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# WORDS IN WORLDS:

# WHY AND HOW A SENSE OF MEANING DEVELOPS IN CONTEXTS

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A dissertation submitted to the Graduate Faculty in Psychology

as partial fulfillment of the requirements for the degree of

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Abstract

WORDS IN WORLDS:
WHY AND HOW A SENSE OF MEANING DEVELOPS IN CONTEXTS
by
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This study addressed the questions of why and how word meaning develops in school-aged children. The critical factors contributing to word meaning development were examined through a study of the word meaning development of two children, D.C. and M.L., over the six-month period of the study. The intent of the study was to compare not the children, but the development of word meanings within the study's different word encounter activities as experienced by the different developmental systems of the two children. The children's uses of the words and responses to inquiries concerning the words are presented and analyzed.

The children were interviewed on their understandings of words chosen from six children's books. "Unknown" and "familiar" words were experienced in Written, Oral/Charade, Repeated Word and Pretest Only activities ("Activities"), and the children listened to the readings of the books in which they heard the words within the stories. All the Activities involved hearing and speaking, but the Written and Oral/Charade Activities incorporated different functions --

specifically, reading and writing in the Written Activities, and acting out and "watching and guessing" in the Oral/Charade Activities. Verbal interviews, in which the responses were coded as "unknown", "frontier", or "known", provided the data for the pre, post, and post/post tests.

For both D.C. and M.L., the development of word meaning in the Written and Oral/Charade Activities was significant, but there was no significant difference in word meaning development between these two Activities. These results suggest that acting out and "watching and guessing" the word acted out were as effective as reading and writing in enhancing word meaning development. The words encountered within the Written Activities were used in spontaneous speech significantly more often by both children. Word meaning development in the Pretest Only Activities was not significant; whereas, it was within the Repeated Word Activities at different test points in time for both children.

The children's rich oral responses detailing their developing sense of word meanings suggest that individual longitudinal studies provide an important source through which to examine why and how word meaning develops in school-aged children.

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In memory of my Mom and Dad who loved their children and taught me about love as devotion, as faith, as patience, and kindness.

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# CHAPTER 1

## Introduction

The experiential system of the young child entering a formal school environment expands rapidly as the child encounters new teachers, peers, contexts, and the printed word. It is estimated that 6,000 to 10,000 words make up the verbal lexicon of the six-year-old child. Between the ages of six and eighteen, the average person adds another 70,000 - 90,000 words to this system, yielding an average of more than twenty words a day ( Miller, 1987; . Nagy & Anderson, 1984).

The questions of why and how word meanings are so rapidly learned has generated many theories and much research. Most of the studies on the development of word meaning in school-aged children and efforts to teach word meaning to them involve reading and writing and refer to the process as "vocabulary acquisition." In school, children are asked to decipher the meaning from the context clues in the written text, to write the word in a sentence, or to look up the meaning in the dictionary. There are few studies on this learning process in which the differentiation has been made among the different functions used to express language.

In order to understand the nature of the word learning process, it is necessary to recognize that both the developmental system of the word learner and the relationship between the word and the functions experienced by the child system through which language is expressed, change over time. In

developmental studies of learning processes, this recognition involves the identification of the changes in functions and activities. For example, most preschool children develop an understanding of novel words, not through reading and writing them, but through hearing and speaking these words in meaningful situations. The child's experience is central to the meaning of the word (Nelson, 1981). When children learn to read, they come to recognize in print words they already know and use in discourse. But as they progress in school, they encounter many words in print they have never heard or seen before. The experience of the word is different, and so the sense of its meaning.

In examining the development of a sense of word meaning within two different developmental child systems, the "context", as understood within this study, is not only the sentence, text, situation, or the genre within which the word is embedded. The child develops a sense of what words mean at the semantic/lexical level within his or her functioning system. As the child participates with others in activities and events in his or her life in which he or she thinks, sees, speaks, listens, plays, reads, and writes, he or she develops a sense of the meaning of the words experienced. The child's conceptual level is embedded within the experience of activities and events, and the semantic/lexical level is embedded within that conceptual level.

