Marie Clay's Theoretical Perspectives and Powerful Messages for Teachers

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The purpose of this discussion is to reflect on Marie Clay's quest for explanations of early literacy development, the literacy processing theory that her research revealed, and the implications of her theoretical constructs for teachers. She summarized her work as developmental, preventative, and provocative, and this stems from the unique perspectives she brought to the study of literacy acquisition and instruction. Her theoretical stance and significant contributions have enhanced our perceptions of literacy, young learners, and early intervention and have created promising opportunities for children and teachers, her profound legacy.

Clay's theoretical understandings guide Reading Recovery® teachers' work with young learners and support her intention to enhance teachers' effectiveness through discussion of theory on two levels: "a theory of what occurs as children become proficient readers and writers . . . and a theory of how to interact with what occurs" (2001, p. 77) in order to provide powerful instruction. The following discussion reviews Clay's literacy processing theory, constructive learners and related learning theory, and implications for literacy instruction that will ensure a self-extending system, the key to guaranteeing ongoing development and success.

A Developmental Theory of What Occurs

In multiple contexts Clay (1991, 2001, 2014) has shared that her academic discipline was developmental psychology with its focus on the study of development of cognitive competences by "active learners *changing over time* within their contexts" (Clay, 1991, p. 2). She chose to study children acquiring early literacy and focused initially on documenting observable behaviors and changes in how children work in reading and writing continuous texts during the earliest phase of literacy acquisition and instruction, their first year of schooling. She interpreted changes in literacy processing (meaning in-the-head processing) as signals of change in psychological processes such as perceiving, linking, and decision-making. This was considered an appropriate first step, as descriptive accounts of children's progress and emerging cognitive competences during literacy acquisition had not been reported in the research literature (Clay, 2001). Clay was embarking on new territory.

While delineation of behaviors changing over time was her first objective, her related goals were explanations of observed changes and considerations of how to modify instruction in order to optimize development for all individuals (Clay, 2004). For struggling learners, she described this as "leading children … back to a more-secure developmen-

tal track, that is, to the *recovery of a more normal trajectory"* (Clay, 2001, p. 288–289), and this brought her to the study of intervention.

Clay initiated her inquiry by studying new entrants, nonliterate learners, engaged in reading and writing instruction designed by their teachers to focus on text processing. She conducted her research by applying an approach common in developmental psychology, the careful recording of behaviors (oral reading behaviors) collected in frequent intervals over an extended period of time. In that her participants were immersed in reading authentic, continuous texts and writing personal messages from the start, she was able to capture children's text processing behaviors from their earliest attempts to read and write. The resulting data entailed records of oral reading behaviors and samples of children's writing products collected longitudinally during their first year of instruction. These procedures allowed her to describe and analyze changes in the performance of learners acquiring early literacy.

One of the provocative aspects of her research was her approach to data collection and her development of alternative means for securing behavioral evidence, i.e., student performance. Clay rejected use of traditional, existing instruments for assessing reading achievement as she found standardized test scores inappropriate for addressing her questions. She, therefore, developed procedures

for capturing and recording oral reading performance sequentially using reliable techniques, her first running record. Her approach, which yields information differing from that provided by test scores, is referred to as *an unusual lens*. More specifically, she defines any observational tool or research methodology that gathers "detailed data on changes in literacy processing over short intervals of time from subjects engaged in reading or writing continuous texts" (Clay, 2001, p. 16)as an unusual lens.

A recent observation regarding Clay's approach to researching the development of literacy behaviors in beginning readers is how it stands as a precursor of the microgenetic method used by development psychologists currently. As described by Siegler (2006), microgenetic analyses involve the study of the genesis or very beginnings of learners' strategic behaviors, how children's learning occurs, and how it unfolds or changes over time. Specially, the methods of study include observations that are conducted throughout the period of rapidly changing competencies. The result is a high density of observations, meaning a high amount of observations in relation to the rate of change. The resulting observations are analyzed with the goal of inferring in-the-head processing. This reflects Clay's approach and intent. She studied how children work in reading and writing continuous texts in order to describe the emergence of cognitive competences for literacy and to clarify the sequence of changes in ways learners process information. Clay's research uniquely addresses emerging literacy.

