

EVALUATION OF THE TESTS OF SENSORY INTEGRATION FUNCTION USED WITH INFANTS.

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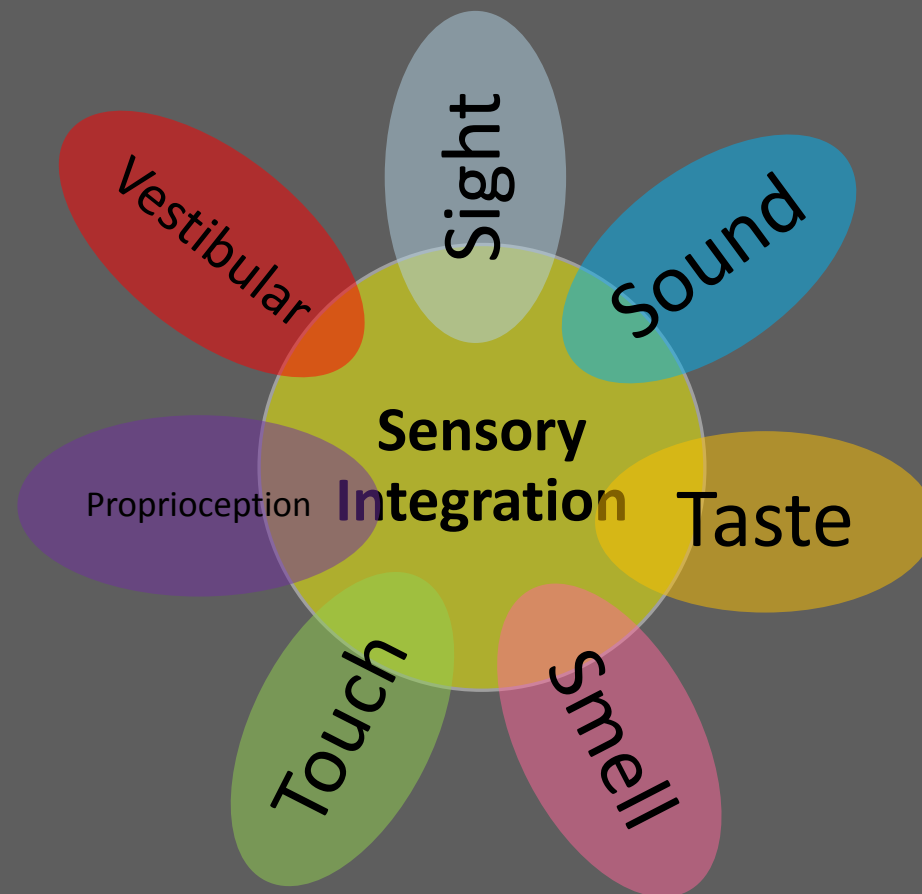
Introduction

- ▶ For accurate treatment OT's need:
 - Accurate assessment of problems
- ▶ Standardised tests
 - Accurate on population developed on
 - Is it accurate on population being used on?
- ▶ Research on standardised tests
 - Different populations often have different normative data
 - Culture & environment affects responses
 - Cannot assume that norms can be transferred to different population

Introduction

➔ Sensory Integrative (SI) function

- Ability of an individual to
 - Register
 - Process
 - Integrate
 - Respond to sensory input
- Organise and process the flow of sensory impulses
- Precise information about oneself and the world
- Performance skill
- Assessed by OT's
- Can assess in children from an early age



Introduction

- Sensory Integrative Dysfunction (SID)
 - Problem in any area of SI Function


- Accurate assessment



Accurate treatment

Two standardised tests

- Infant/Toddler Sensory Profile (ITSP)
- Test of Sensory Functions in Infants (TSFI)


**INFANT/TODDLER
SENSORY PROFILE™**
 Winnie Dunn, Ph.D., OTR, FAOTA
 with Debora B. Daniels, M.A., CCC-SLP
Caregiver Questionnaire
7 TO 36 MONTHS




Child's Name: _____ Birth Date: _____ Date: _____
 Completed by: _____ Relationship to Child: _____
 Service Provider's Name: _____ Discipline: _____
 Circle the birth order of your child within the family 1st 2nd 3rd 4th 5th Other _____
 Have there been more than 3 children, between the ages of birth-18 years, living in your household during the past 12 months? _____

INSTRUCTIONS

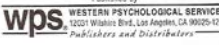
Please check the box that best describes the frequency with which your child does the following behaviors. Please answer all of the statements. If you are unable to comment because you have not observed the behavior or believe that it does not apply to your child, please draw an X through the number for that item. Write any comments at the end of each option.

Use the following key to mark your responses:

ALMOST ALWAYS	When presented with the opportunity, your child almost always responds in this manner, 90% or more of the time.
FREQUENTLY	When presented with the opportunity, your child frequently responds in this manner, about 75% of the time.
OCCASIONALLY	When presented with the opportunity, your child occasionally responds in this manner, about 50% of the time.
SELDOM	When presented with the opportunity, your child seldom responds in this manner, about 25% of the time.
ALMOST NEVER	When presented with the opportunity, your child almost never responds in this manner, 10% or less of the time.

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W. Dunn

**Test of Sensory
Functions in
Infants (TSFI)**
Administration and Scoring Form
 George A. DeGangi, Ph.D., O.T.R., and Stanley I. Greenspan, M.D.
 Published by
 WESTERN PSYCHOLOGICAL SERVICES
 12001 Wilshire Blvd., Los Angeles, CA 90025-1251
 Publishers and Distributors

Name of Infant: _____
 Birth Date: _____ Date of Testing: _____
 Age in months: _____ Sex: M F
 Reason for Referral: _____

Directions

Administer the test according to the instructions presented in the Manual (WPS Catalog No. W 262C). During administration, score the items and record the item scores on the right side of this form. Each item is scored using a numerical rating scale. The criteria for scoring are summarized on the back of this form and detailed in the Manual. Determine the infant's score on each item according to these criteria and enter the number on the right.
 After administration, add the item scores for each subtest and enter the total next to the subtest name. Add the five subtest scores to obtain the Total Test Score and enter that number on the bottom right of the page. Then transfer the subtest scores and the Total Test Score to the profile form below by entering the scores in the appropriate boxes under the column heading "Score."

