

Sensory Integration & Praxis Functions in Children with ADHD

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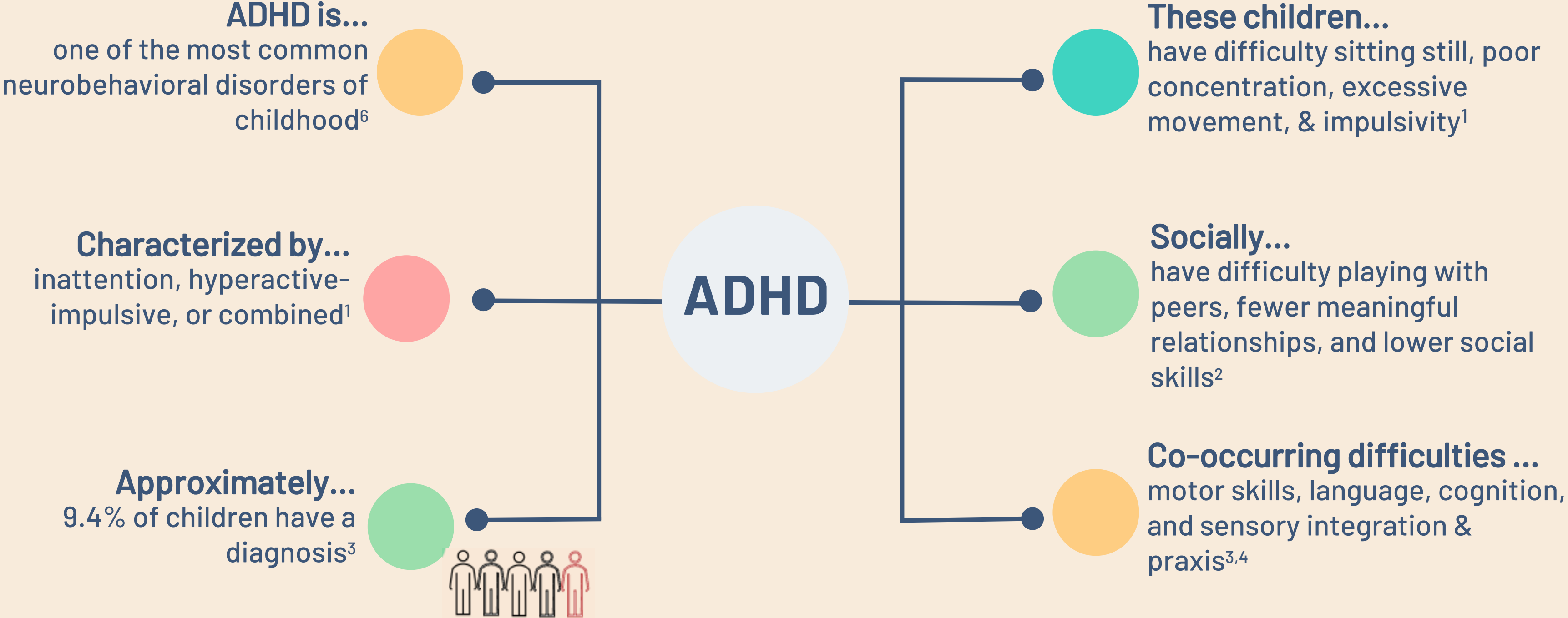




About Me

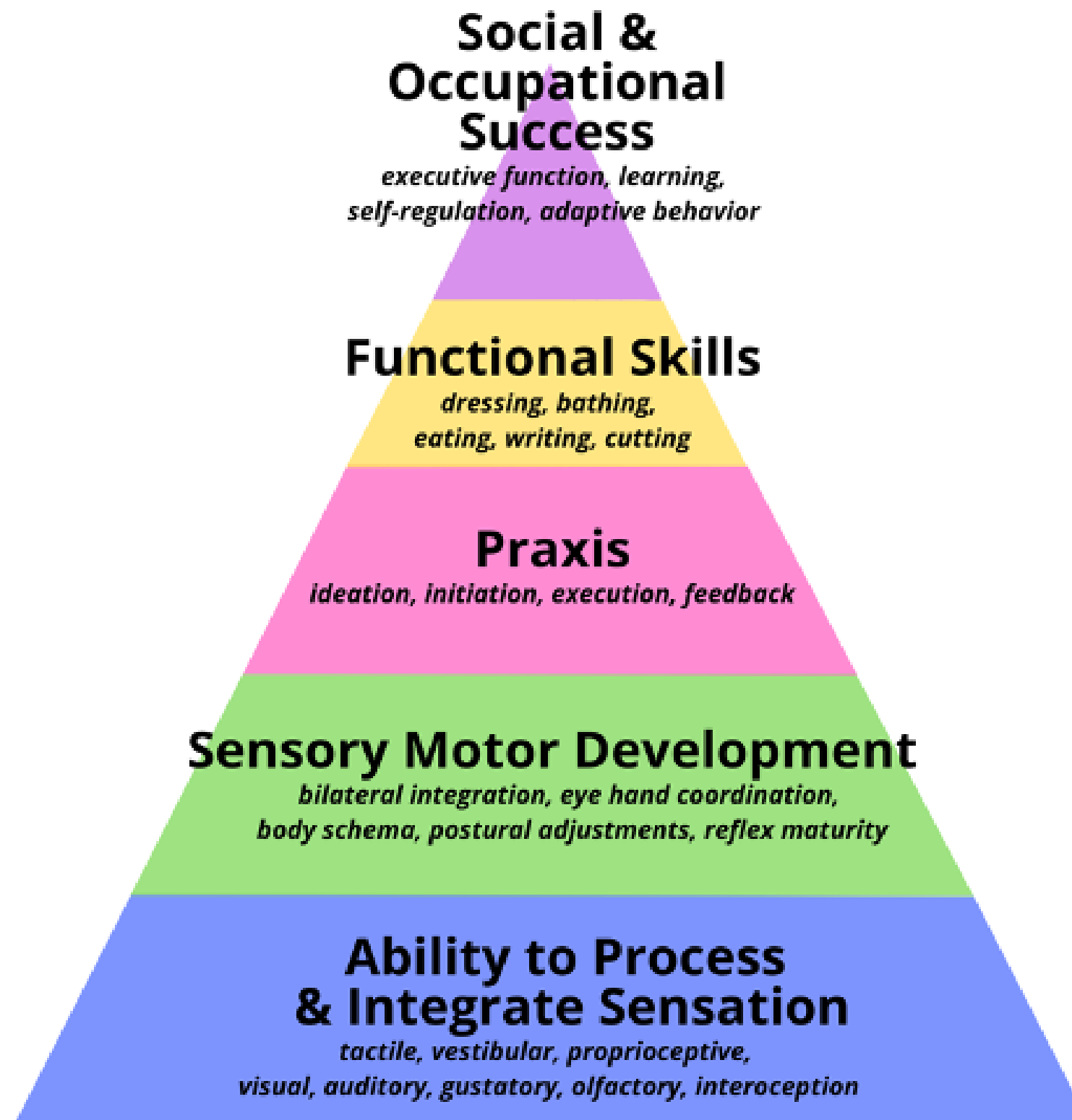
Why This Topic?

