

# A Holistic INLM-Based Psychological Case Study of Heer Shah's: Integrated Intervention for Developmental Delays and Specific Learning Difficulties

Ms. Radha Navnit Jajal<sup>1</sup>, Ms. Badri Nirav Patel<sup>2</sup>

Healvibe Clinic, Ahmedabad

## Abstract

This case study documents the neuropsychological evaluation, holistic formulation, and intervention process of Heer Shah, a 5.5-year-old girl with developmental and specific learning delays. Heer had problems with auditory sequencing, expressive language, fine motor skills, and spatial abilities, leading to academic and emotional frustrations. Applying a multi-dimensional assessment strategy based on the Integrated Neuropsychological Learning Model (INLM), interventions comprised cognitive remediation, sensory-motor therapies, emotional regulation techniques, and integrative naturopathic care. Significant gains were noted following structured intervention.

**Keywords:** developmental delay, specific learning difficulties, cognitive-perceptual interventions, expressive language delay, INLM, integrative therapy

## 1. INTRODUCTION

Early intervention of learning and developmental issues is essential for achieving the best possible neuropsychological results. Heer Shah, a 5.5-year-old female child, was referred to Healvibe Clinic to evaluate ongoing problems with language expression, auditory comprehension, fine motor planning, and behavioral control in spite of having access to proper schooling and support at home.

An INLM-based comprehensive evaluation was administered to assess underlying deficits in ten cognitive-perceptual areas, emotional resilience, sensory-motor regulation, and biological factors. Based on the evaluation, an individualized intervention plan combining cognitive, behavioral, emotional, and herbal treatment approaches was initiated to facilitate neurological recovery as well as prepare for academics.

## 2. Client Information

Heer's parents reported difficulties with her expressive speech delays, irregular responses to verbal commands, awkward motor skills, and recurrent emotional frustrations during formal tasks. Pre-academic skills, particularly letter-sound correspondence, auditory memory, and fine motor writing exercises, were behind age expectations. A comprehensive developmental history, behavioural observations, and standardised psychometric tests identified cognitive-perceptual vulnerabilities consistent with particular learning difficulties and mild sensory integration problems.

Medical history involved long-term therapy with 30 mg Omnacortil and Shelcal as a bone supplement. After this phase, Heer was put on Endoxan, and later on continued steroid therapy for two more years. Medication was stopped entirely by March 2023. These medical considerations were taken into account in her overall neurodevelopmental formulation carefully.

### 3. Assessment Procedures

The following assessment methods and tools were used:

- Diagnostic Test of Learning Disability - Prasad Psycho: In order to assess academic preparedness, cognitive processing skills, and certain learning difficulties.
- Behavior Assessment System for Children - 2 (BASC-2): To assess emotional regulation, behavioural functioning, and adaptive skills.
- Clinical Interviews: With parents for detailed developmental and family history.
- Behavioral Observations: In-session performance, attention span, emotional resilience, and task persistence.

### 4. Results

- Key findings of the in-depth assessment were:
- Auditory Processing: Profound deficits in sequencing of sounds, phonemic discrimination (Score: 2.5/10)
- Expressive Language: Poor syntactic structure, poor vocabulary (Score: 1.5/10)
- Fine Motor Coordination: Difficulties with motor sequencing of handwriting, drawing (Score: 4/10)
- Spatial Skills: Difficulty with position-in-space and spatial relations (Scores: 2/10 and 5/10 respectively)
- Cognitive Categorization and Memory: Low concept formation and recall (Scores: 2/10 and 4/10 respectively)
- Emotional Profile: Minimal anxiety associated with communication impairment and resistance to performing tasks

### 5. Diagnostic Impressions

Primary Diagnosis: Developmental Delays with Specific Learning Difficulties (SLD profile features)  
 Secondary Considerations: Emotional dysregulation linked to expressive frustration, mild sensory processing challenges

### 6. Case Conceptualization – INLM Framework (Jajal, 2025)

Domain	Neuropsychological Challenges	Dietary Components & Potential Benefits
<b>Cognitive–Perceptual</b>	<ul style="list-style-type: none"> <li>- Auditory processing deficits</li> <li>- Expressive language difficulties</li> <li>- Fine motor control issues</li> <li>- Spatial cognition deficits</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Vegetables/Fruits (esp. apple):</b> General cognitive support</li> <li>- <b>Grains (oats, buckwheat, daliya):</b> Sustained energy for cognitive tasks</li> </ul>