To use the profile form, place an "X" in the box that includes the infant's score on each subtest and the Total Test. Complete the profile by connecting the X's.

Subtest	Score	4-6 months			7-9 months			10-12 months			13-18 months		
		Normal	At Risk	Deficient	Normal	At Risk	Deficient	Normal	At Risk	Deficient	Normal	At Risk	Deficient
Reactivity to Tactile Deep Pressure	9-10	8	0-7		9-10	8	0-7	9-10	8	0-7	9-10	8	0-7
Adaptive Motor Functions	7-15	6	0-5		11-15	10	0-9	14-15	13	0-12	15	14	0-13
Visual-Tactile Integration	4-10	3	0-2		9-10	7-8	0-6	9-10	7-8	0-6	9-10	7-8	0-6
Ocular-Motor Control	1-2		0		2	1	0	2	1	0	2	1	0
Reactivity to Vestibular Stimulation	10-12	9	0-8		10-12	9	0-8	10-12	9	0-8	11-12	10	0-9
Total Test		33-49	30-32	0-29	41-49	38-40	0-37	44-49	41-43	0-40	44-49	41-43	0-40

Additional copies of this form (W 262F) may be purchased from WPS. Please contact us at 800-448-8857, Fax 310-478-7828, or www.wpspubs.com.
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DeGangi & Greenspan

Research Question



Can the normative data established in the USA on the standardised tests for assessing sensory integrative function in infants, be applied to infants between the ages of seven to 18 months, in a South African sample?

Objectives

- ▶ All objectives were based on:
 - Use of the ITSP and TSFI
 - Infants between the ages of seven and 18 months
- 1. To **compare the scores obtained** in a SA sample **to the normative data in the manuals** for these tests from the USA.
- 2. To **determine the diagnostic accuracy** of the tests in a SA sample.
- 3. **Establish the construct validity and internal consistency** of the tests on the research sample.

Methodology

Population

- 60 infants
- Age 7– 18 months
- Born at full term
- Without a diagnosed birth defect or gestational illness

Sampling Method

- Cluster sampling
- Degree of convenience - geographical area

Identify Facilities

Distribute Info

Collection

Therapist testing

Scoring of tests

Procedure



Methodology

Data analysis

Demographic Data

Descriptive statistics: %, ranges and means

Raw score means

Compared to typical ranges in test manuals

Z-Scores

Used to determine frequency data

Frequency data

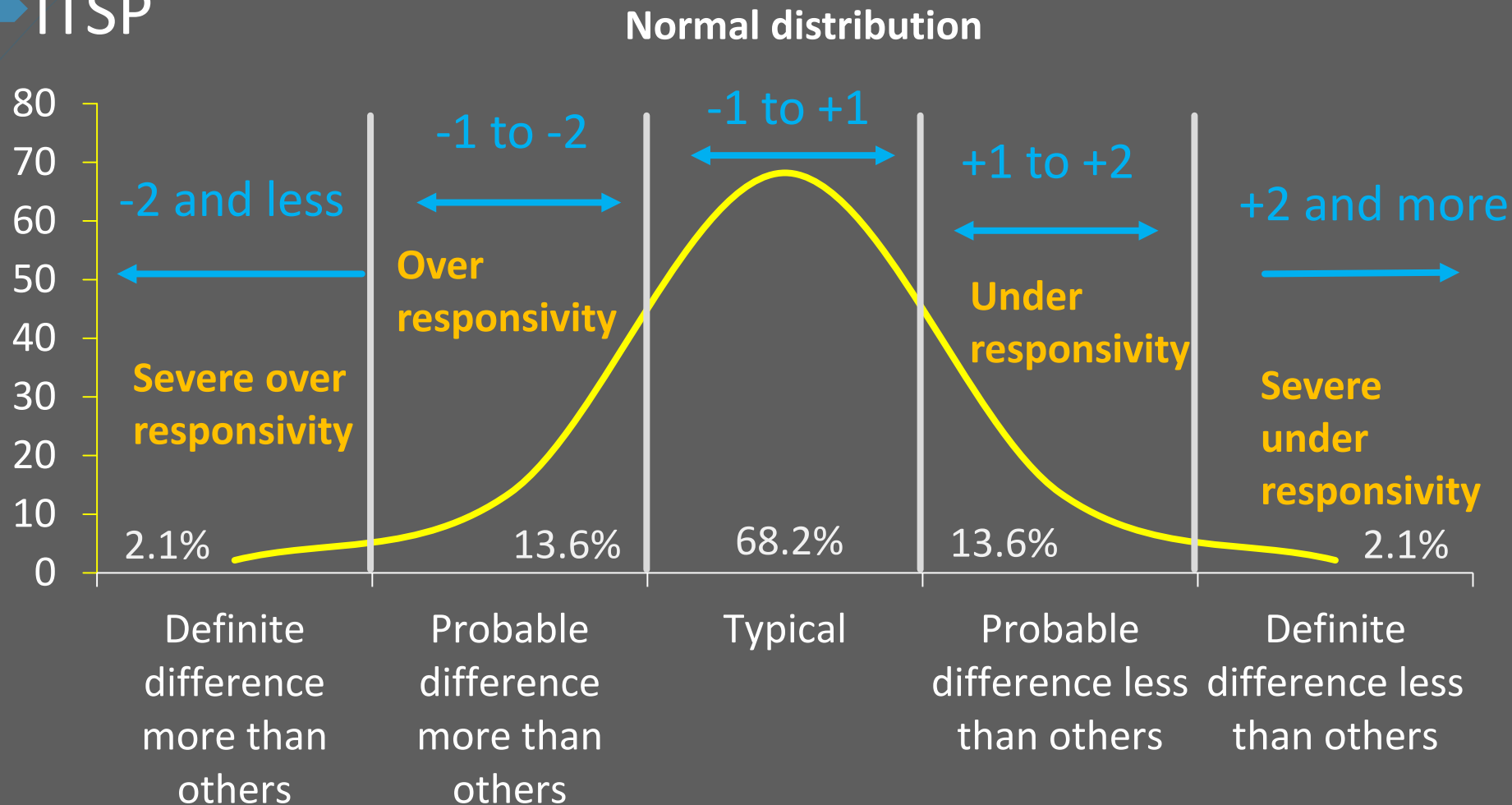
Accuracy, sensitivity, specificity, and misclassification