Background



¹APA, 2013; ²Barnes, Wilkes-Gillan, Bundy, & Cordier, 2017; ³CDC, 2013; ⁴Egli, 2014; ⁵Ghanizadeh, 2011; ⁶Wiolraich et al., 2012

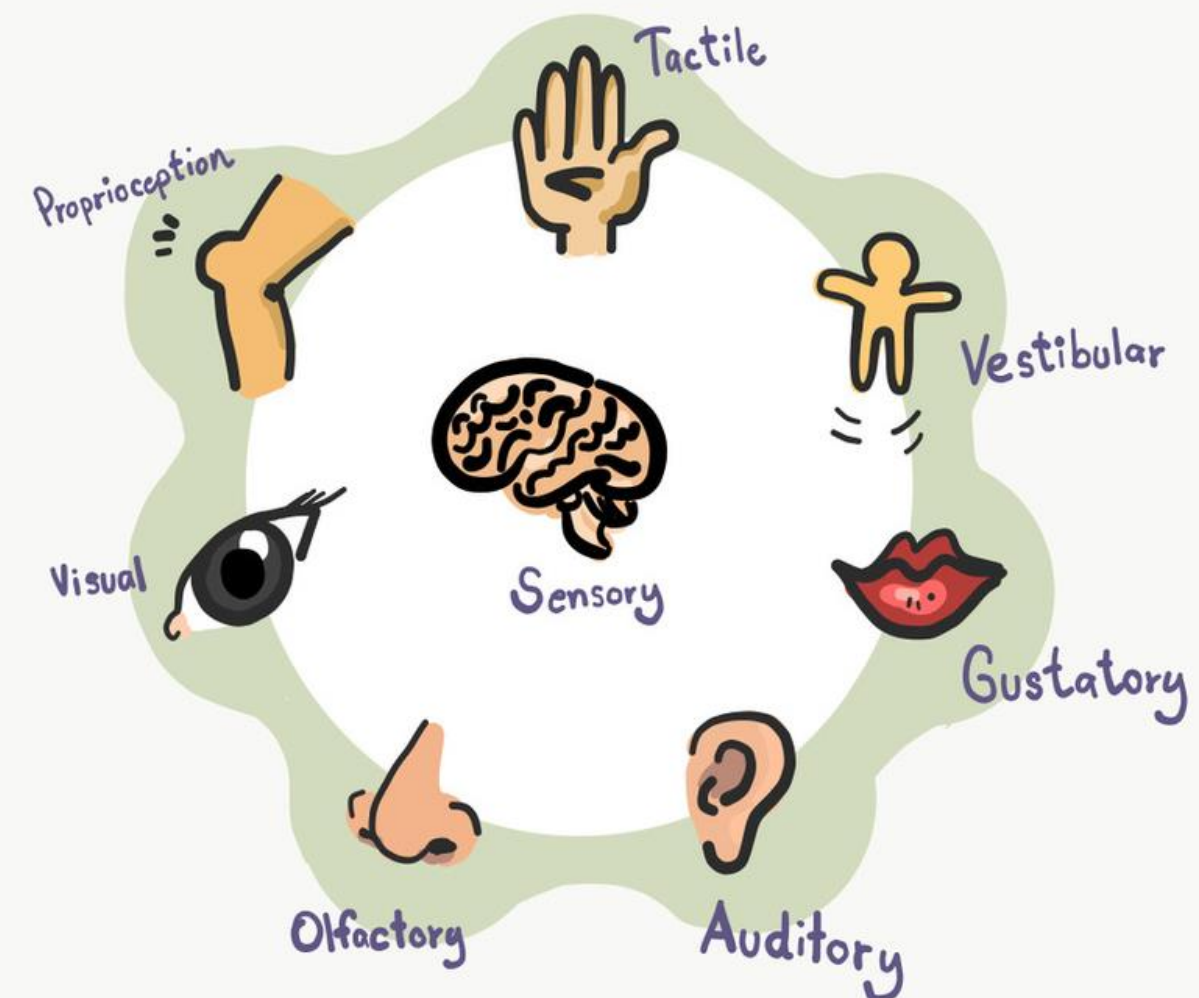




Sensory Integration
is the
Foundation

ADHD & SENSORY INTEGRATION

Children with ADHD have more sensory integration and praxis difficulties than their typically developing peers



ADHD & SOCIAL PARTICIPATION

**Children with ADHD
struggle with social
participation and peer
relationships**

50-60% of children with ADHD:

- **Experience rejection by their peers⁴**
- **Have inappropriate behavior^{3,4,5}**
- **Have problems with social skills^{1,2,3}**



CNN, 2011

SENSORY INTEGRATION & SOCIAL PARTICIPATION



Neefs, 2015



Neefs, 2015

**Sensory integration & praxis
play a role
in social participation**

Ayres, 2005; Barkley, 1990; Cosby, Johnston, Dunn & Bauman, 2012; Dowell, Mahone, & Mostofsky, 2009; Ismael, Mische Lawson, Dean, & Dunn, 2018; MacNeil & Mostofsky, 2012; Schaaf et al., 2014; Shimizu, Bueno, & Miranda, 2014; and Smith Roley et al., 2015

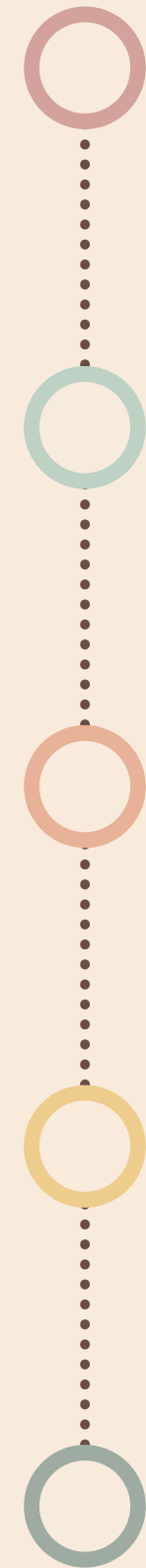
Purpose

To describe the sensory integration and praxis functions in children with ADHD and explore their relationships to social participation



Familis, 2020

Why does this study matter?



