclusion

- The PEDI-CAT can be used to assess the activity and participation of children with ASDs.
 - Valid scores can be obtained for children with ASDs on all 3 PEDI-CAT domains.
 - Children with ASDs were less likely than children with other disabilities to have poor fit in the Daily Activities domain.

Future Research

- Develop an ASD application of the PEDI-CAT that includes items that address unique needs and concerns of children and youth with ASDs.
- Validate the PEDI-CAT with a national sample of children and youth with ASDs ages 3-21.
- Examine the ability of the PEDI-CAT to measure progress over time during transition to adulthood.

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Dr. Haley owns founders stock in CREcare, LLC, which distributes the PEDI-CAT products.

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Non- Disability Sample	N= 2205 (%)
Mean Age (SD)	10.12(6.1)
Gender (Female%)	1079(49)
Race and Ethnicity	
White	1438 (65.2)
Black	241 (10.9)
Hispanic	207 (9.4)
Asian	30 (1.4)
Other	288 (13.1)
School Placement	
Preschool/Kindergarten	294 (13.3)
Elementary/Middle/High school	1256 (57)
Undergraduate/College	196 (8.9)
Not in school	459 (20.8)
Parent/Respondent Education Level*	
No High School	47 (2.1)
High school Graduate	392 (17.8)
Some College	846 (38.4)
College Graduate/ Advanced Degree	919 (41.7)