Construct Validity

Determined with Pearson's correlation coefficient

Explanation of test results

ITSP

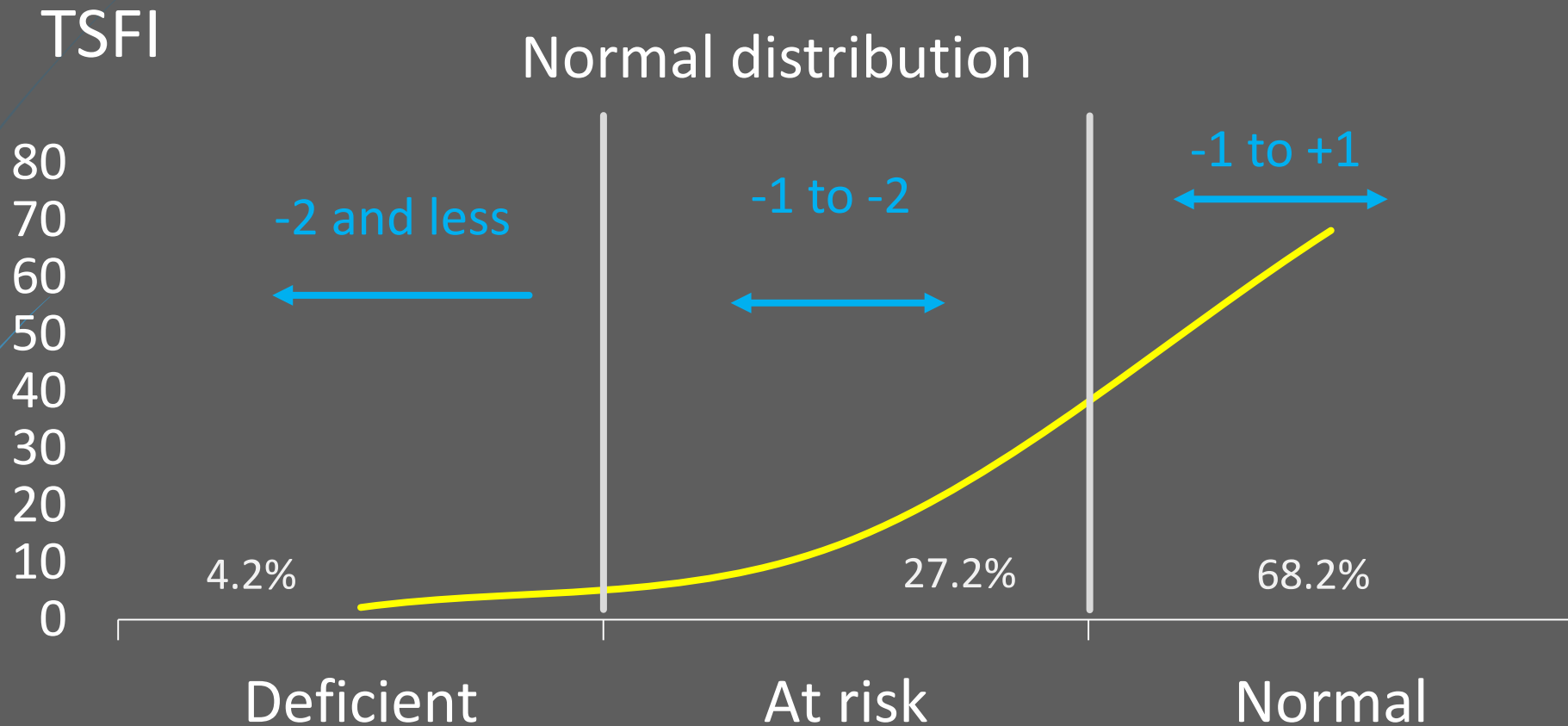


Relationships between Behavioural Response and Neurological Thresholds

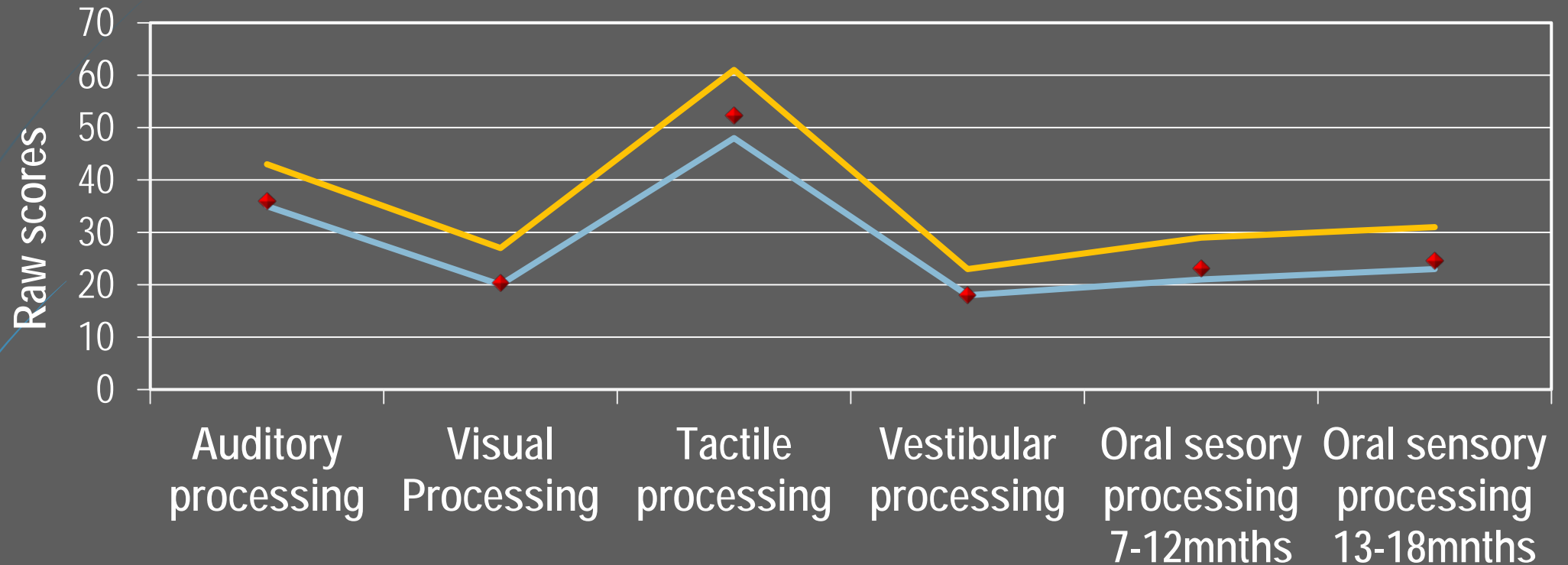
Neurological Threshold Continuum	Behavioral Response Continuum	
	Acting in ACCORDANCE With Threshold	Acting to COUNTERACT Threshold
HIGH (habituation)	Poor Registration	Sensation Seeking
LOW (sensitization)	Sensitivity to Stimuli	Sensation Avoiding

Based on: Dunn W. *The Impact of Sensory Processing Abilities on the Daily Lives of Young Children and Their Families: A Conceptual Model. Infants and Young Children*.1997; 9(4): p. 23-35