To expand research

To increase understanding

To impact intervention

Ayres Sensory Integration®



CL-ASI, n.d.

“Emphasizes the active, dynamic sensory-motor responses that support movement as well as interaction within social and physical environments and that act as a catalysis for development, social participation, and occupational performance”

Research Design

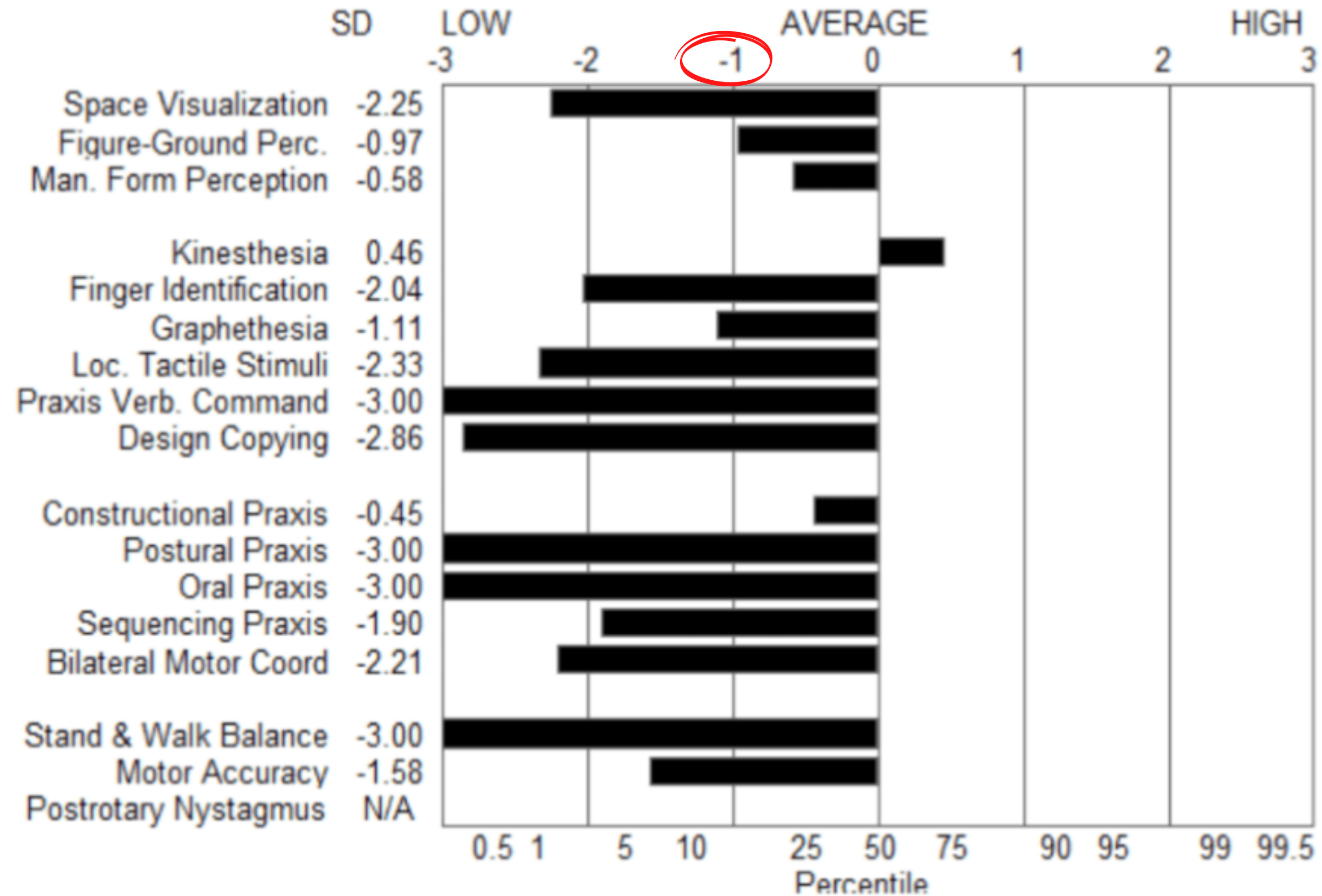
Retrospective descriptive study of de-identified data sets

Methodology

Instruments

- Sensory Integration & Praxis Test^{1,2,3,5}
- Sensory Processing Measure- Home⁴

Example SIPT Scoring Graph



Research Design

Retrospective descriptive study of de-identified data sets

Exclusion Criteria

- Outside age range
- Completed less than 14 SIPT Tests
- Additional dx of ASD, Fragile X, Seizure disorder, or physical disabilities

Methodology

Instruments

- Sensory Integration & Praxis Test^{1,2,3,5}
- Sensory Processing Measure- Home⁴

Inclusion Criteria

- Ages 4-8:11
- Completed at least 14/17 SIPT Tests
- Administered the SIPT & SPM

Outcomes

One

Describe the sensory integration and praxis difficulties of the cohort of children with ADHD on the SIPT and SPM

