# Cognitive Linguistic Assessment Profiles (CLAP) for Bilingual Pre-schoolers

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## Abstract

Researchers have identified the main factors that affect language and literacy development in unilingual English-speaking children and bilingual children who speak English plus another European language. To date, it remains unclear whether their results generalize to **bilingual children** concurrently learning to speak, read, and write languages with more contrasting features, such as those found in Mandarin and Malay. Almost all of the published tests available for **assessing cognition, language or literacy** were developed overseas for use with relatively homogenous groups of unilingual English-speaking children or bilingual children with two European languages. For this reason, most of the available assessment tools have **limited clinical utility** for local bilingual children. Moreover, reliable identification of language and literacy difficulties in young bilinguals depends on test results in both languages. One aim of our 3-year longitudinal study of bilingual pre-schoolers in Singapore (from Nursery to K2 for English L1, Mandarin L1 and Malay L1 children) was to develop the **Cognitive Linguistic Assessment Profile (CLAP)**, a battery of **12 normed subtests** which includes measures of vocabulary achievement in two languages, memory abilities, phonological awareness and early literacy skills. This paper describes how CLAP is now being used in Singapore to screen for specific types of problems in **bilingual children.**

## Introduction

### Cognitive processes and types of knowledge entailed in reading (monolinguals)



(adapted from Vellutino et. al, 2004)
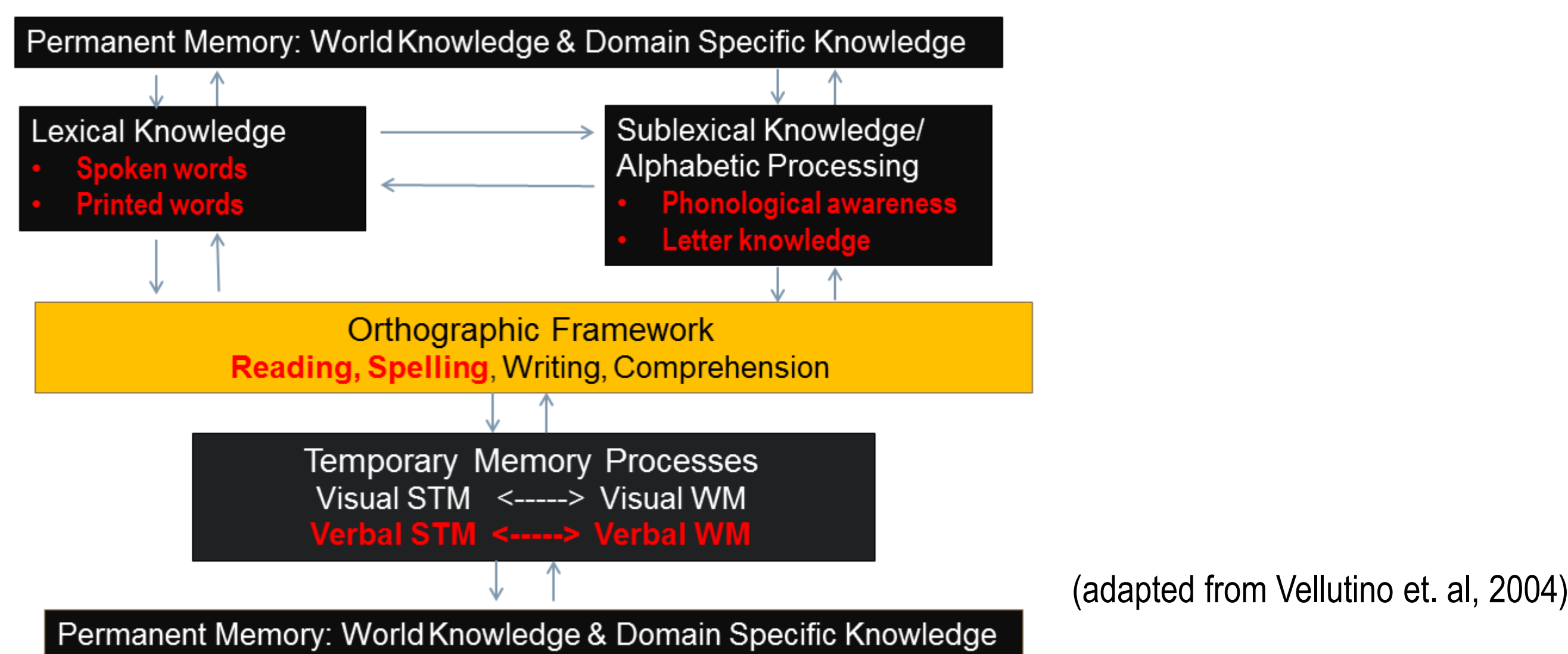
### Children at-risk for language and literacy difficulties:

SLI (Specific Language Impairment)
ESL (English as Second Language Learner)
GLD (General Learning Difficulties) or GDD (Global Developmental Delay)

**Early identification and intervention is critical but VERY challenging:** (Kohnert, 2010 for review)
• Need to test in two languages
• Must use culturally and linguistically appropriate assessment tools
• Much heterogeneity amongst bilinguals in terms of proficiency/exposure

## Research Question

### How to differentiate SLI, ESL, & GLD/GDD?
• Develop a linguistically, culturally and age appropriate language tests in both the 1st and 2nd language of child with separate norms.
• Screen in two languages and use a visual profiling to show an overview of child's abilities.
• Validate the profile using assessments by Speech-Language Pathologists (SLPs).

## Methods

**Participants for norming**
PCF kindergarten children
Simultaneous bilinguals learning both languages from age of 3
**L1**= language most frequently used at home
   (based on Teacher's and Parents' report)
No difference for age & nonverbal intelligence
Assessed once a year.   Time 1: Nursery ($M_{age}$=4;2)
                Time 2: K1 ($M_{age}$=5;1 )
                Time 3: K2 ($M_{age}$=6;2)



**Participants for screening**
Children attending THK Therapy Services & The Children's Therapy Centre.

**Materials**
**Raven's (36 items):** Matrices for nonverbal abilities (CPM, Raven, Court & Raven, 1995)
**Goodenough-Harris Drawing Test:** Draw a person test as measure of cognitive maturity
                (GEHT, Harris & Goodenough, 1963)
**Digit recall (forward/backward) (21 items):** Following format and instructions for WISC-IV (tested in both English and Mandarin, on separate days) (Wechsler, 2003)
**Receptive vocabulary (60-80 items):** (Sze & Rickard Liow, 2009)
Locally developed parallel from BLAB test (English and Mandarin/Malay, tested on separate days)
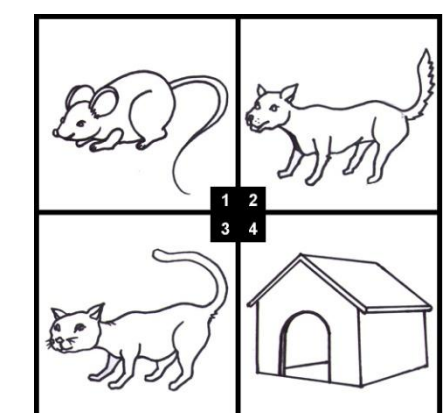
*Example of an item in the BLAB Receptive Vocabulary test. The target word is "cat".*
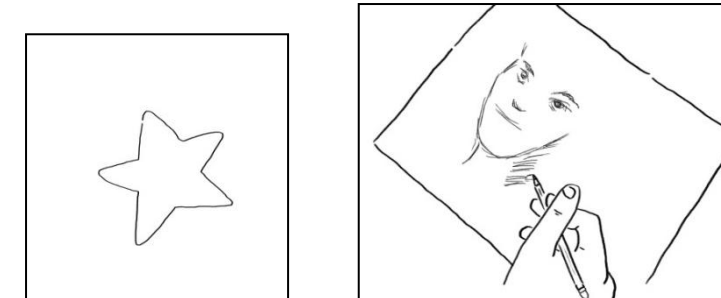