To meet her goal of discovering how children's literacy performance and processing behaviors change over time, Clay examined the reading and

writing behaviors of the proficient learners in her study. These were the learners making expected, age-appropriate progress. Her findings were definitive: Children's progress in reading and writing performances is marked by clear behavioral, or literacy processing, changes. Clay also discovered that over the course of the academic year, children making successful progress become literate at varied points in time and in idiosyn-

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cratic ways. This led her to conclude that there is more than one route to learning how to read and write. There is no single, fixed, developmental path along which every child must travel to gain literacy. In addition, she had behavioral evidence revealing that those children who were not making expected progress in learning to read and write were developing differently.

There are two important consequences of these research discoveries. First, her documented accounts of the reading and writing behaviors of proficient learners provided the basis of her complex theory of literacy processing and her definition of reading. And, second, she began to determine rather specifically what low-progress children need to learn in order to become successful readers and writers.

Through her study of acts of processing in writing and reading, Clay determined that behaviors observed in the earliest records of reading performance were found to be rudimentary and not particularly effective. However, over time, with ongoing opportunities to read and write continuous texts, children's reading and writing behaviors signaled enhanced effectiveness. Clear shifts in both the awareness of information sources in

text and the application of strategic processing behaviors were captured. In a longer chapter (Doyle, 2013), these observations are discussed in some detail. The summaries below serve to highlight evidence of readers' changing attention to different kinds of information and observed changes over time in processing.

Children begin to read or write using very simple working systems borrowed at first from different kinds of learning prior to school. Clay found that children often read their first books using low-level strategies acquired from experiences with talking, writing, and listening to stories prior to entering school. They appear to rely on auditory memory of predictable sentences or stories, and they are aware of concepts of books including awareness of the connections between pictures and text and

the benefits of anticipating and using a repeated sentence pattern. Many Reading Recovery teachers find this type of processing on the earliest levels of text reading on the Observation Survey (Clay, 2013).

Following 6 months of school, Clay observed that proficient learners attended to many aspects of text and exhibited a range of new behaviors. Specifically,

- they responded to print with a series of utterances,

- they checked with pictures for agreement,

- they matched pointing and word utterance on 50% of the text,

- they increased attention to words using the spaces between words to guide them, and

- they located one or more words on request. (Clay, 2001, p. 59)

While these early processing behaviors are not very effective, they do represent an adequate, initial starting place. And, the development of more-effective working systems and literacy processing strategies result from ongoing instructional opportunities and exposure to little books.

Proficient learners use their knowledge of oral language.
Proficient readers/writers engaged in literacy activities successfully by drawing on their existing language knowledge. Their oral language provided a reliable source of information for predicting meaningful texts and for detecting errors. Gradually, the readers' awareness of semantic and syntactic information in text was augmented by visual perceptual learning, including increasing knowledge

of letters, letter-sound associations, words, and subwords. Thus, their literacy development proceeded "in the direction of more and more receptiveness to visual perception cues which must eventually dominate the process" (Clay, 1982, p. 28).

Early writing experiences serve as a significant source of new learning, a beneficial reciprocity.
Children's personal writing experiences served as a significant source of new learning that contributed to the child's construction of more-effective literacy processing systems. Writing experiences helped build the working systems needed to search for information in print, an awareness of how to construct a message, and awareness of the sources of information available in written language. Clay (1975) observed that beginning writers "do not learn about language on any one level of organization before they manipulate units at higher levels. When they know a few letters they can produce several words, and with several words they can make a variety of sentences" (p. 19). In writing messages, children learn/work on all levels of the language hierarchy, and this learning contributes to their construction of early literacy systems and acquisition of language knowledge that extends processing in both reading and writing. This represents the reciprocity between reading and writing.

Proficient learners exhibit changes in essential, foundational reading behaviors neglected by most theorists of initial reading acquisition.
Clay discovered that in the earliest instructional contexts, the teacher-scaffolded reading and writing activities supported learning in four

areas essential for proficient early reading: (a) consistent left-to-right movement across words and lines of text; (b) awareness of letter and word forms (visual perception of print); (c) construction of appropriate speech responses (syntax); and (d) matching spoken word units to printed word units. "Directional behaviors manage the order in which readers and writers attend to anything in print. Gaining control of them is a foundational step in literacy as oral language is matched to written language" (Clay, 2001, p. 118).