Thus, the "context" of the word also pertains to the interface between the internal and external worlds of the participant. In this study, the developing system of the child in which he or she experiences the word and its meaning

through the use of different functions as he or she participates in different shared activities over time, is the "context" within which word meaning develops. Within this developing system the child experiences other "contexts" within which word meanings are embedded, such as, the sentence or a book. This contextual view of word meaning is rooted in the works of Bakhtin (1984/1963), de Saussure (1915/1959), Heidegger (1962), Luria (1981), Nelson (1984, 1989, 1992), Sperber & Wilson, (1986), Vygotsky (1934/1986), and Wittgenstein (1953/1968), and is the perspective through which word meaning development is examined and analyzed in this study.

Most researchers and theorists agree that the development of word meaning involves repeated encounters with words in different contexts ( Miller & Gildea, 1987; Nagy, 1988; Nagy & Herman, 1987; Nelson, 1984, 1989, 1992; Sternberg, 1983, 1987). Many stress the importance of reading ( Chomsky, 1972; Elley,1989; Nagy & Herman, 1987; Robbins & Ehri, 1994; Wells, 1986), and recommend vocabulary instruction as a means to enhance word meaning development (Beck, McKeown, & Omanson, 1983; Chall, 1987; Gildea & Miller, 1987; Jenkins, Matlock, & Slocum, 1989; Nagy, 1989; Stahl & Fairbanks, 1986). Some have emphasized that many levels of understanding are involved in developing a sense of word meaning (Curtis, 1981, 1987; Dale, 1965; Drum & Konopak, 1991; Durso & Shore, 1991; Graves, 1984; Stahl, 1991; Trembly, 1966). Research on learning-disabled readers ( Brady, Shankweiler, Mann, 1983; Bryant & Bradley, 1971; Katz & Wicklund, 1971; Orton, 1925; Orton &

Montessori, 1966; Vellutino, 1977, 1987) and the visual and linguistic processing involved in reading (Berninger, 1987; Rayner, 1986) certainly suggest that literacy places great demands on the child system. Downing (1970, 1974), Ehri (1979, 1980), and Spencer (1988) remind us that the concept of the word develops after the child learns to read and write. Others have written extensively on the effects and consequences of literacy, and some have suggested that reading and writing transform thought and create higher forms of thinking (Donaldson, 1978; Goody & Watt, 1968, 1987; Greenfield & Bruner, 1966; Havelock, 1963; Luria, 1981; O'Donell, Griffin & Norris, 1967; Olson, 1975, 1977; Tulviste, 1991; Vygotsky, 1962, 1978).

Because the written text is obviously an integral part of the modern world and the means through which children are exposed to and may encounter many new words, it is important to begin to explore whether it is exposure to the written text or only "literacy" that leads to word meaning development. It is probable that children and adults who do not read and write, are exposed to the written text through listening to stories, speeches, radio, and through listening to and watching videos, movies, plays and television. It may be important to examine the different functions through which the written text can be encountered and appreciated. Halliday (1985) reminds us that speech and writing are different ways of learning and knowing which contribute to different points of view on the world. Listening to and viewing the written text acted out may offer another avenue through which word meaning can develop.

Teasing apart the literacy-related activities from the word otherwise expressed may disambiguate the potentially critical contributors to the development of word meaning within the child's developing system.

If some word meanings develop and some do not within the activity experienced by the child system, what is it about the word that develops meaning that contributes to this difference? Nelson (1992) has proposed that children learn words, not because of internal and external constraints, but because the word is "relevant" to the shared contexts within which it is used. "Relevance" -- not the variables of grammatical category, language frequency, the type of book in which the word is encountered, or the child's partial knowledge of word meaning -- explains why children develop word meaning. Teasing apart the particular properties of the word expressed may lend support to this proposal.