*Sample of items administered in Expressive vocabulary test for noun and verb.*

**Expressive vocabulary (N=140 items):**
Locally-developed picture naming test (tested in both English and Mandarin/Malay, on separate days) (similar to Druks & Masterson, 2000)

**Letter knowledge (20 items):** include letter name and sound
**Phonological Awareness (16 items):** include phoneme deletion and isolation
**Reading and Spelling test:** WRAT4 Reading and Spelling tests: single words (tested on separate days) (Wilkinson & Robertson, 2006)
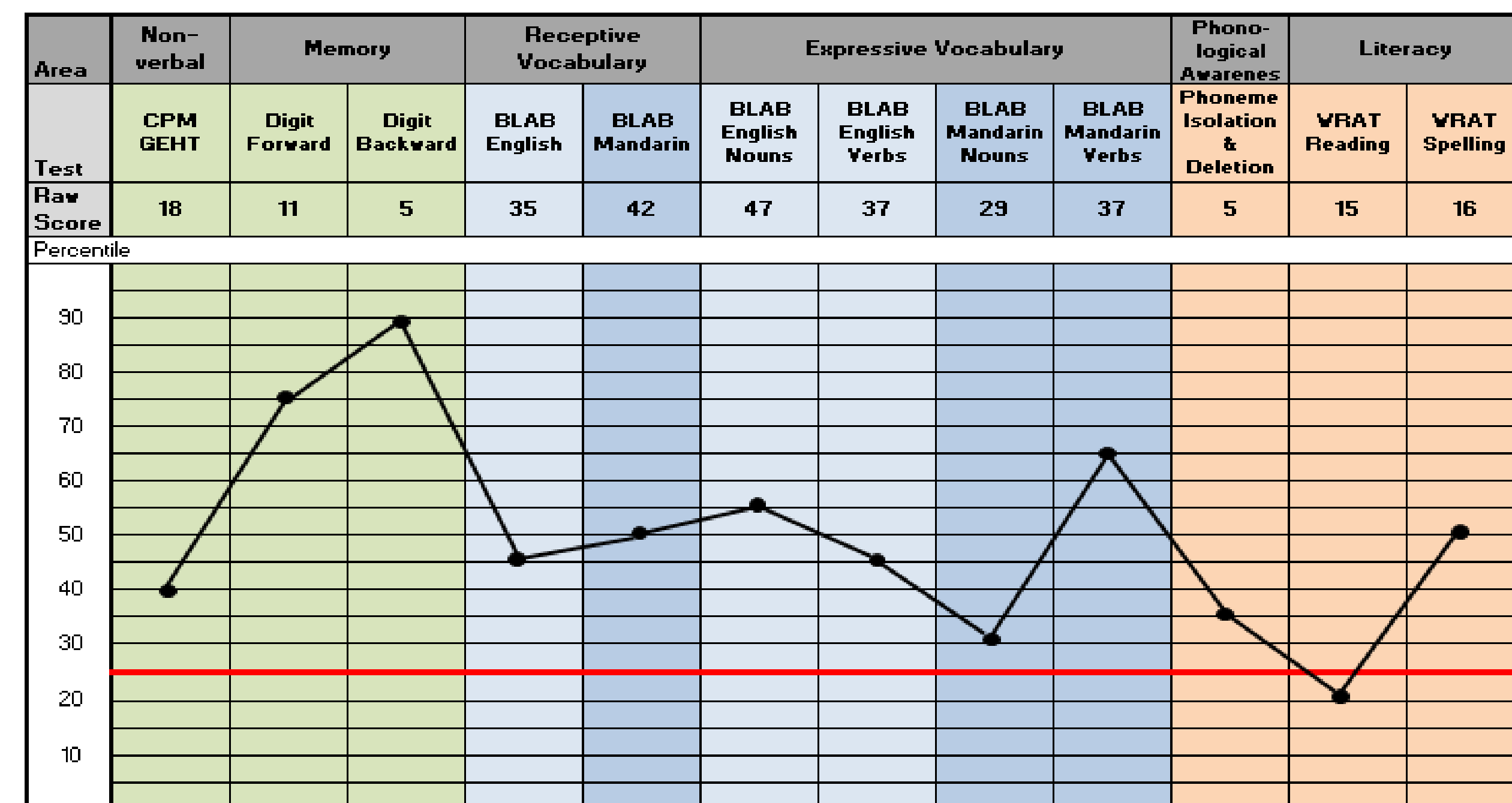**Follow up by the qualified Speech Language Pathologists (SLPs):** Early Repetition Battery (ERB) (Seeff-Gabriel et al., 2008) and Mandarin Receptive Grammar Test (MRGT) (Khoo, 2012; Pak, 2012)
**Cut off point:** 25th percentile (Chua, Rickard Liow & Yeong, 2014)
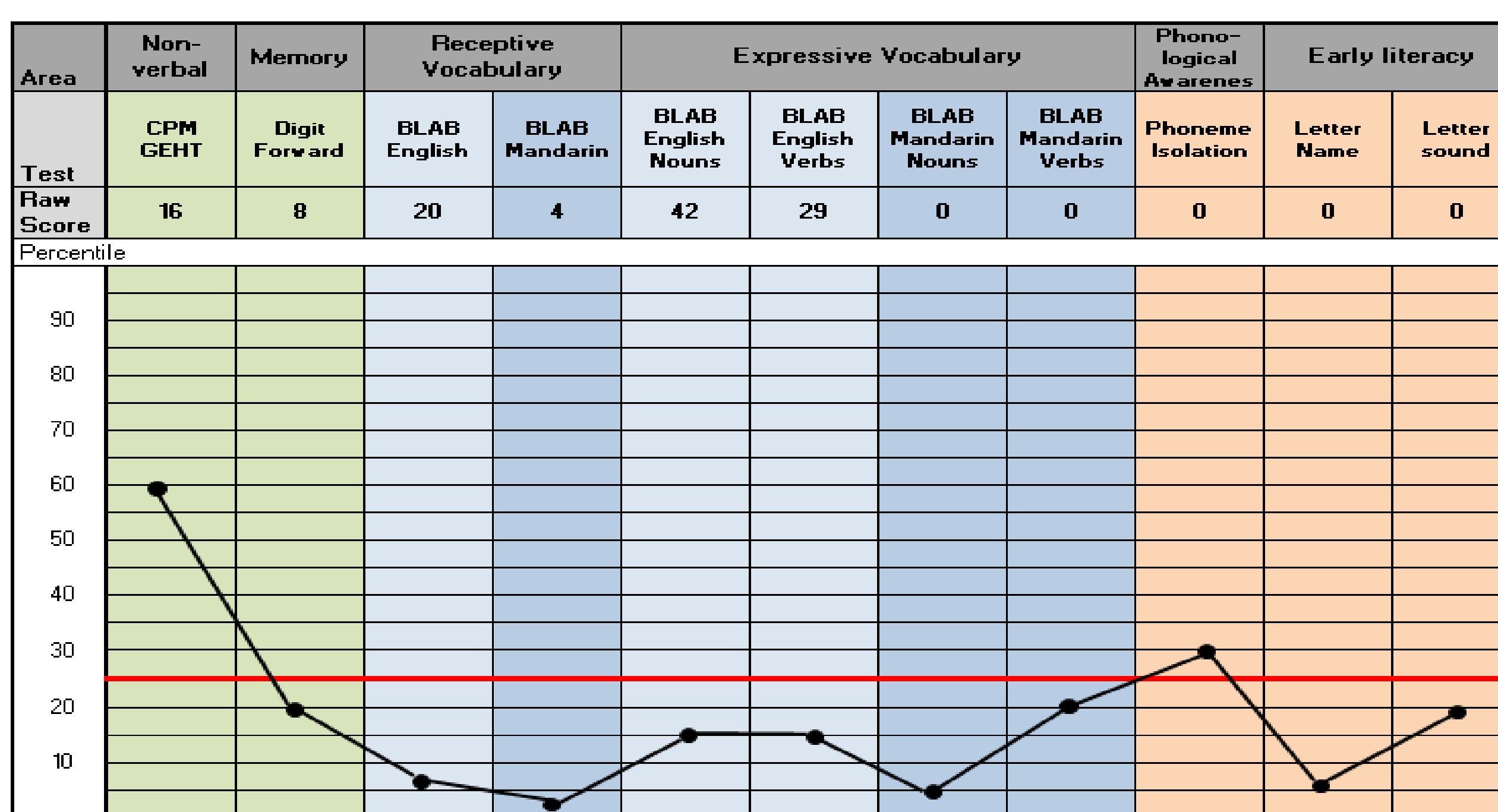
## CLAP (4 case scenarios)

