

*Children's Progress, Inc.*

**Concepts of Vygotskyian Assessment**

Spring 2004



**Eugene Galanter**

**Columbia University**

## BACKGROUND AND PHILOSOPHICAL OVERVIEW

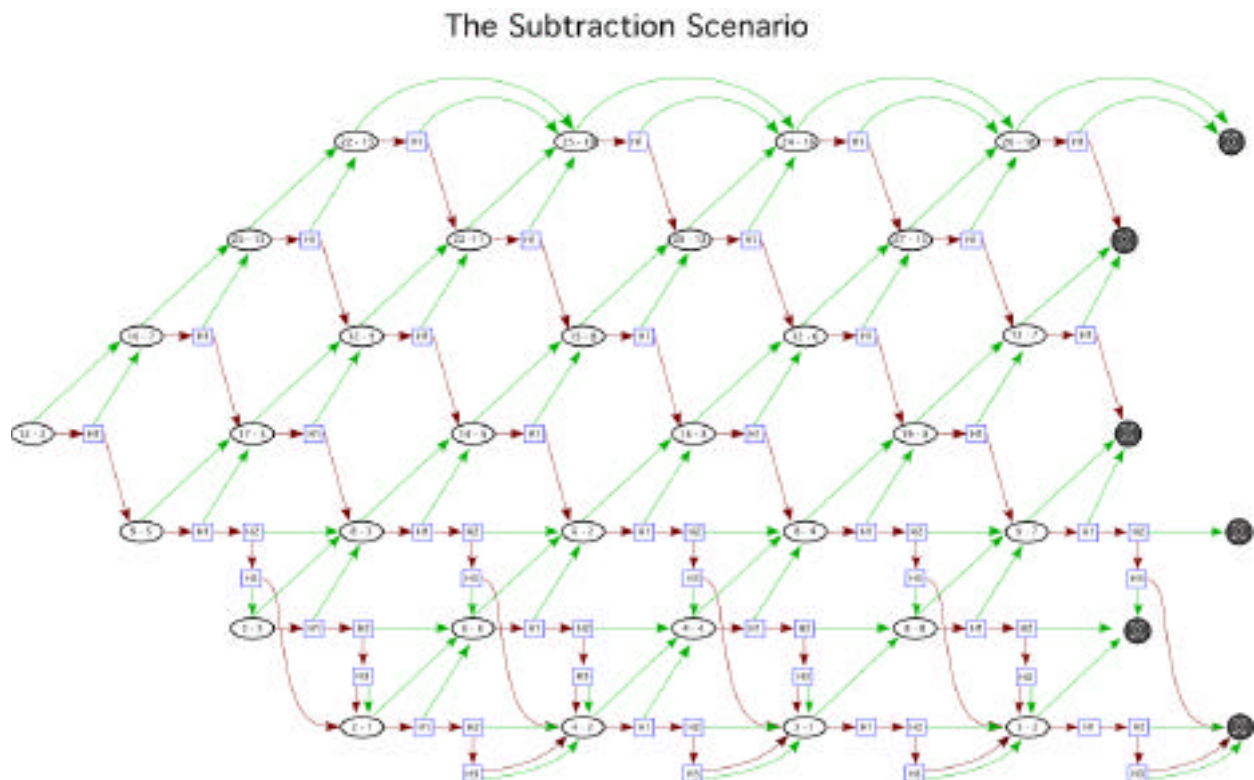
Teaching requires us to measure what a child has mastered. The technology behind this effort was developed originally by psychometricians in the late 19<sup>th</sup> and early 20<sup>th</sup> century. These tests were commercialized and adopted by schools and colleges in the 1930's. Such tests generate a number. That number is presumed to capture a child's achievement or mental capacity. It's no wonder that parents, teachers, and even politicians are in turmoil. Without a sound basis to provide guidance for a child's educational welfare, these so-called "objective" tests merely measure failure. The "score" consists of nothing more than how many questions the child got wrong. Current high stakes tests demoralize administrators, frustrate teachers, pigeon hole students, and leave parents without helpful information. Elsewhere I have called such scores a Scarlet Number.