If children have no understanding of a word's meaning, how do they decipher what a word means? Anglin (1993) suggests that morphological decoding is a substantial element involved in determining a words meaning. How does this sense of meaning develop over time? Miller & Wakefield (1993) suggest that the analysis of semantic relations between concepts is useful. Nelson (1984, 1989) believes that the child's experience is central to the meaning of the word because the concept of the word is embedded in that experience. An examination of the content of children's responses over time may help to illuminate this word learning process.

The researcher's two school-age children, D.C. and M.L., participated in different Activities, and this study explores the effects of this participation on each child's word meaning development. The critical factors contributing to word meaning development are examined and determined, and the content of the children's verbal responses over time are presented and analyzed in order to illuminate the evolving thought processes involved in deciphering and developing a sense of a word's meaning. Before the details of this proposal are presented, theories and research on word meaning development and instruction, and on written and spoken language, will be reviewed. The review of the literature will proceed from a discussion of theories of word meaning development in contexts, to general theories of lexical development, to the role of reading and vocabulary instruction. Studies which demonstrate that the development of word meaning involves different levels of understanding will then be reviewed, along with theories and studies on how children decipher word meaning over time. Following this discussion, the review will proceed from research on learning disabled readers and the visual and linguistic processing involved in reading to theories and research on the impact of literacy. A discussion of the critical factors involved in learning processes will set the stage for the brief discussion of the purposes and predictions of this study.

## Contextual View of Word Meaning

The understanding of what a word means develops over time, and this meaning itself changes, as the child changes and experiences the word

differently. It was Wittgenstein (1968) who insisted that an analysis of theories had to acknowledge that science is done from within a conceptual perspective intimately tied to one's own natural language and that language cannot be reduced to a logical system. He came to believe there was no private language; beliefs expressed in natural language derive from the social community. His implicit consideration of context, natural language and perspective suggested a distinction between psychological process and philosophical analysis, questioned the classical understanding of concepts, and led to a non-objectivist contextual view of meaning and truth.

Early in the twentieth century, de Saussure (1915/1959) emphasized that language must be seen as an organized totality in which the meaning of a word is only significant in terms of other words spoken by people embedded in a particular speech community. He argued that words are not in themselves concepts but labels for concepts which are abstract notions, and could, in fact, refer to more than one concept. He also introduced the notion of contrasting language over time (diachrony) against the study of language at any moment in time (synchrony).

Vygotsky (1934/1986) believed that "word meaning" expressed through speech was the most fundamental and elementary form of verbal thinking, contributing to the unity between thought and word. The meaning of words evolves from primitive generalization to abstract concept, and as the content changes, so does "the way in which reality is generalized and reflected in a

word" (p.213). Word meanings, Vygotsky wrote, are not static but dynamic, changing as the child develops and with the various ways in which thought functions. The development of word meaning within a person mirrored the development of consciousness. For Vygotsky, consciousness is a higher form of awareness of self and others which develops from socially-mediated activity.

Vygotsky (1934) and Luria (1981) apply the concepts of "meaning" and "sense" to the psychological analysis of language and consciousness, drawing from the works of Paulen (1928) and Stanislavski (1951, 1956). "Meaning" is a stable system of generalizations, but the "sense" of a word is the sum of all the psychological events that come to consciousness when the word is encountered. Words are enriched by the "sense" derived from the contexts of use. The "sense" of a word speaks to the dynamics of the development of word meanings. Vygotsky writes, "A word in a context means both more and less than the same word in isolation: more, because it acquires new context; less, because its meaning is limited and narrowed by the context" (p.245). Luria points out that the "sense" of a word is embedded in the "sense" of an utterance, and that in written texts the "sense" is the subtexts through which actors and others deepen their understandings of texts. Word meanings, said Luria, are drawn from human experiences which reflect "the world in varying degrees of completeness and depth" (p. 44). As the sense of word meanings change, so does word meaning and the consciousness of the self in the world.