Two

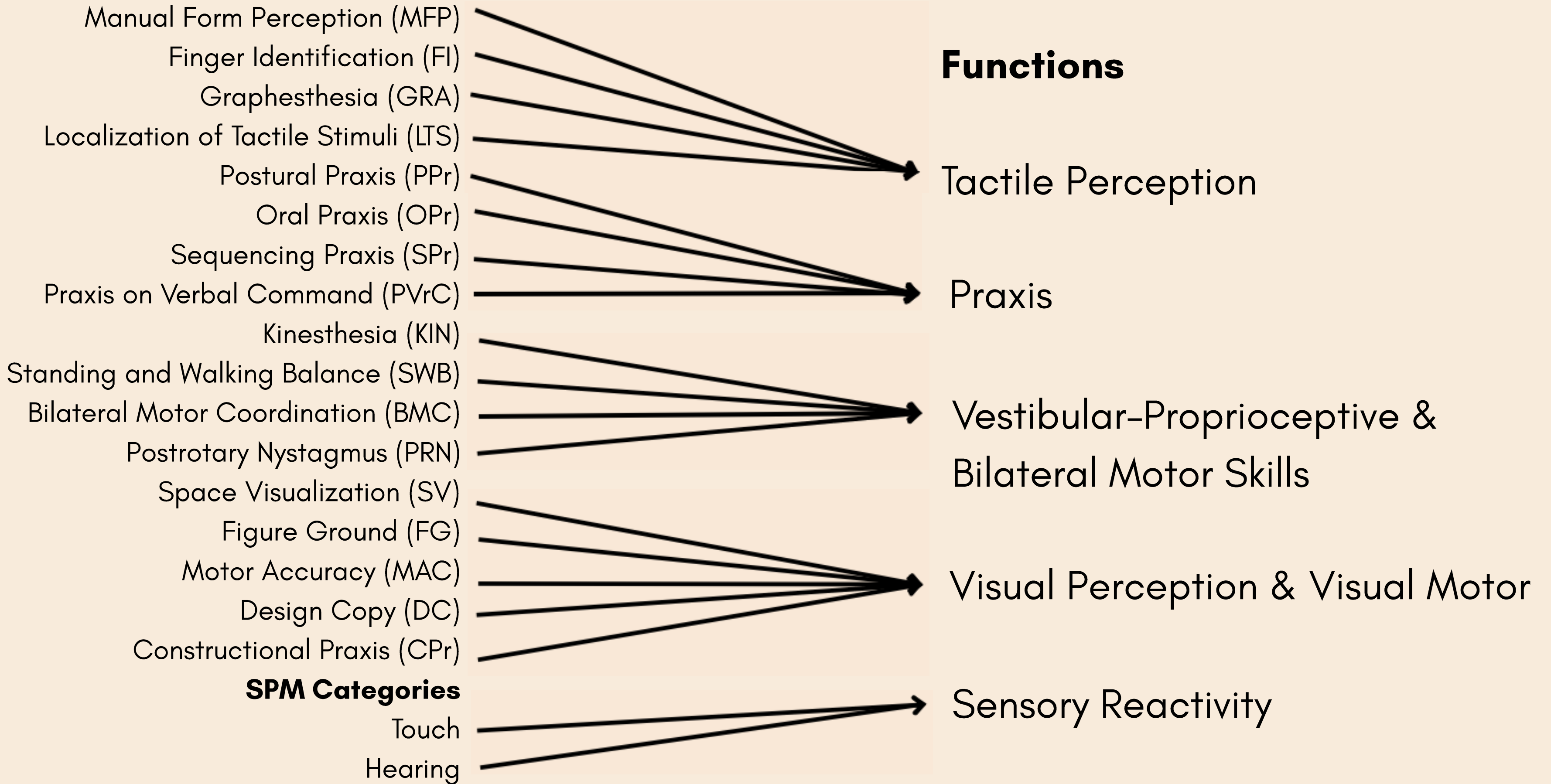
Describe difficulties of sensory integrative and praxis functions

SIPT Tests

- Manual Form Perception (MFP)
 - Finger Identification (FI)
 - Graphesthesia (GRA)
 - Localization of Tactile Stimuli (LTS)
 - Postural Praxis (PPr)
 - Oral Praxis (OPr)
 - Sequencing Praxis (SPr)
 - Praxis on Verbal Command (PVrC)
 - Kinesthesia (KIN)
 - Standing and Walking Balance (SWB)
 - Bilateral Motor Coordination (BMC)
 - Postrotary Nystagmus (PRN)
 - Space Visualization (SV)
 - Figure Ground (FG)
 - Motor Accuracy (MAC)
 - Design Copy (DC)
 - Constructional Praxis (CPr)
- SPM Categories**
- Touch
 - Hearing

Functions

- Tactile Perception
- Praxis
- Vestibular-Proprioceptive & Bilateral Motor Skills
- Visual Perception & Visual Motor
- Sensory Reactivity



Outcomes

One

Describe the sensory integration and praxis abilities of the cohort of children with ADHD based Tests of the SIPT and SPM