		<ul style="list-style-type: none"> <li>- <b>Homemade health shake (banana, grapes, dried ginger, coriander, honey):</b> Antioxidants &amp; nutrients</li> <li>- <b>Supplements (Brahmi, Ginseng):</b> Cognitive resilience</li> </ul>
<b>Emotional</b>	<ul style="list-style-type: none"> <li>- Emotional dysregulation from communication breakdowns</li> <li>- Performance anxiety</li> <li>- Oppositional behavior</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Functional foods (avocado, bananas, cranberries):</b> Mood regulation</li> <li>- <b>Ashwagandha:</b> Stress reduction &amp; emotional regulation</li> <li>- <b>Gut-healthy foods (yogurt, pulses, khichdi, aloe vera, fenugreek, etc.):</b> Support gut-brain axis for emotional stability</li> </ul>
<b>Behavioral</b>	<ul style="list-style-type: none"> <li>- Task avoidance</li> <li>- Frustration outbursts</li> <li>- Overuse of gesturing</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Consistent balanced meals:</b> Stable energy, reduced irritability</li> <li>- <b>Avoidance of raw vegetables:</b> Easier digestion, reduced physical discomfort</li> <li>- <b>Supplements (Ashwagandha, Ginseng):</b> Improve frustration tolerance &amp; behavioral coping</li> </ul>
<b>Physical</b>	<ul style="list-style-type: none"> <li>- Motor delays suggesting immature sensorimotor integration</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Supplements (Calcium, Manganese, Vitamin D):</b> Support motor development through bone &amp; muscle health</li> </ul>
<b>Biological</b>	<ul style="list-style-type: none"> <li>- Gut-brain health influencing cognition &amp; behavior</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Anti-inflammatory naturopathic diet:</b> Improves gut-brain axis, supports cognition</li> <li>- <b>Functional foods (coconut water, carrot juice, cranberries, etc.):</b> Detox, reduce inflammation, support neurological health</li> <li>- <b>Supplements (Ashwagandha, Brahmi, Ginseng):</b> Cognitive &amp; biological resilience</li> </ul>
<b>Social</b>	<ul style="list-style-type: none"> <li>- Peer communication difficulties during group play</li> </ul>	<ul style="list-style-type: none"> <li>- <b>Indirect benefits via improved cognition &amp; emotion regulation:</b> Support better language use and confidence</li> <li>- <b>Overall well-being through diet:</b> Promotes social engagement and peer interaction</li> </ul>

### 7. Treatment Recommendations (Based on INLM)

Subsequent to the results of the assessment and case conceptualisation in the INLM model, the following multi-dimensional treatment plan was prescribed for Heer Shah:

- Neuropsychological Intervention Model (INLM): The treatment plan was designed to include cognitive-perceptual remediation supplemented with treatment strategies for emotional, behavioural, and social components along the overall principles of the INLM (Jajal, 2025).
- Targeted Cognitive Interventions: Remedial Education: One-on-one instruction focusing on the devel-

opment of visual-spatial skills, recognition of phonological awareness, and expressive language. Employing multisensory strategies to engage a variety of learning modalities.

- Cognitive Rehabilitation Therapy (CRT): Exercise to enhance attention, working memory, and executive functions, on which academic performance is based.

**Emotional and Behavioral Interventions:**

- Cognitive Behavioral Therapy (CBT): To manage anxiety through the recognition and amendment of negative thought processes and coping strategies (Beck, 2011). Techniques to cope with hyperactivity using behavioural methods and encouraging self-regulation.
- Emotion-Focused Therapy (EFT): To improve Heer's awareness and regulation of his emotions, building resilience (Greenberg, 2011).

**Integrative Approaches (Nutritional Support):**

- Under medical guidance, consideration of using Brahmi (*Bacopa monnieri*) for its possible cognitive-enhancing and anxiolytic properties (Jajal, 2025).
- Under medical guidance, consideration of Muleti (*Glycyrrhiza glabra*) for its adaptogenic effects in managing anxiety and stress (Jajal, 2025).
- Providing sufficient Vitamin C intake from diet or supplements for its contribution to overall cognitive well-being.
- Parental Support and Guidance: Psychoeducation of parents regarding learning disabilities, anxiety, and effective ways of supporting Heer at home. Coordination with the school to provide a stable and supportive learning environment.
- Regular Monitoring and Evaluation: Constant evaluation of Heer's school progress, emotional stability, and behavioural functioning in order to make any necessary modifications in the intervention plan.