Heidegger (1962) insisted that any analysis begins with the initial

existential, "to be in a world." The self needs an environment, a setting, or a place. The world is the place in which one already is. To have a place to relate to, a world with other people and things, is 'a priori' in the ontological sense. The self's care and concern about being in a world full of possibilities makes existence meaningful. And the development of understanding is interpretation, the working out of possibilities. When entities within the world are understood in terms of the being of self (Dasein) through articulated interpretation, these entities have meaning.

Bakhtin ( 1984/1963) believed that this interpretation, this voice, consists not just of words or ideas strung together but of a semantic position, "a point of view on the world," which responds to others within and without the self. He insisted that the understanding of the other is always an imperfect translation; for we all speak something of a foreign language, and that meaning lies on the boundary between two speakers. True communication, Bakhtin said, never erases boundaries or pretends to a perfect fit, but contributes to an open-ended self-developing idea.

The voice of Bakhtin is echoed in Sperber and Wilson's (1986) theory of relevance. They claim that when two people communicate, they never entirely share mutual knowledge, for each is always listening or speaking with a different set of assumptions drawn from different experiential histories. Verbal communication is possible because each person assumes that what is being communicated is relevant to the shared contexts or cognitive environments of

the participants. Communication thus always depends upon inference and interpretation. Sperber and Wilson wrote, "We see communication as a matter of enlarging mutual cognitive environments, not of duplicating thoughts (p. 193)".

Nelson (1992) extends Sperber and Wilson's idea of relevance to the problem of how children acquire word meaning. Words are interpreted within particular shared contexts, in which "the cognitive environments of the communicators at least temporarily share sufficient common structures so that the relevance of a communication can be inferred (p.3)" Each child brings his or her conceptual knowledge derived from world models or event representations to bear on the interpretation of the meanings of words used in these shared contexts. Ultimately, the child interprets the meaning of novel words in terms of the relevance of the word to the shared context within which it is used. This theory of relevance may also explain why some word meanings develop for a child and others do not, even though the child is initially able to interpret word meanings within shared contexts.

## Lexical Development.

Cognitive Pre-requisite Position. The cognitive pre-requisite position on word learning proposes that conceptual representations and developed relations between concepts contribute to lexical development. Piaget (1952), the primary proponent of this position, believed that language follows thought and is a tool of intellectual structure. Actions, not verbalizations, are the elements of early life that develop into the operations of the mind. Many psychologists maintain this

cognitive pre-requisite position, although not necessarily in Piagetian terms or in an exclusive sense (Bates 1976; Bowerman 1976; Bruner 1966; Clark 1973; Nelson 1974; Karmiloff-Smith 1979).

Goodman (1984) proposes a constructivist view of mental representation, though the essential tool of that construction is language. As a general purpose symbolic tool, language, he said, encodes and creates versions of the world. Because language embodies conventional cultural categories, it imposes shared meanings on the encodings.

Berger and Luckman (1966) believe that the lexicon and syntax of language bear the categories of culture. Reality, they say, is constructed anew by each individual through the use of this language tool.

Social Support Position. The social- support position on the development of word meaning emphasizes the importance of the sociocultural context within which the child gradually develops a sense of what words mean. This position was at the core of Vygotsky's (1934/1962; 1934/1987) thinking. He believed that language grows from two roots, representation and communication, and it continues to be a social tool for each. The internal aspect of the word, the word meaning, he said, was the unit of analysis revealing a dynamic system in which functions unite. Hence, "every idea contains a transmuted attitude toward the bit of reality to which it refers" (p.10).

Building upon this position, Bruner (1975; 1983) proposed that caregivers provide language-acquisition-support systems to the young child

through finely-tuned responses to the child's search for meaning. Wertsch (1985) writes extensively on the child's internalization of social voices. Integrating the Bakhtinian notion of "genre" with Vygotsky's perspective, Wertsch suggests that "intrapsychological semiotic mediation" is suffused with sociohistorical forces. Wertsch and Stone (1985) further claim "that children can say more than they realize and that it is through coming to understand what is meant by what is said that their cognitive skills develop (p. 167)".