Explanation of test results

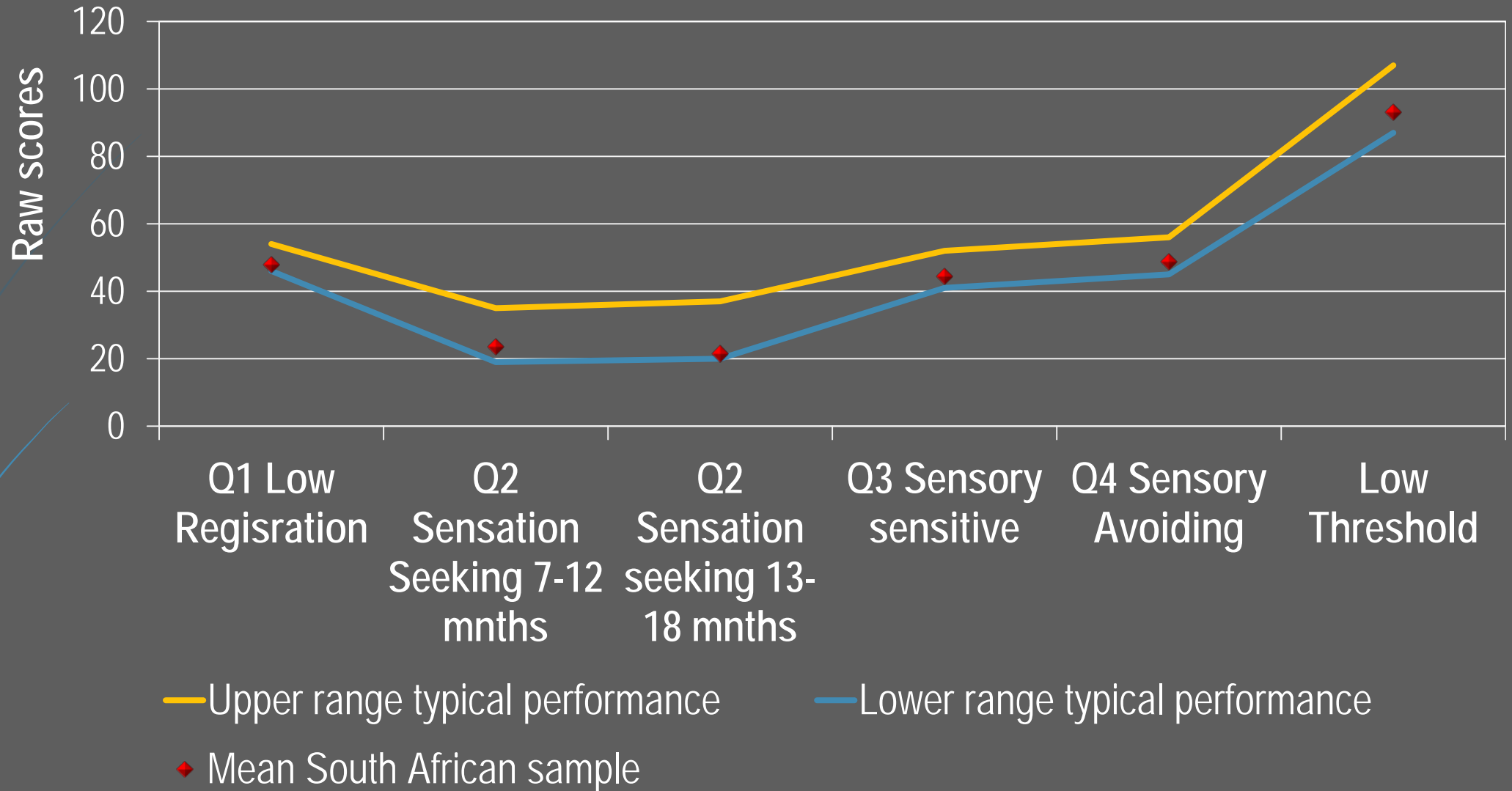


Results: Compared to normative data