**Profile A indicated by CLAP: Typical Development**
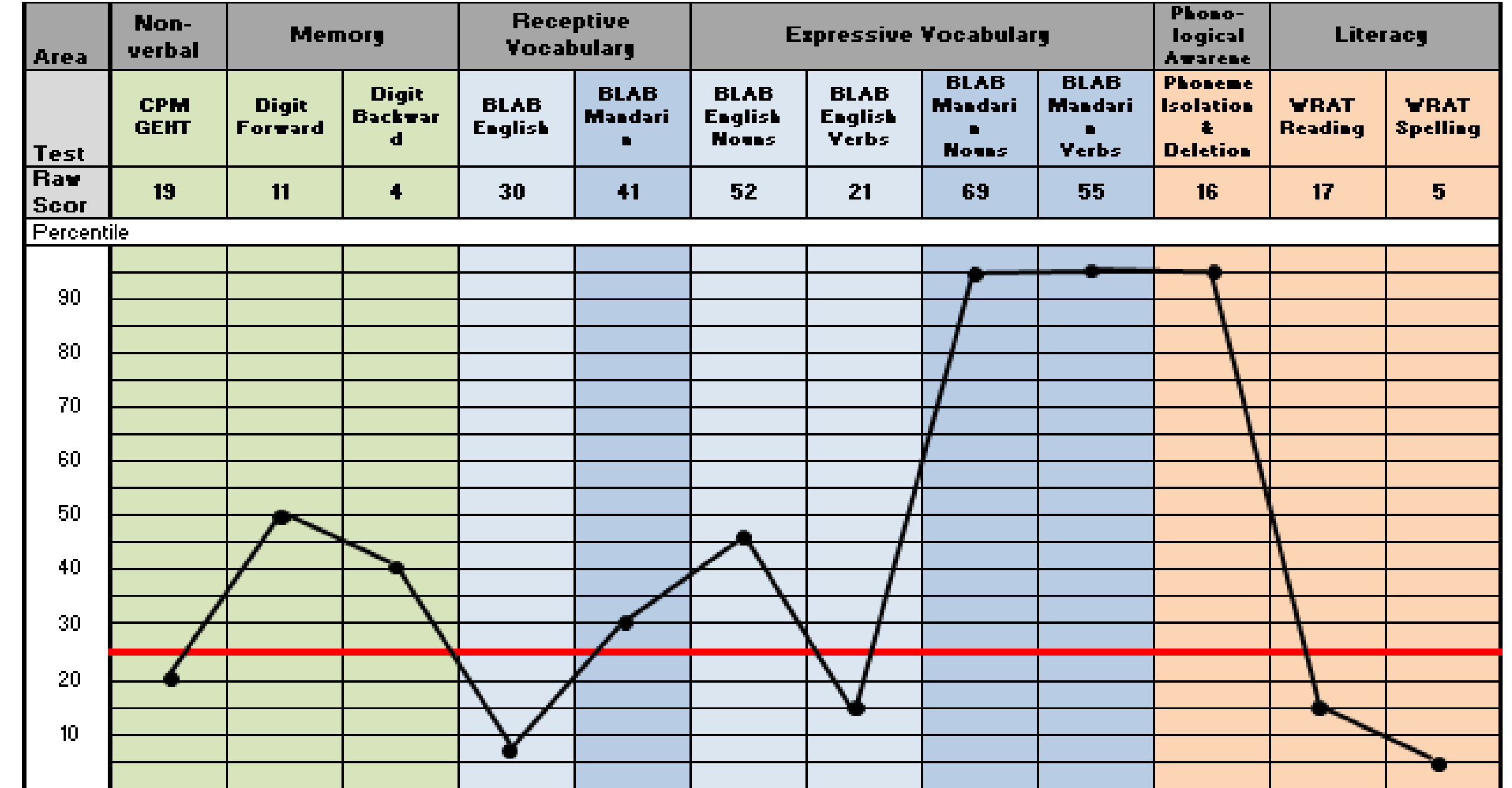Malay dominant, K2, with no previous diagnosis/concerns from parents & teachers