Nelson (1987), combining useful elements of both cognitive pre-requisite and social support positions, posits that the learning of word meanings is a process of conceptual reference. "There are limits", she says, "to the inferential power of the cognitive system that are set by the stage of general cognitive development in addition to the availability of concepts and words to express them" (1981, p.51). The child's experience is central to the meaning of the word because the concept is embedded in that experience. Nelson conceives of three processes incumbent in the development of the lexicon. Learning from situational context is primary in the early stages of vocabulary building. In each stage of development, attaching words to concepts or knowledge is more economical than forming and matching novel words and concepts. In the late preschool years learning from the linguistic content takes place and is an indication that a lexical system has been established. "Relations between words become established in the lexicon such that a lexical network is set up that is independent of but interacts with the underlying conceptual network" (p.53).

Nelson (1985, 1988) emphasizes that the development of a working lexicon involves not only cognitive processes but indirect and direct social guidance toward a convergence on conventional meanings.

## The Effect of Reading

Researchers studying vocabulary acquisition in school-age children emphasize the importance of reading. Nagy and Herman (1987) believe that incidental reading, rather than vocabulary instruction, contributes most significantly in the "long run" to word knowledge. They conducted a series of studies in which students were pretested and later asked to read grade-level texts silently, without any information about the nature of the experiment. Knowledge of target words (assumed by teachers to be the most difficult) was assessed a week later (Herman, Anderson, Pearson, & Nagy, 1985; Nagy, Herman, & Anderson, 1985a,b). The results indicated that the reading produced a small but statistically reliable increase in word knowledge throughout grades 3, 5, 7, and 8. They noted that the younger children learned new words and that different texts yielded differing results. They estimated that the chance of learning a word from incidental reading was 1 in 20, commenting that "If 1 in 20 of these words is learned, the yearly gain in vocabulary will be between 750 and 1,500 words, or between a quarter and a half of the average child's annual vocabulary growth" (p. 27). Frequent and regular reading, they believe, provides the additional opportunities to encounter large numbers of words repeatedly.

Chomsky(1972) studied the effect of independent reading and of reading

to school-age children on their language and reading performance, and demonstrated that those who read independently or were read to more frequently outperformed their peers in these areas. These children read or were read books beyond their linguistic development.

Many children experience the written word long before they begin formal schooling. Words and symbols surround them, and many books are read to them in the years before they learn to read and write. There exist a few other studies, besides the Chomsky study cited above, on the development of word meaning that involve the children's listening to the reading of stories rather than the reading of them.

Studies of early readers (Clark, 1976; Durkin, 1966; Teale, 1978; Wells, 1986) show that children who have been read to regularly excel in language and reading activities. Wells (1985) recorded the speech of thirty-two children spontaneously interacting in their home and coded for four different activities (book viewing, book listening, drawing or coloring, and writing). The results, although correlational, indicated that listening to stories from books was significantly associated with reading comprehension and knowledge of literacy. Wells believes it is the exposure to "the more symbolic and sustained context-independent properties of written language and...its characteristic rhythms and structures" that facilitates success with respect to literacy in school. He points out that although the days of two children may be very similar, the activity and exchange between caregiver and child with respect to book reading

may be crucially different. Whether the child, through listening to written stories, unconsciously hears and develops over time an appreciation for the written expression of language, is a question raised but unresolved by Wells' study.

Robbins & Ehri (1994) also studied the effect of reading storybooks on the recognition vocabulary of kindergarten children. Stories were read twice, and the children heard unfamiliar words repeated in the reading. The results of the study indicated that storybook reading did contribute to children's recognition vocabulary, and that children with larger vocabularies learned more words than children with smaller ones.