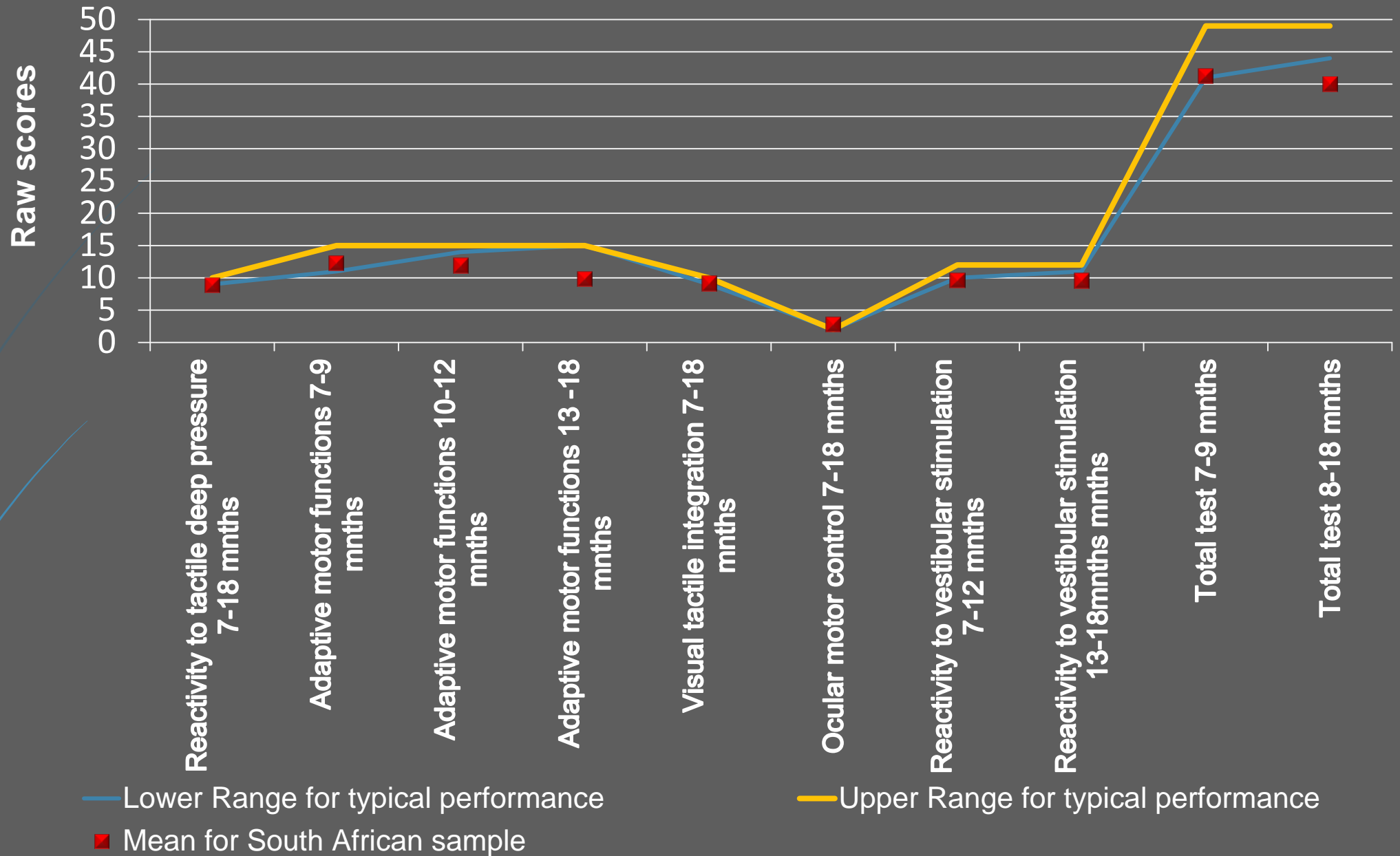


- Upper range typical performance
- Lower range typical performance
- ◆ Mean South African sample