In an ideal world, instruction and evaluation would complement each other as naturally as talking and listening do in normal conversation. Evaluations would be used to gain insight into a child's understanding of the material, and not as a way to sort children by their scores into a "bell curve." Current standardized tests leave teachers powerless and serve to misinform the public as to the abilities and educational potential of children. Their vaunted objectivity, based merely on reliability and validity coefficients, fail the needs of teachers, administrators, or parents, while at the same time terrifying many children.

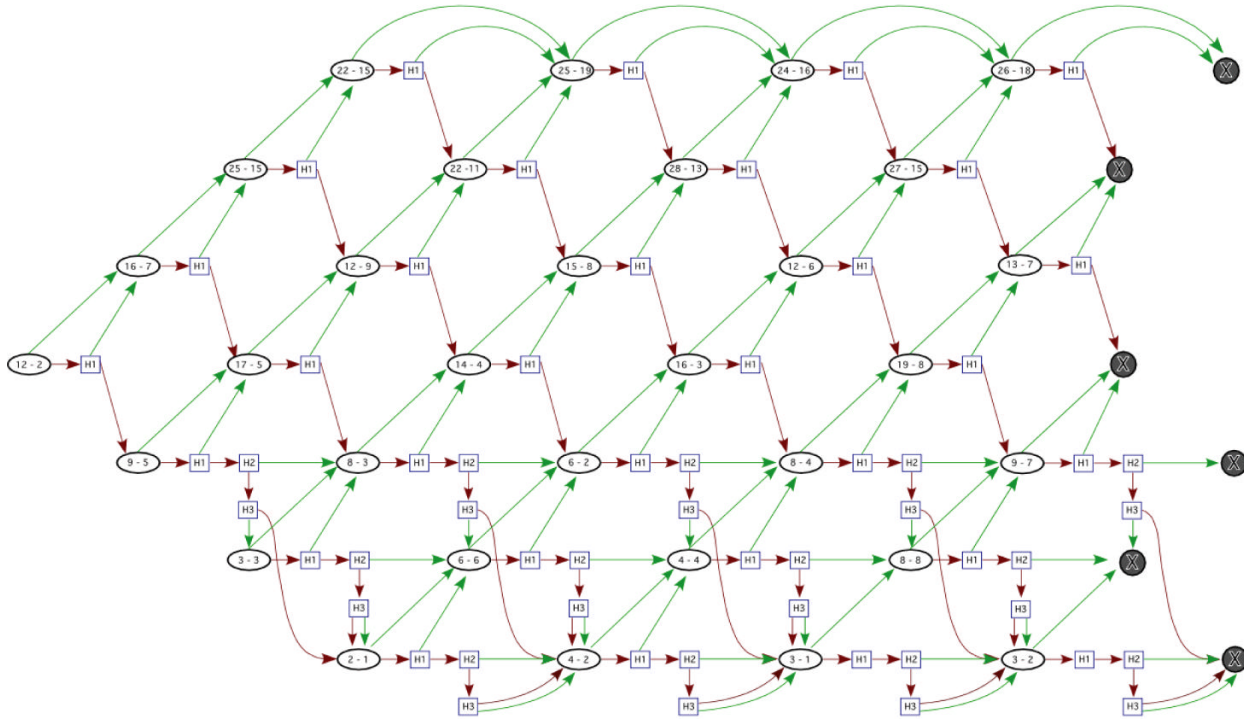
At Children's Progress we have addressed these issues directly, and have developed a totally new way to unpack a child's understanding. The principles that underlie CPI's psychoeducational diagnostics, assessments, and evaluations rest on three proprietary properties.

### 1) Psychophysical, psychomotor, psychosocial, and other screening diagnostics:

A child's physical and physiological, and neurological characteristics can enhance and/or limit educational success. CPI attends to this fact by first evaluating various sensory, perceptual, and motor skills, as well as dyslexic tendencies, psychosocial difficulties, and forms of behavior often seen as reflections of limited attention. This Visual-Auditory-Motor complex (the **VAM**) screens for color vision deficit, limited visual acuity, astigmatism, auditory difficulties in intelligibility, motor control and response speed using tracking tasks and multiple reaction time paradigms, and other neuropsychological instruments. All of these findings are provided to the teacher or other responsible adult in a narrative report for each child.