Some studies also show that reading aloud regularly to students beyond the age of six, in a shared context of reading and reading activities, contributes to reading and listening skills (Cohen, 1968; Elley, 1980; Elley and Mangubhai, 1983). Elley (1989) demonstrated in two school studies that oral story reading, with or without explanations, constitutes a significant source of vocabulary acquisition. Children were pretested presenting half the words as picture-vocabulary items and the other half as multiple-choice items. Stories were read by teachers three times over the week following the pretest and no explanations as to word meaning were given. Children were post tested two days after the third reading of the story. In the first study, 157 seven year olds showed vocabulary gains of 15 percent. In the second study, 127 eight year olds participated and were divided into two groups (A & B). All Activities were the same except the teacher in Group B provided brief explanations for the

targeted words. The children in Group A also showed a 15 percent gain in vocabulary, and the children in Group B showed a 40 percent gain. Contrary to the finding of the Robbin and Ehri study discussed above, the low scorers "gained at least as much in vocabulary knowledge as their more knowledgeable peers" (p.179).

Obviously, children who read or are read to increase their chances of learning new words because of the simple fact that they see or hear more words. The literate language to which one is exposed through different sensory systems, whether the written texts of stories, books, speeches, radio, videos, movies, plays, and television, provide encounters with often different and more difficult words than the everyday discourse one encounters. Why and how this word learning takes place remains unclear. There exists a need for developmental studies that identify and differentiate among the many factors that are involved in the word learning process. Studies contrasting the effects on word meaning development of words that are read and of words that are heard may illuminate the process of word learning. Longitudinal studies of the child's developing sense of word meaning and usage would shed yet more light on this process.

## Vocabulary Instruction

Most researchers who study vocabulary acquisition believe that instruction plays a significant role in enhancing word development. Some emphasize a specific method of teaching particular word meanings, and others

emphasize the utility of teaching students how to derive word meaning from contexts.

Nagy (1988), though still maintaining that incidental reading contributes most significantly to word knowledge, believes that instruction on word meaning may be important by the third or fourth grade, when the child begins to read words he or she has neither encountered in print nor in oral language, and where comprehension of the text depends upon the knowledge of unfamiliar words. "The primary goal of vocabulary instruction", he argues, "is not to teach students new labels, but to teach them new concepts" (p. 21).

Chall (1987) views the learning of word meanings within the framework of her Reading Stage Theory (see Appendix A). The hurdle for most children in the early school years, she says, is the medium, not the message. In grades 4 and 5, a shift to the message (the meanings of words and ideas) takes place. It is after the age of 10, she believes, that children begin to move from concrete to abstract definitions. Although she does not argue against contexts for learning word meanings, she believes there is great value in directly teaching word meaning, although it remains unclear what this direct method might be.

Jenkins, Matlock, and Slocum (1989) studied the vocabulary and word derivation development of 135 fifth-grade students. They examined and contrasted two approaches to vocabulary instruction. The first approach, direct teaching with three levels of exposure, consisted of the teacher reading of word and definition, the students oral reading of word and definition in unison,

definition exposure only, word exposure only, and finally student substitution of a synonym for the target word. The second approach taught a general strategy for deriving meaning from context, summarized in the acronym, SCANR. Specifically, it instructed the students to substitute word, check the context, ask if s fits, need a new idea?, and revise. Results indicated that both strategies significantly improved the student's vocabulary, and that repetition and practice lead to higher levels of mastery.

Miller (1987) believes that learning new words from purely literary contexts of use is harder than learning them through interaction with others, and that educators must find a better way to foster vocabulary growth than through drills on arbitrarily preselected words using dictionaries and model sentences. He says, "Put at the front of your mind the idea that a teacher's best friend in this endeavor is the student's motivation to discover meaning in linguistic messages" (p. 98). Information needs to be available at the moment the student is motivated to learn. Recognizing that other people are not able to always assist in this endeavor, he believes that much can be done with computers to make learning words easier. Through interactive video displays, the fifth and sixth graders with whom Miller worked, read a text from a motion picture they viewed. When a tagged to-be-learned word appeared in the text, the child accessed its meaning immediately in any of three forms (definition, sentences, pictures) and then returned to the text. Significant improvement in the students' grasp of unfamiliar words resulted.