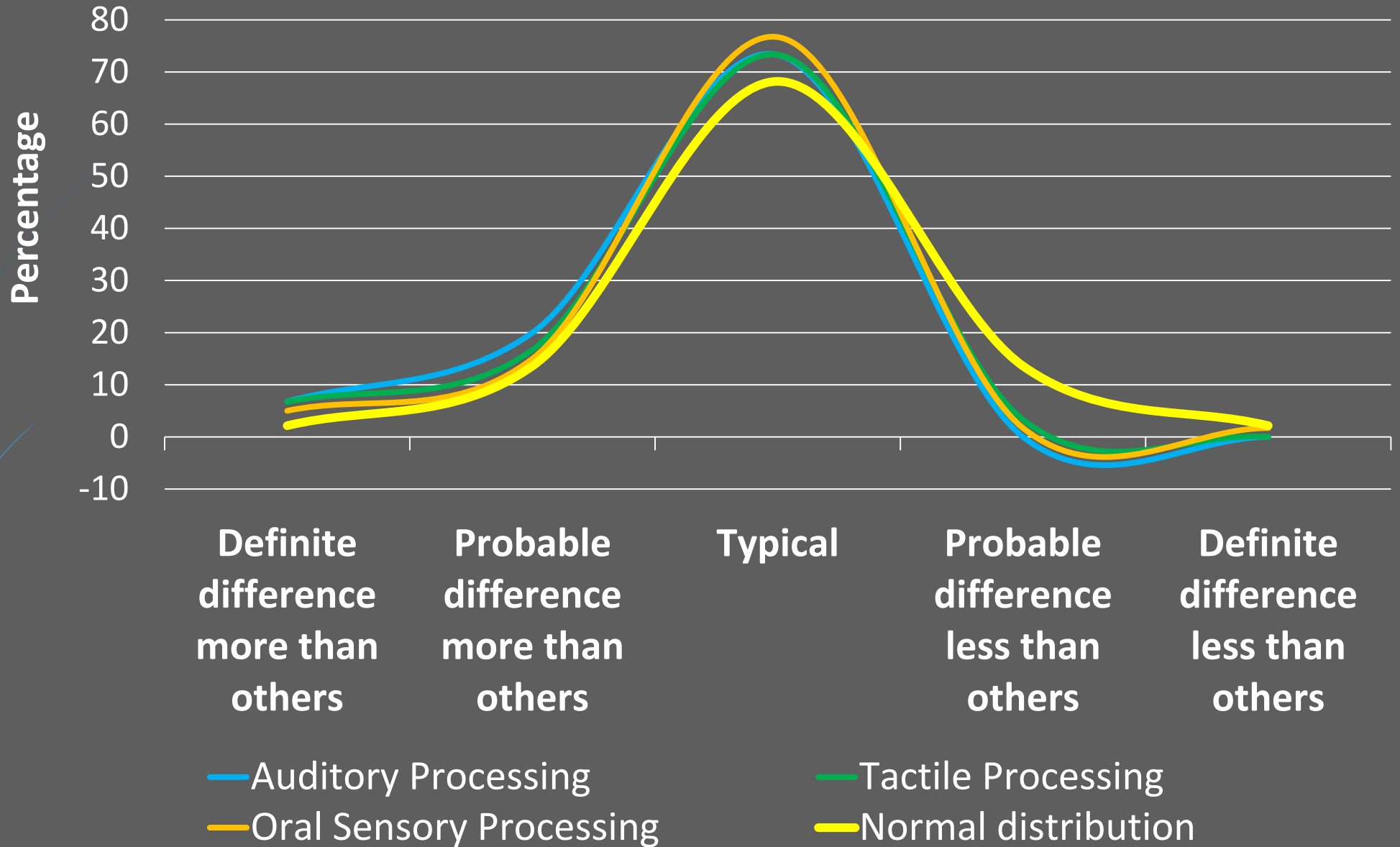
Raw scores of processing sections compared to normative data (ITSP)



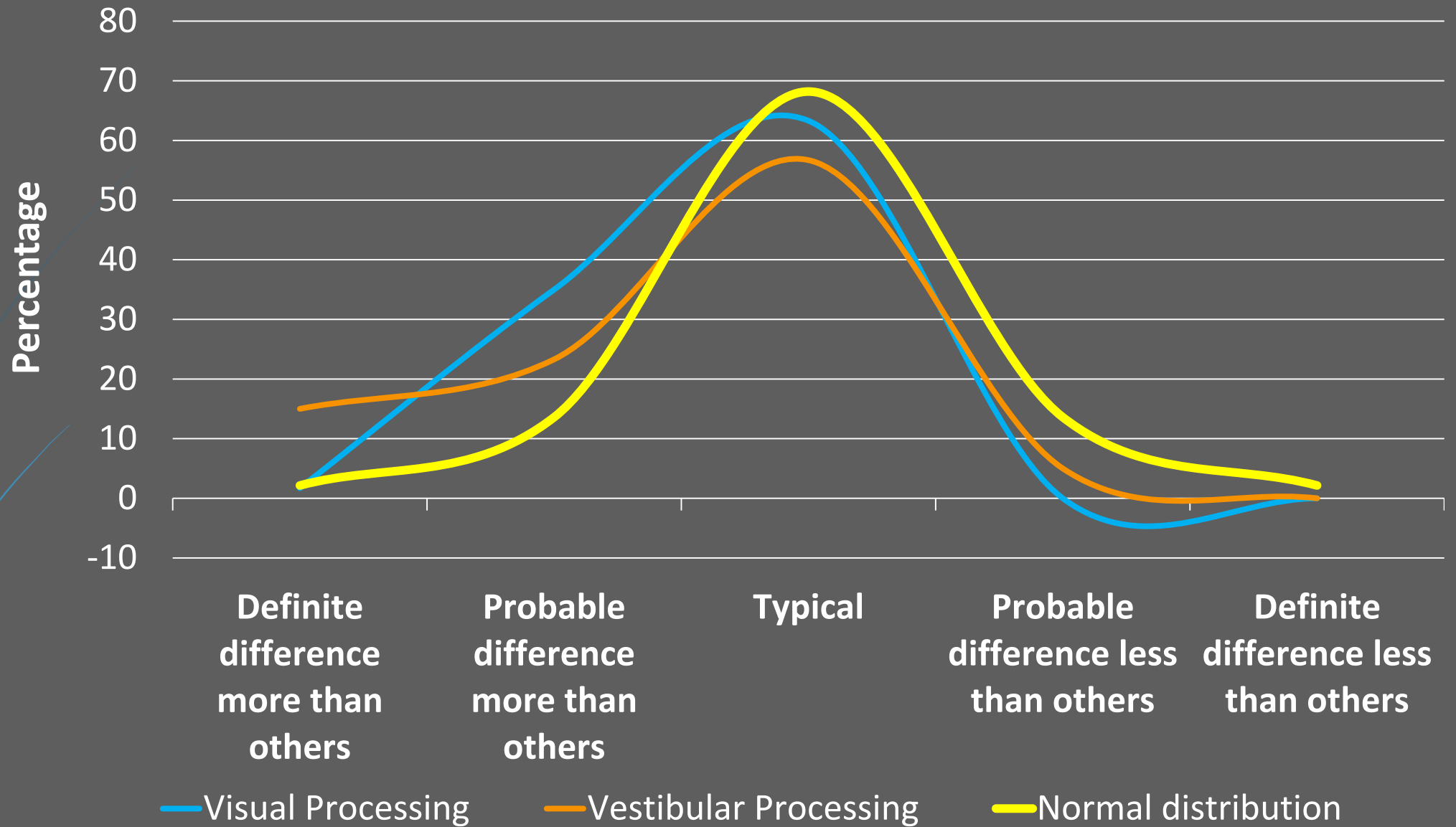
Raw scores of quadrant scores compared to normative data (ITSP)