Where to look, what to look for, how to fixate and move eyes across print (sentences and individual words) involve coordinating the body, hand, and eye movements needed for literacy processing. And, in fact, such motor behaviors (e.g., one-to-one matching) create an early working system for processing text. These foundational aspects of early literacy acquisition are paramount to and a residual of reading and/or writing continuous texts. Because Clay examined early reading behaviors meticulously, she clarified these essential requisites unexplored by other theorists.

Self-correction of reading errors is tutorial for the young learner.
Spontaneous, unprompted self-corrections of reading errors was a pattern of behavior that appeared in very early records of oral reading and revealed a reader's self-monitoring and correcting on the basis of appropriate one-to-one matching. Over time and with acquisition of more knowledge of the information sources, self-correction behaviors revealed that readers could independently search and check print in more detail to confirm

and correct their reading. Clay suggests that a learner's "willingness to choose between alternatives leads to a search for more information and this can potentially take processing to new levels of complexity" (2001, p. 120). Thus, self-correction behaviors and the problem solving involved in monitoring, searching, choosing, evaluating, and confirming are tutorial for the reader who is reinforced internally for his efforts.

Early processing behaviors evolve into more efficient decision-making, strategic behaviors.
Clay (2001) found that from the beginning, proficient readers use language and visual and motor information so that "what on the surface looks like simple word-by-word reading . . . involves children in linking many things they know from different sources (visual, auditory/phonological, movement, speaking/articulating, and knowledge of the language)" (p. 79) to read a precise message. She discovered that readers were constructing a network of strategic behaviors, or action systems, or cell assemblies for processing text. "These cognitive terms describe what readers do as they work sequentially on the information sources in print to get the author's message" (Clay, p. 198).

The proficient readers had learned how to search and check information, how to go back to search again, and how to monitor their reading and confirm their decision making. She describes the types of strategic behaviors they applied as

- controlling serial order according to the directional rules for the script being read, across lines and within words;

- using what you know about in reading to help writing and vice versa;

- problem solving with more than one kind of information;

- actively searching for various types of information in print;

- using visual information;

- using language information;

- drawing on stored information;

- using phonological information;

- working on categories, rules, or probabilities about features in print;

- using strategies which maintain fluency;

- using strategies which problem solve new features of printed words and meanings; and

- using strategies which detect and correct error. (Clay, 2001, p. 199)

Additionally, by studying the patterns of oral reading behaviors collected over time, Clay (2001) discovered changes indicative of primitive literacy processing systems evolving into more-efficient literacy process systems. Her depiction of such changes from initial reading to more-efficient processing includes these:

1. Move across print selecting some letters or words for attention or making up sentences to match the pictures.

2. Discover how what they know relates to anything about the print on a page.

3. Pick up different kinds of information in sequence.

4. Focus on one type of information but can be prompted to take another kind of information into account.

5. Gradually attend to more than one kind of information to solve words and phrases.

6. Check one source of information against another.

7. Mix slow sequential processing on hard words with faster processing on easy words.

8. Exhibit searching, choosing, and rejecting behaviors.

9. Adjust their processing to the demands of the task, processing differently when reading easy, instructional, and challenging texts — after 1 year of school. (Clay, 2001, p. 125)

Gradually, readers demonstrated the ability to construct what a line of text might say, locate the sequence of information to attend to, and detect or monitor mismatches between their seeing and saying (Clay, 2001). At the point when proficient learners moved into more-formal beginning reading instruction, the records of behaviors revealed the following:

- They could not read, but they identified the words in text with 80% accuracy.

- They selected words one after the other to construct viable sentences.

- They could reject a response and try a different one.

- They began to self-correct.

- They knew a few words in reading and/or writing.

- They could bring two kinds of behaviors together (e.g., verbal and pointing behavior).