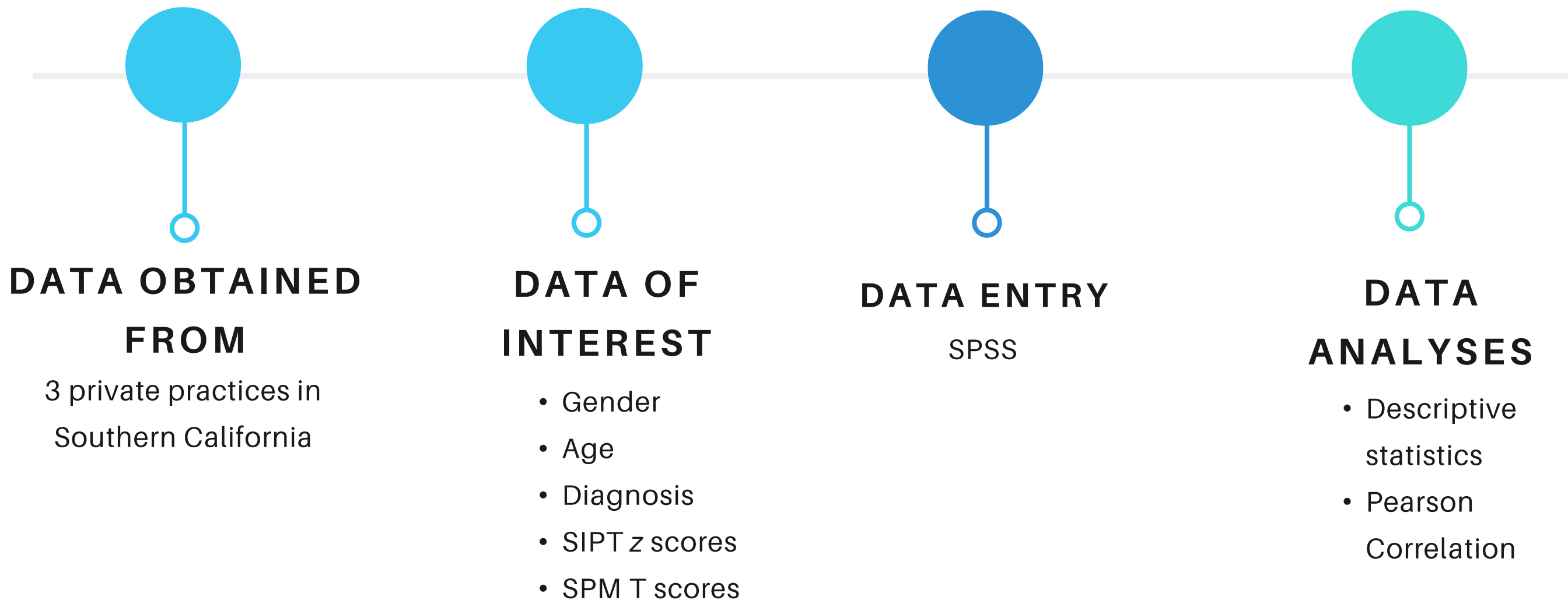
Two

Describe difficulties of sensory integrative and praxis functions

Three

Examine the relationships among sensory integrative functions and social participation

Procedures



Data Analysis

Descriptive statistics mean (Z and T scores), frequency, and percentages generated for each of the 17 SIPT Tests and 7 SPM categories,

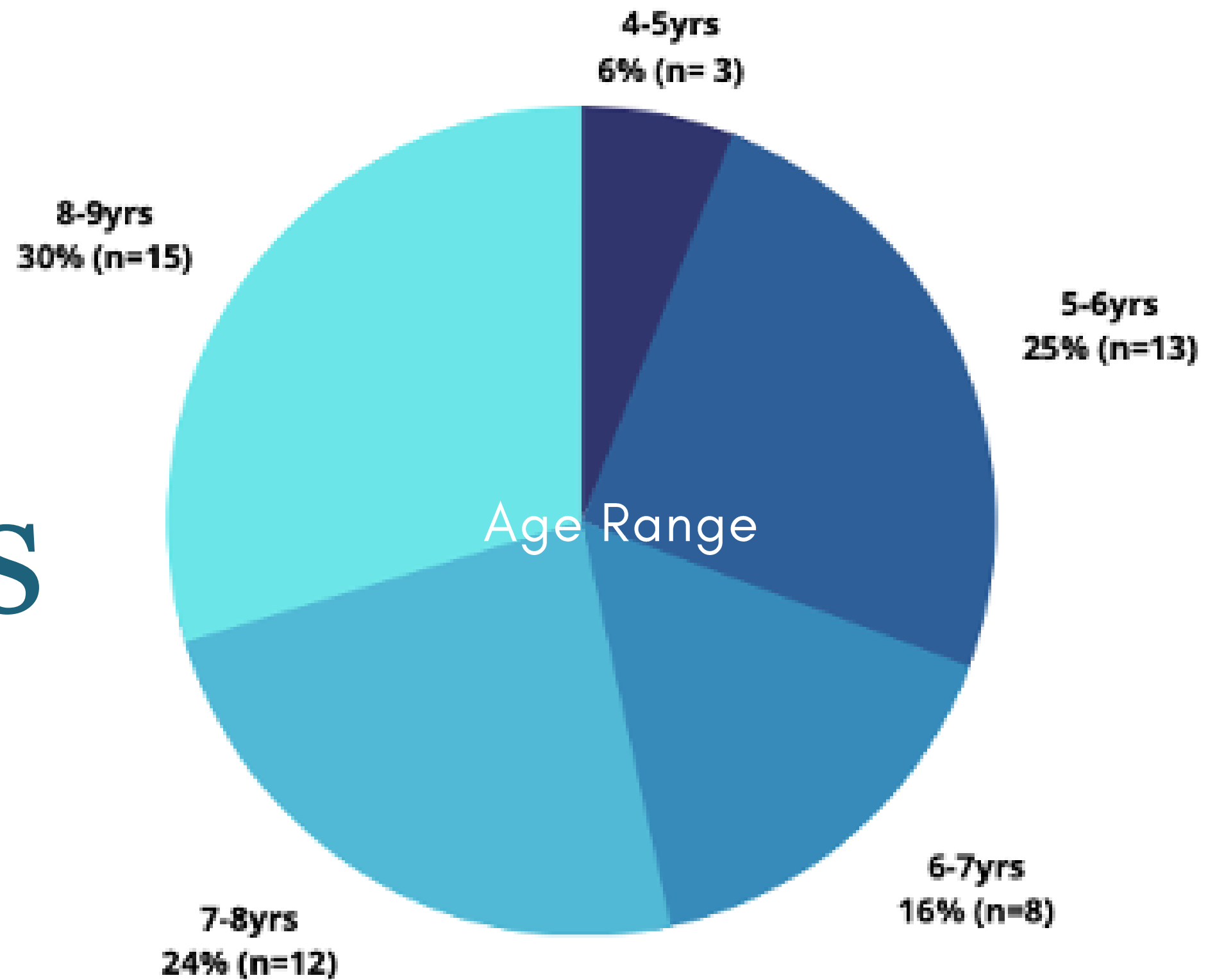
And for five sensory integration and praxis functions,

A Pearson correlation to examine relationships between sensory integration functions and social participation (SPM)