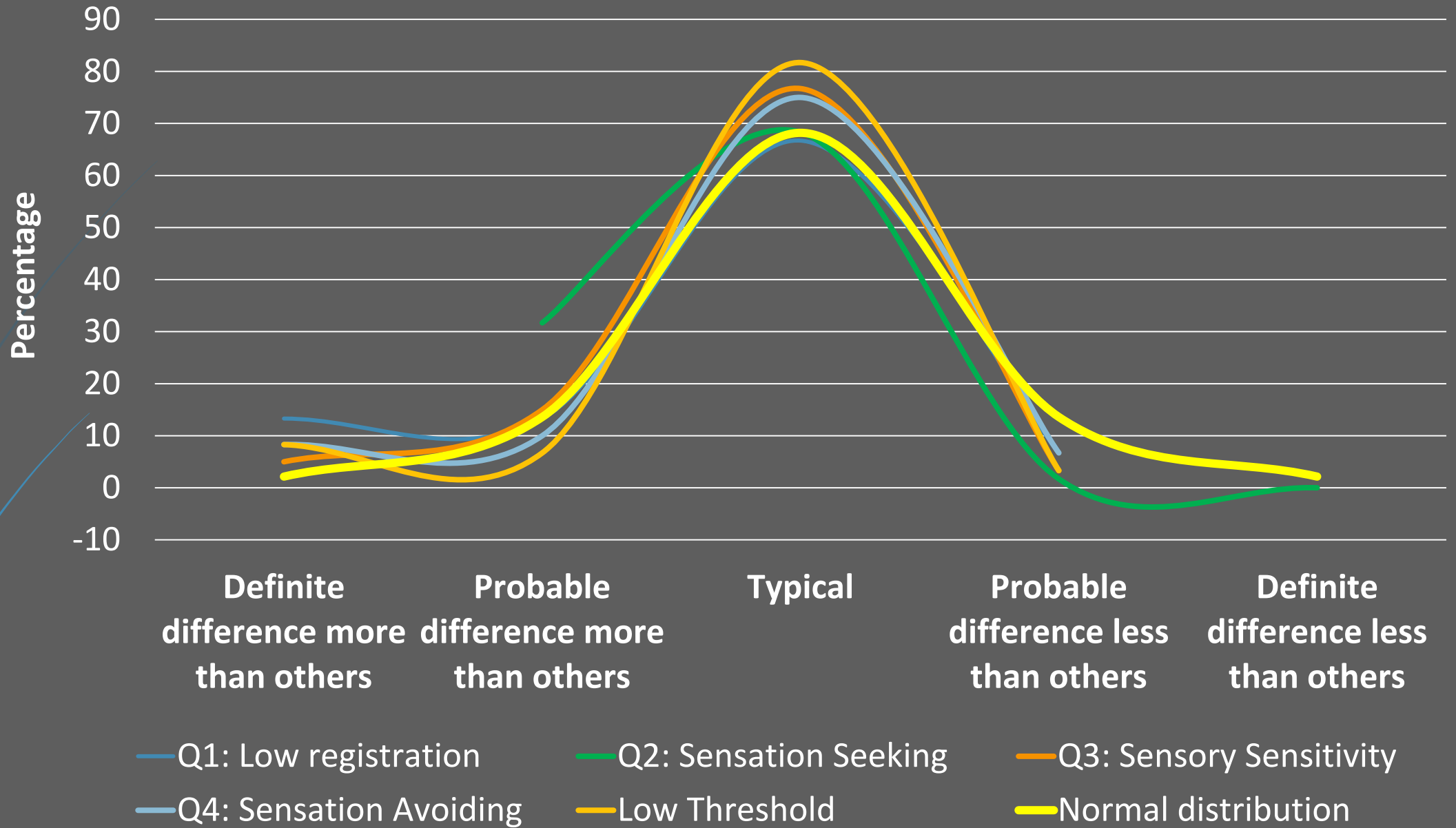
Raw scores of subtests and total test scores compared to normative data (TSFI)