- They often stressed the separation (juncture) between words. (p. 59)

In summary, Clay (1982, 2001) found that their literacy processing behaviors had evolved from primitive forms of problem solving to behaviors indicative of more-expert solving approximating the processing of a mature reader. Thus, she had a description of early literacy acquisition revealing a transformation in learners' processing behaviors over the first year of instruction. This serves as a transformative model of growth and an alternative view of progress, and this depiction of literacy acquisition gives a depth of understanding that could not be secured by collecting scores on any achievement measure. It also allows identification of instructional recommendations.

A Theory of How to Interact: More Provocative Hypotheses

Clay's analyses of early literacy behaviors led to what she called a *literacy processing theory,* "a theory of assembling perceptual and cognitive working systems needed to complete increasingly complex tasks" (Clay, 2001, pp. 269–270). Her provocative hypotheses are that perceptual and cognitive systems are constructed independently by the learner, and once established, enable one to learn to read by reading and to learn to write by writing. In effect, the active, independent learner has continued access to new learning, and this creates the self-extending system (Clay, 2005a). Thus, she suggests that the "goal of teaching is to assist the child to construct effective networks in his brain for linking up all the strategic activity that will be needed to work on texts" (Clay, 2005a, p. 44).

Therefore, the focus of development and instruction must involve considerations of how the child's brain develops, what transpires, and what influences growth.

Clay's theory of how teachers should interact with learners to ensure the acquisition of effective, cognitive processing systems is based on understanding the child as a constructive learner and on instruction as coconstruction — the child engaged with a knowledgeable, responsive teacher. What does it mean to construct one's own learning? In relation to literacy acquisition, it means that the learner is the sole architect of the internal, neurological networks of working systems for reading and writing. This is understood to result from experience and from the mind's engagement in forming, testing, and revising hypotheses.

Zull (2011) states, "It is the capacity of the brain to organize and change itself through experience that leads to development of the mind. By sensing, recording and reproducing our experiences, the brain gains the capacity to think, decide, and act" (p. 10). Lyons (2003) and Zull concur that "the brain is molded by experience—by the sensory input it receives, by problems it has solved, and by the emotions it has experienced" (Zull, p. 21). Therefore, "carrying out of an activity builds more competence in the activity" (Clay, 1991, p. 318), and this realization creates understanding of the active learner constructing the neural networks for reading and writing as a result of literacy experiences.

The engagement of the young learner in hypotheses formulation, testing, and revising is apparent in a young child's ability to acquire oral language. A young learner actively con-

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structs a complex system of language rules that govern his oral language production as a result of engagement in communicative acts. The processes involved further explicate how language learning is constructed independently and individually.

Language is acquired by the learner's active participation in communicating meaning to others. As the child engages in conversations, he formulates hypotheses regarding rules for language production, receives feedback, and confirms or modifies his hypotheses on the basis of the feedback. Very often, the earliest utterances do not reflect the rules of proficient speakers; however, progress results from his independent hypothesis formulation, reformulation, and refinement. In effect, "children act on their own theories of how things work and change these theories slowly in the face of conflicting evidence" (Clay, 2014, p. 203).

The active, constructive learner is a risk taker whose mind strives to make order of complexity by problem solving with his current understanding and theories. He learns when engaged in tasks that are within his zone of development and not overwhelming. Difficult, hard tasks cause frustration and thwart learning. He is active, engaged, and successfully making new discoveries when he feels in control, i.e., capable of managing the task, motivated to meet new challenges, and reinforced for his efforts. Such experiences build positive emotional responses, a key factor in a child's learning (Lyons, 2003).

The acquisition of complex literacy processing "begins when a child is expected to compose and write a simple message or read a simple continuous text" (Clay, 2001, p. 97) for

it is in processing complete messages that the perceptual/cognitive working systems for literacy are formed, developed, and linked. For the child actively engaged in reading and writing, the learning proceeds on multiple dimensions involving and connecting functional systems of the brain (Lyons, 2003) key to perceiving, recognizing, and storing perceptual information (perceptual learning), integrating different kinds of information, and searching, monitoring, evaluating, confirming, reacting, comprehending, and taking action (cognitive learning). Perceptual and cognitive systems are connected via neural networks that are constructed and linked at the time they are needed and these are strengthened through use.