Results

Demographics

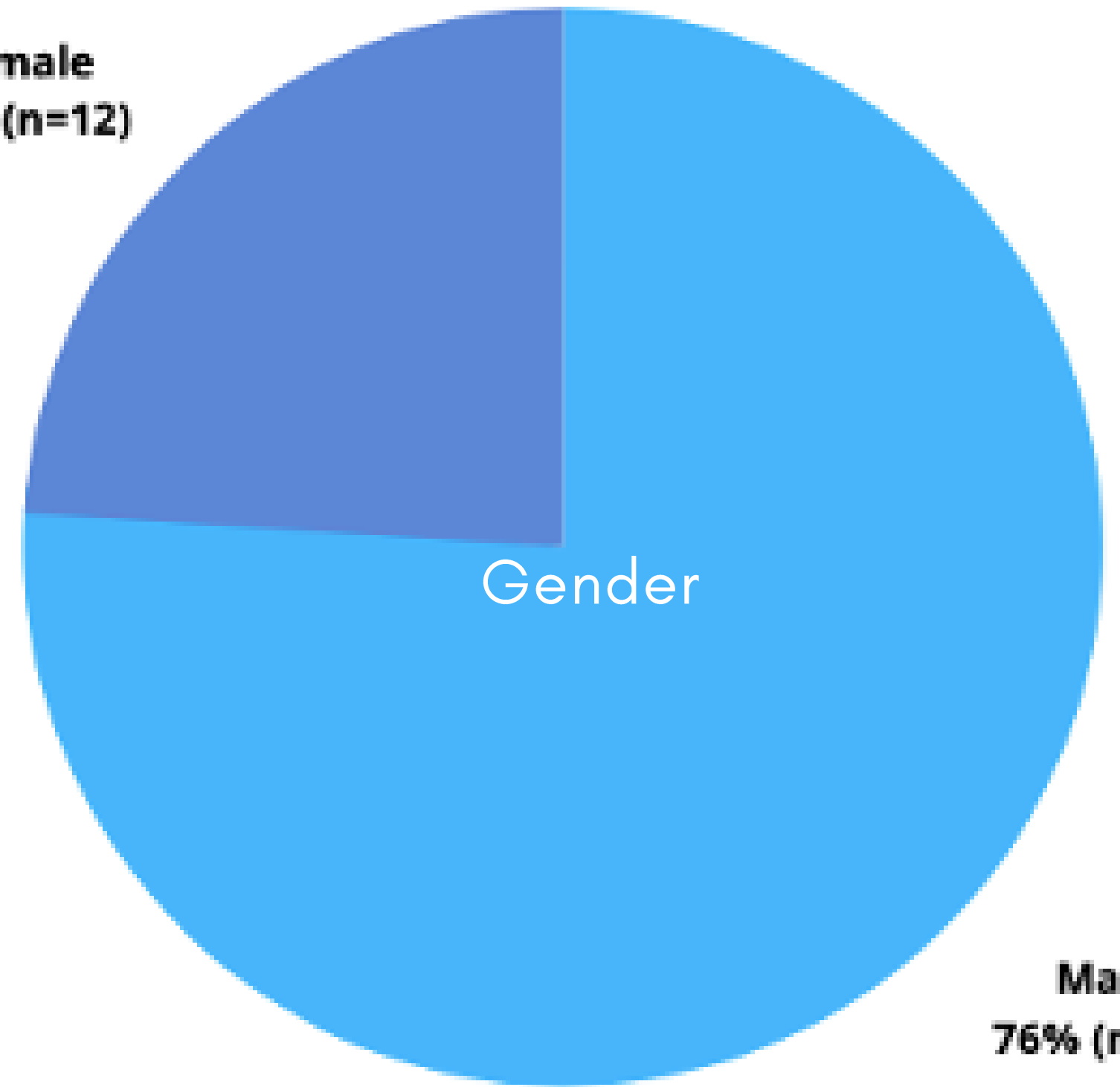
n = 51



Demographics

n = 51

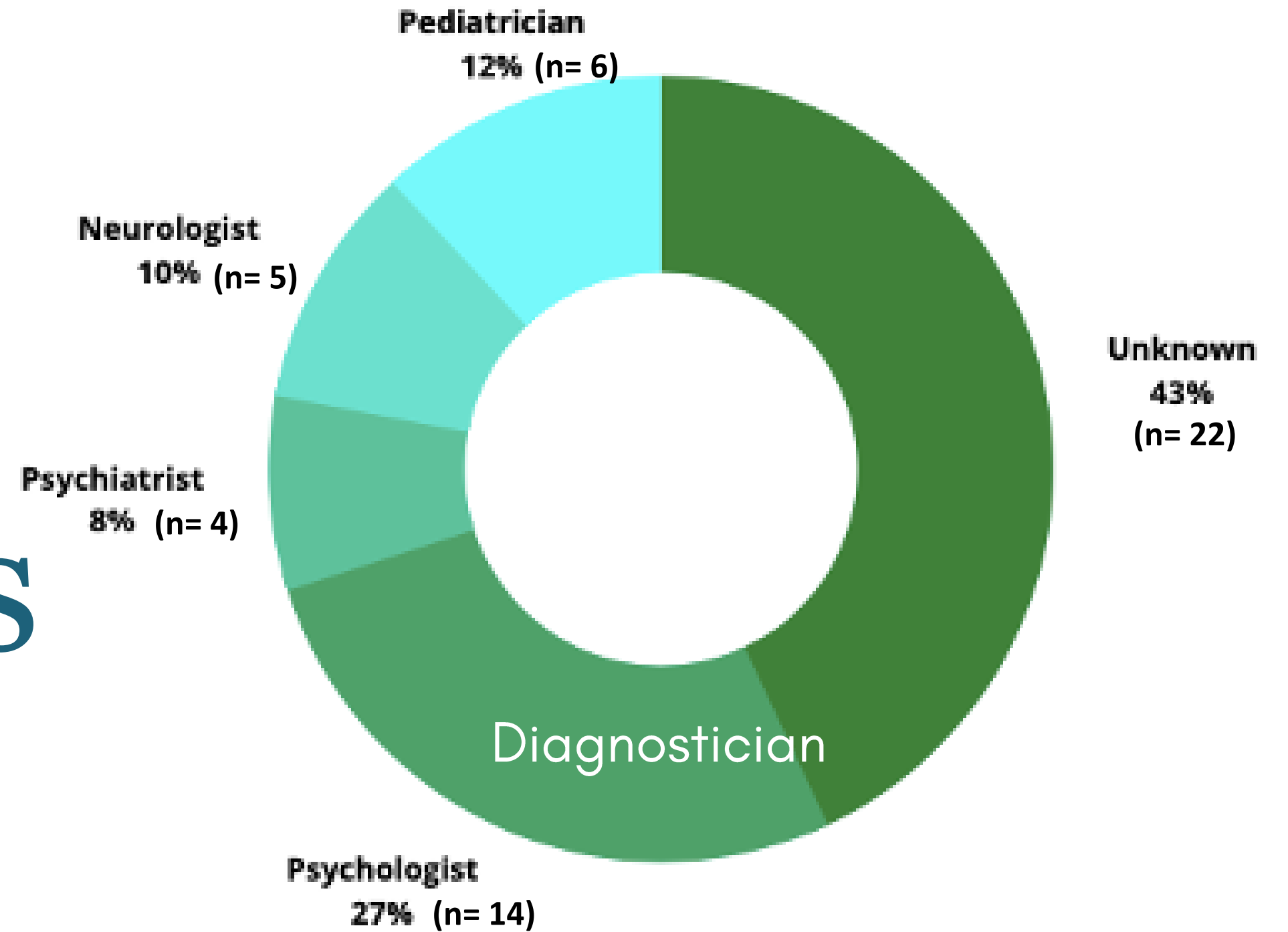
Female
24% (n=12)