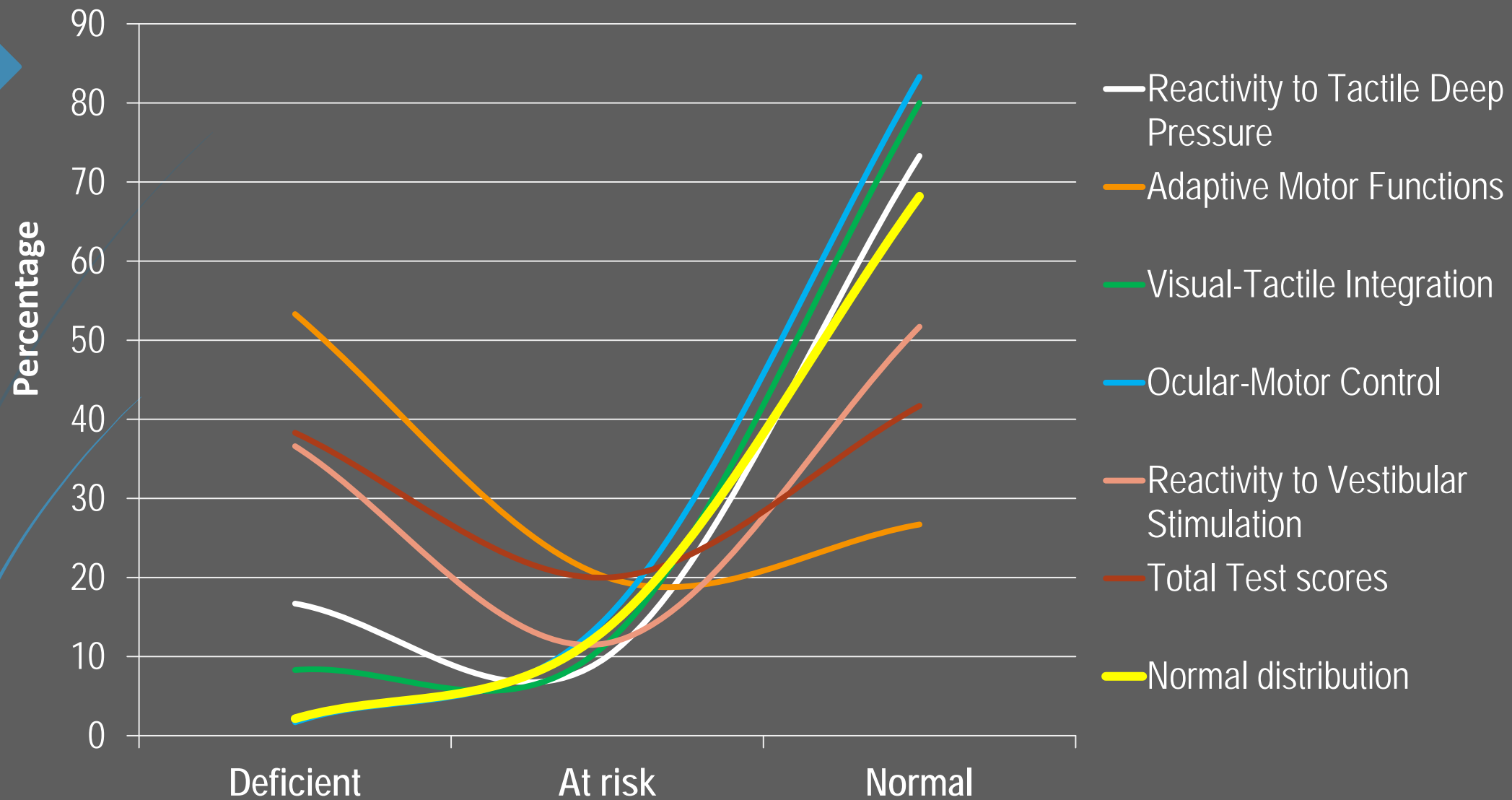
Distribution of scores for section scores compared to normal distribution (ITSP)



Distribution of scores for vestibular and visual processing section (ITSP)



Distribution of scores for the quadrant scores (ITSP)



Distribution of scores for the subtests and total test scores (TSFI)

Results: Diagnostic accuracy

- ▶ The ability of a test to discriminate between the target condition and health.
- ▶ Can be quantified by the measures of:
 - Diagnostic accuracy such as sensitivity and specificity,
 - Predictive values
 - Likelihood ratios
 - The area under the ROC curve
 - Youden's index
 - Diagnostic odds ratio

	ITSP	TSFI
Total sections	5 Sections + 5 Quadrants	5 Subtests + Total test score
Accuracy Level set at 80%	All acceptable	One subtest 58.3% and Total test score 73.3%
Sensitivity Under identifying problems if below 80%	1 section 73.7% and 3 Quadrants 73.7% / 78.9% / 57.9%	Two subtests 63.6% / 52.6%
Specificity Over identifying problems if below 80%	All acceptable	Two subtests 39.0% / 75.6% Total test score 61.0%
Misclassification Want score to be close to 0	Found to be low. Highest at 6.7%	Four subtests high 20.8% / 7.5% / 8.3% / 5.8% Total test score 13.3%

Results: Internal consistency

- Refers to the extent to which all items in a test work together
 - Creates homogeneous test
 - Measures a specific construct
- Measurement = Cronbach's alpha (α)
- $\alpha \geq 0.7$ indicates good consistency

ITSP	TSFI
Overall test $\alpha = 0.84$	Overall test $\alpha = 0.69$
α for Sensory processing sections and quadrants ranged from 0.80 to 0.86 in this sample	α for the subtests ranged from 0.50 to 0.71 in this sample
α in test manual ranged from 0.43 to 0.86	No α scores available for comparison
Good internal consistency when used on a South African sample	Moderate to low internal consistency when used on a South African sample

Results: Construct validity

- Convergent validity – Tests same traits
- Divergent validity – Tests different traits
- Both tests indicate to test sensory processing
- No correlation found between ITSP and TSFI
- Construct validity indicates divergent validity
- Tests not measuring the same areas of sensory processing

Limitations

- Very specific homogeneous sample
 - All participants attend child day care facilities
 - Geographical area with middle to high income
- Difficult to generalize findings to other infant groups in SA
- Tests were compared based on research on a sample based in the USA, and not scores standardised on a sample in SA
 - This may account for the issues with sensitivity

Limitations

- Small sample size
 - Results should be interpreted with caution
 - Cannot be generalised
- Identification of SID in the infants was affected by validity of the TSFI
 - Difficulties found cannot be considered as accurate for some subtests
 - Follow up for difficulties must be made with care
 - Number of problems appear to be over identified

Recommendations

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- Further research on:
 - Use of the TSFI on SA population
 - Use of the ITSP on SA population
 - Influence of the child day care environment on the development of SI function in infants
- The TSFI be used in conjunction with other tests
 - parent interviews
 - relevant background information
 - results from neurodevelopmental testing
 - skilled observations of the infant's behaviour

References

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- All the supervisors and staff at the various child day care facilities
- The South African Institute for Sensory Integration (SAISI) for research grant



A decorative graphic on the left side of the slide. It features a solid blue arrow pointing to the right, positioned at the top. Below the arrow, several thin, light blue curved lines sweep downwards and to the right, creating a sense of movement or flow.

Questions?