| Area | Non-verbal | Memory | | Receptive Vocabulary | | Expressive Vocabulary | | | | Phonological Awareness | Literacy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test | CPM GEHT | Digit Forward | Digit Backward | BLAB English | BLAB Mandarin | BLAB English Nouns | BLAB English Verbs | BLAB Mandarin Nouns | BLAB Mandarin Verbs | Phoneme Isolation & Deletion | WRAT Reading | WRAT Spelling |
| Raw Score | 18 | 11 | 5 | 35 | 42 | 47 | 37 | 29 | 37 | 5 | 15 | 16 |
| Percentile | | | | | | | | | | | | |



**Profile C indicated by CLAP: Specific Language Impairment (SLI)**
English dominant, Nursery; Other test results: ERB (6%-7% ); MRGT (15%)

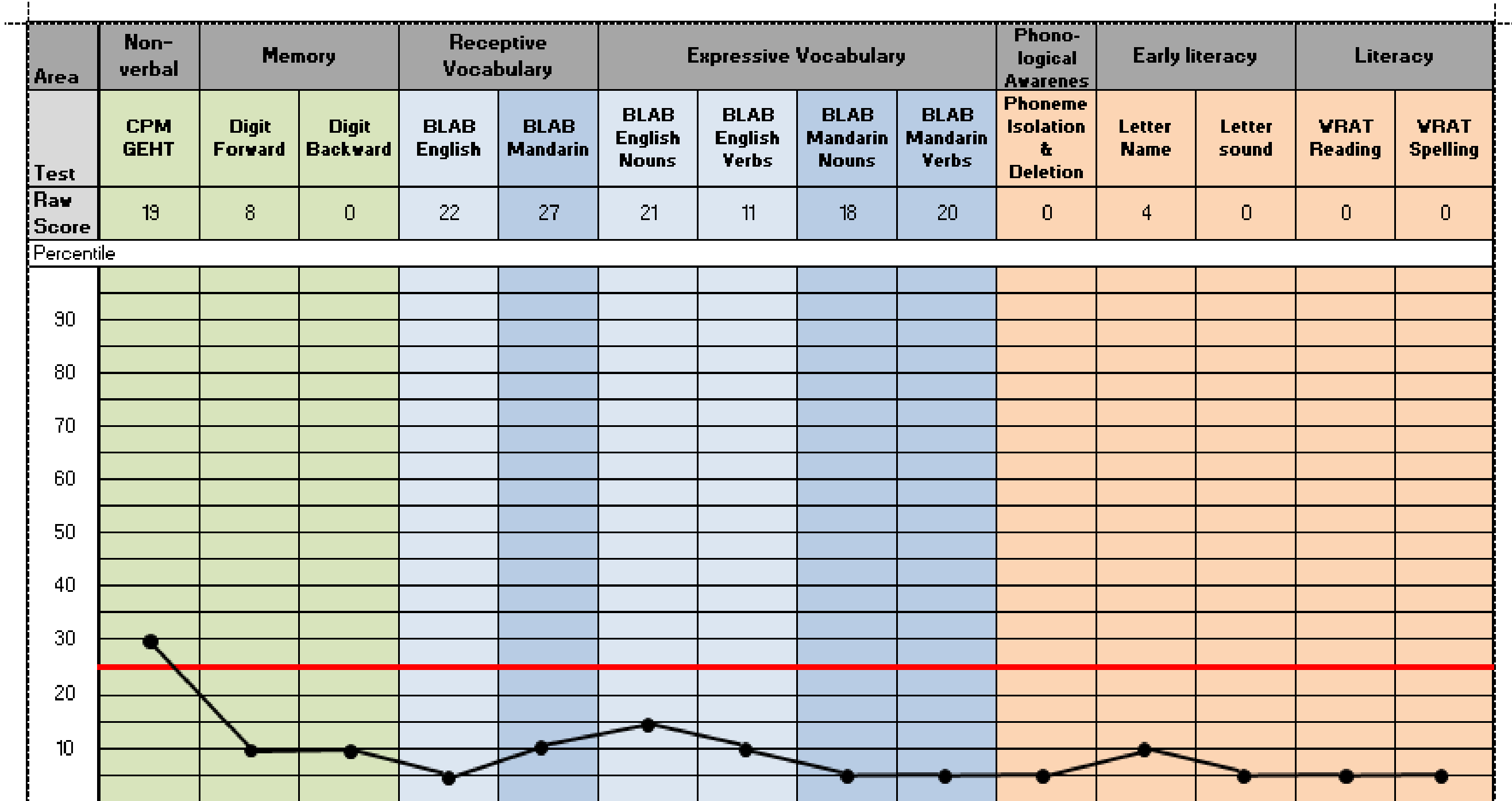| Area | Non-verbal | Memory | Receptive Vocabulary | | Expressive Vocabulary | | | | Phonological Awareness | Early literacy | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test | CPM GEHT | Digit Forward | BLAB English | BLAB Mandarin | BLAB English Nouns | BLAB English Verbs | BLAB Mandarin Nouns | BLAB Mandarin Verbs | Phoneme Isolation | Letter Name | Letter sound | |
| Raw Score | 16 | 8 | 20 | 4 | 42 | 29 | 0 | 0 | 0 | 0 | 0 | |
| Percentile | | | | | | | | | | | | |