## The Subtraction Scenario



Copyright 2000, Children's Progress, Inc.

Figure 1

A larger image of this lattice is available as an Adobe Illustrator document named: Subtraction Lattice.ai

In our evaluation lattices, the nodes interlock to comprise an evaluation structure that cannot be duplicated in a test administered to groups of people, and further even if administered individually, the path through the lattice will vary from person to person. Insofar as inter-individual comparisons are concerned, CPI maintains that the evaluation instrument should tell us about the unique individual, rather than locating the individual at some ordinate of the distribution of other individuals. CPI combines assessment (does the student understand this concept?) with diagnosis (what kinds of errors is the student making?). cf. *Single-Participant Research Design*, D. L. Morgan & R. K. Morgan, *American Psychologist*, Vol. 56, Feb 2001.

As we remarked previously, our technology extends notions about assessment first suggested by Lev Vygotsky. He said "We give children tasks of varying degrees of difficulty, and we judge them on the basis of how they solve them. If we (were to) offer leading questions or show how the problem is to be solved, the solution (would not be psychometrically) regarded as indicative of mental development." But with such hints, or as Bruner called them, "scaffolding," Vygotsky says, we could find in the child a new cognitive level. The spread between what the child can do alone, and how such hints can help. He termed that spread the "zone of proximal development (the ZPD)."

In the past, such data could only be extracted from careful clinical interviews. The Internet and its flexibility lets us get such detailed information. A matrix of a child's performance is used as a template to generate a meaningful narrative report about the child's progress that a teacher can use. This narrative report of the child's skills is supported by a detailed analysis of the vectors of a child's behavioral path through the lattice. Administrators can examine summary data based on these vectors that can be extracted from any set of students, classes, schools, districts, or even an entire state, sorted by any set of variables located in the child's initial physical and demographic input page.

### 3) The layering of concepts and the "convergence damping" of the lattice:

Consider a simple example of the difficulty in interpreting an item solution in a standardized test:

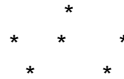
The child is shown:

$$2 + 5 = ?$$

and is asked to place the correct number at the ?, or more commonly to select the correct answer from among a set of arbitrary alternatives. If the wrong answer is offered, the test scores the child as weak in addition. In such a standardized test, the child receives an "incorrect" mark. In our mathematical arts lattice, such an answer could lead to a new screen displaying:

$$\begin{array}{r} 2 \\ +5 \\ \hline ? \end{array}$$

and the child might (or might not) insert an appropriate answer. In either case we come to know more about the child's zone of proximal development, i.e., that he or she may use a different algorithm to solve addition problems than his or her peers. Help or hints like this we call a "prospective hint." If this item is answered incorrectly, the next item could look like:



*How many stars? Click on the number 3 4 5 6 7 8 9*

This is a "retrospective hint." It recognizes that the child's arithmetic knowledge is not at the level of numerical representations of addition. If again the child is confused, the items could retreat to comparisons of the numerosity of simple objects, with no press in subsequent items, for addition or counting.

In language arts we see how a student fares when faced, for example, with problems that require understanding how to make words that end in "y" plurals or how to identify nouns and pronouns in a sentence, or whether two words are synonyms. CPI does not simply report that a child achieved a certain level of performance, but also describes specific problems, e.g., that a child was struggling with recognizing the plural forms of words and was incorrectly adding an "s" instead of an "es" for words like "patch." We interpret these hints that may offer help to get the correct answer a way to converge on the upper bound of the child's ZPD. When the child gives a correct answer, the evaluation moves to a new item, damping the time spent on assessing, say, single digit arithmetic.

We call the arrangement of items in each academic domain a "concept structure." The organization of the whole evaluation is a stack of such concept structures like a layer cake, through which the child moves; first through a concept, and then up or down into more or less demanding conceptual representations. The path the child takes represents a form of evaluation, quite unlike current adaptive testing.

For more information on the technology, and its history and development see these topics at our web site:

<http://www.childrensprogress.com>