Literacy processing is a reader's decision making during reading and writing. Our awareness of the neurological functioning of the brain clarifies how this processing involves "many working systems in the brain which search for and pick up verbal and perceptual information governed by directional rules; other systems which work on that information and make decisions; other systems which monitor and verify those decisions; and systems which produce responses" (Clay, 2001, p. 1).

Initially, the learner constructs and applies very simple action systems (working systems established prior to schooling). He uses his existing knowledge of oral language and knowledge of the world and initial hypotheses of how books work (e.g., predicting text from pictures) to read simple texts. Each reading experience is an act of construction (Clay, 2001) creating opportunities for new learning, i.e., hypothesizing, trialing, eval-

uating, and refining with meaning the goal. In the process, knowledge of information sources is expanded and problem-solving abilities become more proficient, or more expert. Thus, as children read and write continuous texts and are presented with many opportunities for more and more perceptual comparisons, new items of information—including words, roots, prefixes, patterns, clusters, chunks—are discovered and added to the recognition, or perceptual working systems (Clay, 2001). Likewise, the child will construct inner strategic processing systems.

Qualitative changes in strategic processing that occur as readers integrate information and bring different systems together are suggested by these examples:

1. They make unstable, newly learned responses to print (locating, or looking, sounds parts and making letters), and these occur erratically, make unpredictable appearances and gradually become consistent.

2. New integrations appear, such as when the teacher notices that most error substitutions have an appropriate initial sound.

3. Observable behaviors (like pointing or self-correction) once used, disappear into some other integration, no longer needed as props most of the time but still available if there is a need to draw them into the solving process momentarily. (Clay, 2001, pp. 131–132)

These observations serve as behavioral evidence of how over time and after many opportunities to read and

write, the learner constructs complex working systems to support reading for meaning (Clay, 2001).

The neural networks for literacy evolve and transform as teachers provide opportunities to read and write a gradient of texts with increments of increasing challenges. The child's opportunities to work at slightly higher levels of complexity create the problem-solving experiences that extend the efficiency of the neural processing system.

> As readers become competent the strategies that make up the linking and decision-making systems encounter new problems and novel features, and these become 'known' and available in the repertoire of problem-solving strategies. . . This is the independent learning engaged in by the 'system in use,' the processes carried out by the brain for the reading and writing to occur. (Clay, 2001, p. 224)

In all instances, the reader needs the kind of texts and level of text difficulty on which his existing processing systems work well. "A small amount of error in a predominantly correct text leads the child to notice new differences" (Clay, 1991, p. 248), attend to new information, and make new discoveries. This is accomplished by teachers who balance new text choices with repeated readings of familiar texts read with fluency and ease. "It is the quantity of successful reading that builds the assured independence of the competent reader" (Clay, 2005b, p. 98).

The novice reader constructs the neural systems as a result of his independent efforts in reading or writing texts of appropriate challenge, and the orchestration of problem-solving

behaviors is unique for each reader in each situation. Teachers cannot teach the learner how to construct or orchestrate the complex neural systems for processing; however, teachers do serve as coconstructors who support the child's learning through their interactions and instructional support. They create appropriate learning conditions, judge how the learner's literacy processing is developing, make it easy for the child to be successful, and offer beneficial scaffolding through contingent teaching.

Complex literacy learning is accomplished by instruction that starts with a child's strengths and builds on his

existing processing systems (Clay, 1997, 2005a). Therefore, teachers select or write texts that allow the child to engage his existing working systems to read successfully. From these experiences, tentative responses strengthen and more-efficient working systems emerge. Concomitantly, the child experiences success, feels in control, and takes risks in his attempts to problem solve. These are key aspects of constructive learning.

The teacher creates powerful, supportive learning opportunities by basing instructional decisions on detailed observations of daily performance. Analyses of daily running records confirm that the level of text chosen

for the child allows high rates of correct responding with appropriate challenge. These reading experiences create the opportunity for the in-the-head processing systems to strengthen and extend through successful problem solving. Teachers choose each new book to match and strengthen the child's emerging awareness and working systems, not to test.