**Profile B indicated by CLAP: English as a Second Language Learner (ESL)**
Mandarin dominant, K2; Follow up test results: ERB (2%-4%); MRGT (75-90%)

| Area | Non-verbal | Memory | | Receptive Vocabulary | | Expressive Vocabulary | | | | Phonological Awareness | Literacy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test | CPM GEHT | Digit Forward | Digit Backward | BLAB English | BLAB Mandarin | BLAB English Nouns | BLAB English Verbs | BLAB Mandarin Nouns | BLAB Mandarin Verbs | Phoneme Isolation & Deletion | WRAT Reading | WRAT Spelling |
| Raw Scor | 19 | 11 | 4 | 30 | 41 | 52 | 21 | 69 | 55 | 16 | 17 | 5 |
| Percentile | | | | | | | | | | | | |



**Profile D indicated by CLAP: Global Developmental Delay (GDD)**
Mandarin dominant, K1; Other test results: ERB (1%); MRGT (5% -10%)

| Area | Non-verbal | Memory | | Receptive Vocabulary | | Expressive Vocabulary | | | | Phonological Awareness | Early literacy | | Literacy | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Test | CPM GEHT | Digit Forward | Digit Backward | BLAB English | BLAB Mandarin | BLAB English Nouns | BLAB English Verbs | BLAB Mandarin Nouns | BLAB Mandarin Verbs | Phoneme Isolation & Deletion | Letter Name | Letter sound | WRAT Reading | WRAT Spelling |
| Raw Score | 13 | 8 | 0 | 22 | 27 | 21 | 11 | 18 | 20 | 0 | 4 | 0 | 0 | 0 |
| Percentile | | | | | | | | | | | | | | |



## Discussion and Future Directions

**Clinical utility**: CLAP results able to reflect **different profiles of ESL, SLI and GDD children;** provides comprehensive information but administration time long (2 hours); Norms now available for PCF kindergarten children with **different types of local bilingual backgrounds.**

**Future directions**
• Reduce number of items per task (c. 30 for vocabulary) for the screener and reduce testing time to one hour;
• Manual and CD-ROM of CLAP tests now available (with instructions on administration and scoring);
• **Could be used by trained teachers or educational specialists** before a child is referred to SLPs or Psychologists.

## References

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