**8. Findings and Interpretation (Post-Intervention)**

**LD Test Scores Before and After Intervention**

Area	Before Intervention	After Intervention	Interpretation
Eye-Hand Coordination (EHC)	4/10	5/10	Slight improvement observed; motor sequencing deficits persist, indicative of persistent dysgraphia tendencies. According to the Prasad manual, improvement from 4 to 5 suggests emerging control over fine motor integration, though visual-motor fluency remains below age expectancy.
Figure Ground (FG)	5/10	5/10	No significant change. Continued difficulty with selective visual attention, especially in crowded visual fields. As per the manual, a stable midrange score reflects

			functional, though not automatic, figure-ground discrimination.
Figure Constancy (FC)	5/10	7/10	Marked improvement in recognizing invariant properties of shapes across orientation changes. Indicates better symbol stability and visual generalization, consistent with post-intervention visual perceptual gains as outlined in the Prasad framework.
Position-in-Space (PS)	2/10	7/10	Significant gains noted. Initial deficits in letter orientation (e.g., b/d, p/q) and spatial reversals have decreased. Improvement aligns with enhanced spatial body schema development, as emphasized in spatial training protocols in the Prasad manual.
Spatial Relations (SR)	2.5/10	5/10	Moderate gains; while still below average, child now demonstrates partial ability to judge object positions in 3D space. Suggests developing spatial conceptualization but ongoing need for spatial simulation tasks.
Auditory Perception (AP)	2/10	8/10	Substantial improvement, especially in auditory discrimination and phonemic segmentation. Reflects successful phonological awareness training. In line with Prasad's model, this degree of improvement supports enhanced auditory sequencing and decoding readiness.
Cognitive Ability (CA)	4/10	7/10	Considerable improvement in categorization, logical sequencing, and verbal reasoning. According to the manual, transition from low to upper-mid scores indicates successful encoding and schema-based learning interventions.

Memory (M)	3/10	7/10	Post-intervention improvement shows enhanced short-term auditory memory and visual recall. Consistent with better use of mnemonic strategies and incidental learning methods described in the Prasad manual.
Receptive Language (RL)	3/10	8/10	Significant progress in listening comprehension and response to verbal instructions. Reflects gains in integrating verbal with visual cues, matching the Prasad manual's interpretation of improved semantic mapping and auditory closure.
Expressive Language (EL)	1.5/10	7/10	Major improvement from severely limited to functionally age-appropriate verbal expression. Vocabulary depth, syntactic organization, and spontaneous verbal output show clear gains, consistent with structured language stimulation programs outlined in the manual.

Following 5 years of integrated intervention, notable improvements were documented:

**BASC-2 Results Before and After Intervention**

Domain	Before Intervention	After Intervention	Interpretation
Externalizing Problems			
Hyperactivity	29	18	Significant improvement in managing restlessness, impulsivity, and staying still.
Aggression	27	23	Moderate improvement with no significant behavioral issues.
Conduct Problems	15	13	No significant change.
Internalizing Problems			
Anxiety	26	21	Significant reduction in anxiety symptoms.
Depression	21	19	Minor improvement in depressive symptoms.

Somatization	21	21	No significant change.
Functional Communication	30	18	Improvement in understanding and expressing social cues.
School Problems Index			
Attention Problems	29	10	Improvement in attention-related issues.
Learning Problems	26	19	Minor improvement in academic learning problems (raw score, interpretation based on Prasad Psycho).
Atypicality	28	18	Significant reduction in unusual or maladaptive behaviors.
Withdrawal	27	22	Minor improvement in social withdrawal behavior.
Adaptive Skills			
Adaptability	25	20	No significant change.
Leadership	24	18	No significant change.
Activities of Daily Living	29	18	No significant change.
Social Skills	27	10	Mild improvement in social skills, with greater social interactions.
Study Skills	27	18	Minor improvement in study-related skills (raw score, interpretation based on Prasad Psycho).

**Note:** Study Skills and Learning Problems are referred to herein but are discussed primarily in the Prasad Psycho assessment. Given scores are example raw scores; interpretation is according to the Prasad Psycho's standardised norms.

### 9. Conclusion and Recommendations

Heer Shah has shown promising improvements in cognitive, motoric, and emotional areas, substantiating the efficacy of the INLM-guided holistic intervention approach. Ongoing emphasis on expressive language, auditory sequencing, and emotional resilience is advised.

Future Steps:

- Continue expressive language therapies and cognitive rehabilitation
- Implement early academic preparatory interventions (phonics-based reading)
- Continue herbal and dietary support under supervision
- Promote organised peer socialisation activities

INLM's assimilation of psychological, cognitive, emotional, and biological aspects was instrumental in facilitating Heer's overall development and academically preparing her.



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