All interactions in both reading and writing contexts provide opportunities for the teacher to support the child's construction of effective working systems. One important goal is independent problem solving revealed by the learner who takes initiative,

actively engages in solving challenges, makes some links, and works at difficulty (Clay, 2005b). These actions confirm that the learner is becoming self-reliant with self-monitoring and self-correcting strategies in both reading and writing. And, this independence is established from the first lessons.

To support the learner's constructive processes, effective teachers focus on "process variables (how to get and use information) rather than on mere correctness and habitual responses, and . . . temporarily value responses that were partially correct for whatever they contributed toward correctness" (Clay, 2001, p. 225). Teachers

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interact with a constructive child by prompting judiciously. To encourage the learner's construction of effective processing systems, the teacher may call on the learner "to form a hypothesis somewhere in the processing system and make a decision" (Clay, p. 122). Examples of prompting to encourage processing include these: What do you think? Which is it? What did you notice? You try it. You solved the puzzle; how did you know? Teachers also call on readers to take action by prompting them to search for information, to attend, to monitor, to check, to confirm, and to revise (among others). The resulting action sequences lead to self-correction, the ultimate goal of instruction.

As a child engages his strategic processing systems to problem solve new challenges, miscalculations, errors, and self-corrections will occur. Self-correction behaviors confirm that the child is continuing to develop an emotional and cognitive self-extending system.

Teachers who reflect on what errors and self-correction behaviors reveal about the child's processing strengths and what he might be neglecting have rich indications of how to respond, or interact. A powerful teaching move is to honor the partially correct and create success by providing the most-beneficial scaffolding at this time for this learner, accounting for the cutting edge of his emerging processing systems.

At the early stages of literacy acquisition, the child's engagement in writing personal messages involves the learner's construction of knowledge and processes apparent in both writing and reading. This includes knowledge about letters, sounds, and words, how to use phonological information, how to control serial order, how to search, monitor, self-correct, and make decisions about words and messages, and how to integrate different kinds of information to solve problems (Clay, 2001). Teachers build on the rich potential of this reciprocity, expanding and strengthening neural networks for literacy, by supporting the learner to use his competencies in one area to support learning in the second area.

The goal of instruction for our constructive learners is development of literacy processing systems that are self-managed, self-monitored, and self-extending. Thus,

> the reader can potentially draw from all his or her current understanding and all his or her language competencies, and visual information, and phonological information, and knowledge of printing conventions, in ways which e*xtend both the searching and linking processes as well as the item knowledge repertoires*. Learners pull together necessary information from print in simple ways at first . . . but as opportunities to read and write accumulate over time, the learner becomes able to quickly and momentarily construct a somewhat complex operating system which might solve the problem. (Clay, 2001, p. 224)

Summary

Clay wove her theories of literacy and of how to interact with young learners engaged in acquiring literacy processing systems for reading and writing in her texts *Literacy Lessons Designed for Individuals Part One* and *Part Two*. The teaching procedures account for what occurs, signaled by transformations indicative of developmental changes over time, and reflect a theory of learners as active constructors of their own knowledge. Teachers provide their Reading Recovery children with "lessons directed to making them constructive — to actively process information, to find and relate information from different sources, to bring it together, construct a decision, and monitor the effectiveness of that decision" (Clay, 2005b, p. 101).

For struggling readers, this is accomplished in individual lessons with teachers who react to observed behaviors with contingent responses supportive of the learner's emerging, cognitive competencies. Knowledgeable, observant teachers are key, and Clay (2001) considered Reading Recovery teachers adept at interpreting and applying complex, theoretical understandings.

Clay's developmental, provocative, preventive perspectives resulted from her many studies of literacy acquisition, her documented accounts of observed changes, and her theoretical explanations of complex processes. The result is an effective intervention creating the promise of optimal development for children in need of more-supportive interactions and a more-secure developmental track (Clay, 1991, 2001).

Endnotes

1. To gain more understanding of how the brain functions in relation to the acquisition of literacy, read Carol A. Lyons' 2003 text, *Teaching Struggling Readers*.

2. To learn more about the connections between microgenetic analyses of learning and Clay's research, read the 2011 article referenced below by Schwartz and Gallant.

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