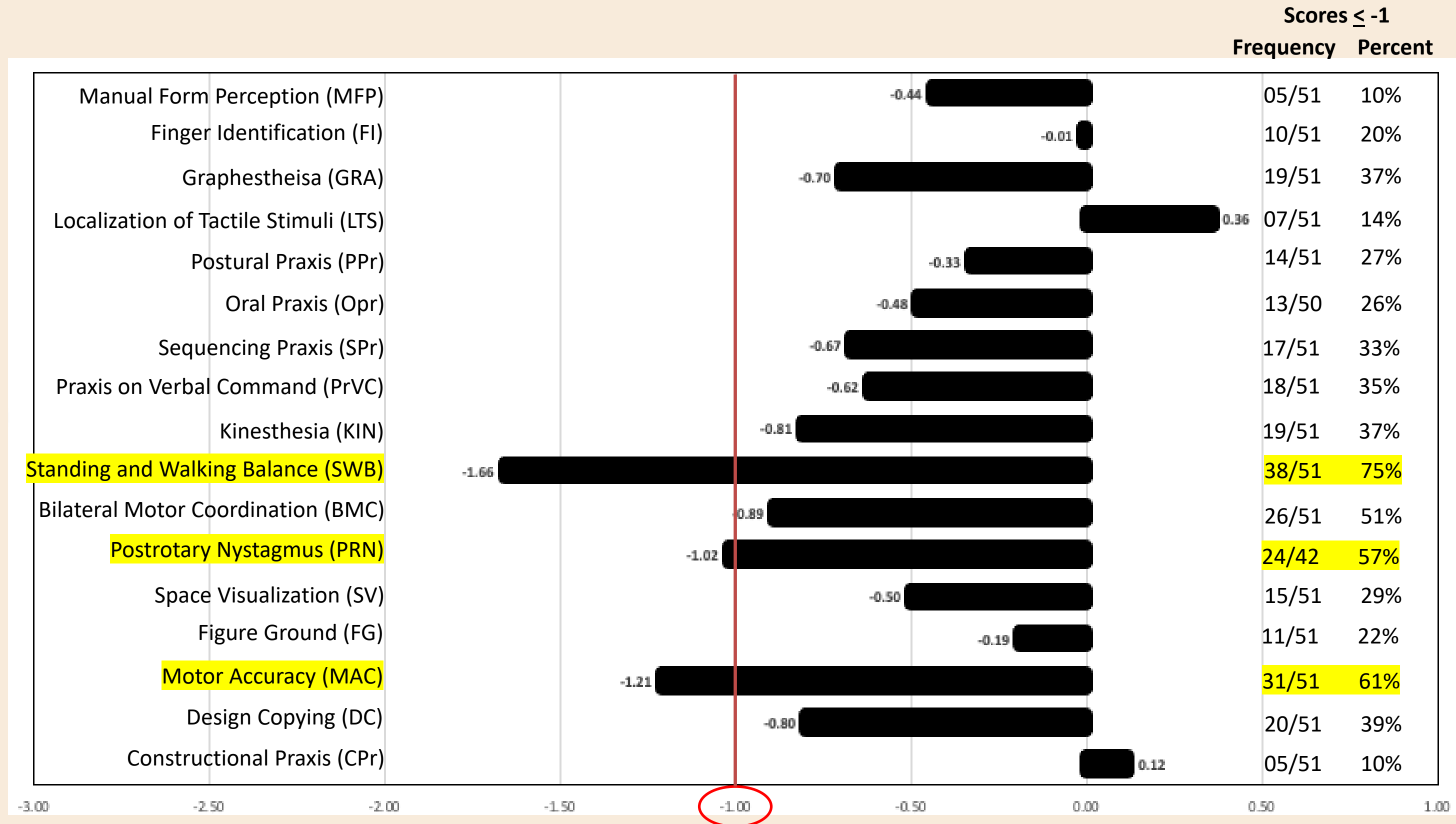
Male
76% (n=39)

Demographics

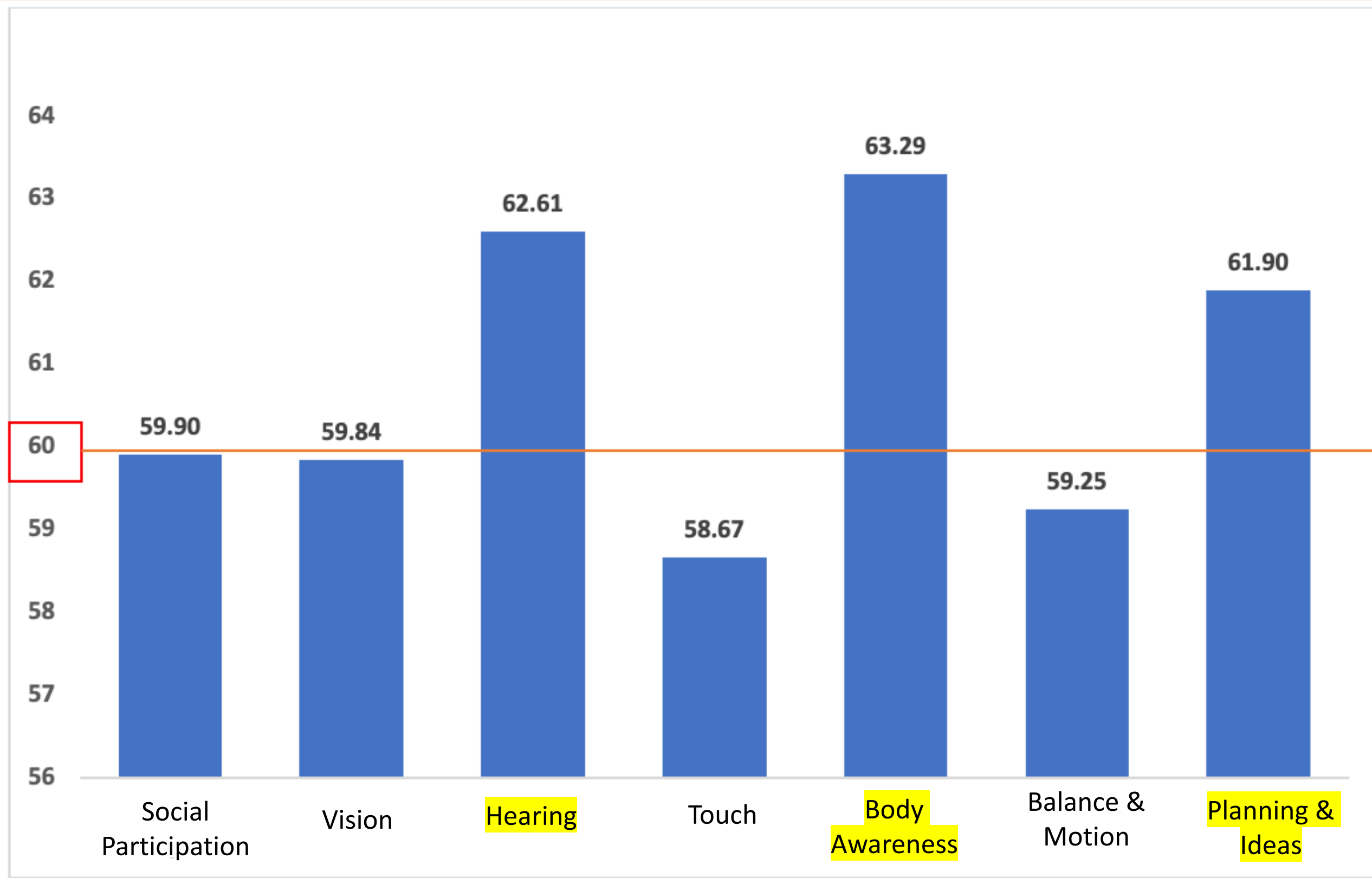
n = 51



Cohort SIPT Mean Z Scores, Frequency, & Percent



Cohort SPM Mean Z Scores, Frequency, & Percent



| Category | T score \geq 60 | |
|----------------------|-------------------|---------|
| | Frequency | Percent |
| Social Participation | 30/51 | 59% |
| Vision | 26/51 | 51% |
| Hearing | 36/51 | 71% |
| Touch | 28/51 | 55% |
| Body Awareness | 34/51 | 67% |
| Balance and Motion | 25/51 | 49% |
| Planning and Ideas | 36/51 | 71% |

Group Mean, Frequency, & Percent on the Sensory Integrative Functions

| Function | Mean Z Score | Frequency ≤ -1 | Percent ≤ -1 |
|---|--------------|---------------------|-------------------|
| Tactile Perception | -0.21 | 06/51 | 12% |
| Manual Form Perception (MFP) | | | |
| Finger Identification (FI) | | | |
| Graphesthesia (GRA) | | | |
| Localization of Tactile Stimuli (LTS) | | | |
| Praxis | -0.53 | 13/51 | 25% |
| Postural Praxis (PPr) | | | |
| Oral Praxis (OPr) | | | |
| Sequencing Praxis (SPr) | | | |
| Praxis on Verbal Command (PrVC) | | | |
| Vestibular and Proprioceptive and Bilateral Motor Skills | -1.10 | 29/51 | 57% |
| Kinesthesia (KIN) | | | |
| Standing and Walking Balance (SWB) | | | |
| Bilateral Motor Coordination (BMC) | | | |
| Postrotary Nystagmus (PRN) | | | |
| Visual Perception and Visual Motor | -0.52 | 10/51 | 20% |
| Space Visualization (SV) | | | |
| Figure Ground (FG) | | | |
| Motor Accuracy (MAC) | | | |
| Design Copying (DC) | | | |
| Constructional Praxis (CPr) | | | |
| Sensory Reactivity | Mean T Score | Frequency ≥ 60 | Percent ≥ 60 |
| Touch | 60.60 | 28/51 | 55% |
| Hearing | | | |

Pearson Correlation

Relationship Between Sensory Integrative Functions & Social Participation

| | 1 | 2 | 3 | 4 | 5 | 6 |
|------------------------------|--------|--------|--------|------|--------|---|
| 1. SIPT- Tactile Perception | - | | | | | |
| 2. SIPT- Praxis | 0.40** | - | | | | |
| 3. SIPT- VPBMS | 0.19 | 0.45** | - | | | |
| 4. SIPT- VPVM | 0.51** | 0.44** | 0.37** | - | | |
| 5. SPM- Sensory Reactivity | 0.04 | -0.01 | 0.18 | 0.22 | - | |
| 6. SPM- Social Participation | 0.00 | -0.04 | 0.07 | 0.19 | 0.42** | - |

Note: SIPT= Sensory Integration and Praxis Test. SPM= Sensory Processing Measure. VPBMS= Vestibular and Proprioceptive and Bilateral Motor Skills. VPVM= Visual Perception and Visual Motor
***p < .01*

Summary

- This cohort showed most difficulties with:
 - Vestibular-Proprioceptive and Bilateral Motor and Sensory Reactivity Functions.
 - SIPT tests of balance, motor accuracy, and postrotary nystagmus.
 - SPM categories of hearing, body awareness, and planning and ideas.
- This cohort showed greatest strengths with:
 - SIPT tests of tactile perception and visual construction
 - SPM categories of social participation, vision, touch, and balance and motion, though all were borderline
- Correlations
 - Sensory Reactivity was moderately correlated with Social Participation

Discussion

- ADHD and Autism may have different sensory profiles
- In this current study, parents did not identify social participation as a significant challenge, which contrasts with previous studies

Implications

Children with ADHD have difficulties with vestibular-proprioceptive and bilateral motor skills and heightened sensory reactivity

Assessing these functions as part of a comprehensive evaluation is important to capture a child's full profile and design interventions

Questionnaires & performance measures may provide more in depth understanding of the sensory integrative functions that affect participation and function

It may be beneficial to consider sensory reactivity when addressing social participation challenges in ADHD

Limitations



A large, stylized handwritten signature in dark blue ink, written in cursive. The signature is positioned on the left side of the page, overlapping a light green circular graphic element. The background of the page features abstract, overlapping shapes in shades of green and grey.

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My Family & Friends

Questions?



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