Stahl and Fairbanks (1986) conducted a meta-analysis and found that vocabulary instruction significantly improved student's performances on multiple-choice tests, short-answer tests, cloze tests, and standardized tests. They also hypothesized that vocabulary instruction might lead to a greater general interest in words, leading to the learning of more words in general.

Beck, McKeown, and Omanson (1983) designed a vocabulary training program, labeled "rich instruction", to determine a causal relationship between word knowledge and comprehension. They incorporated the three features of frequency of encounters, richness of instruction, and extension of word use beyond the classroom into the design of their study. Classroom teachers taught fourth-grade students 104 words in 75 daily sessions of 30 minutes each (26 minutes per word). Results from the study, as measured by multiple-choice tests, found that students learned 95 percent of the instructed words in a test given at the completion of the week's instruction, and 80 percent of them on a test given 3 weeks later. Although Beck et al. "provide a way of thinking about words that leads to the creation of a lively and productive verbal environment" (p.158), such a program, at the above rate of instruction, could usefully generate only a small percentage of the 5,000 words students are estimated to learn annually.

## Partial Knowledge of Word Meaning

Several researchers have criticized the use of multiple-choice vocabulary tests because they do not adequately assess the test-taker's knowledge and

because there are many levels between an "unknown" and a "known" word. Curtis (1987) points out that many possible routes exist on multiple-choice tests to a correct or an incorrect answer. To establish the relationship between levels, Dale (1965) asked 28 fifth graders to categorize a set of words from a standardized test according to the level of their knowledge of the words (i.e.,"I never saw it before," "I've heard of it, but I don't know what it means," "I recognize it in context..," and "I know it"). Curtis (1981) asked college students to do the same. Both found, by asking the students to provide definitions for all those words with which they had any degree of familiarity, that "correct" responses were often provided for words that were something less than "known".

Drum and Konopak (1991) assert that because words refer to concepts, depth of meaning will develop over the years of schooling. "A word is not just known," they say, "its use represents varying states of knowledge dependent upon the learner's mental representation for the word" (p. 75). Graves (1984) suggests a range of meanings describing the different states of knowledge about a word. Durso and Shore (1991) adopt Trembly's (1966) term "frontier" words because they exist in a frontier region between known and unknown words, and tag "frontier" words as ones "that are judged as familiar but that the subject can't define". (This study adopts this term, as well). They found that these words were easier to learn than "unknown" words. Stahl (1991) uses the term "twilight zone" to describe words about which the user has some knowledge but for which he or she cannot define it or use it productively.

## Deciphering And Defining Word Meaning

Within the levels of understanding what a word means, may lie the key to how school children rapidly develop an understanding of word meanings. Although many researchers and theorists have suggested why this development takes place, the nature of this developmental process is still unclear.

Anglin (1993) provides a detailed analysis of the derivational and collocational morphology of the recognition vocabulary of 96 first, third, and fifth grade children. In this study, the children were verbally interviewed over a 95-minute period on the meanings of 196 words, some of which could be morphologically decoded through knowledge of root and inflected forms, derived words, literal compounds, and idioms. Anglin carefully distinguished between "psychologically based" vocabulary (words the children knew) and words that were figured out or "potentially knowable" on the basis of what he called, "morphological problem solving." The results of the study indicated that the ability to morphologically decipher the meaning of the words increased with age. This ability was particularly pronounced between grades 3 and 5, in which the number of morphologically decoded root words, literal compounds, and idioms doubled, and the number of derived words nearly tripled over the number of such words decoded between grades 1 and 3. Anglin admirably detailed the way school children were able to recognize words and figure out the meanings through morphologically analyzing the stimulus words. An examination of the texts from the verbal interviews, however, suggest that it is unclear why the

children morphologically decoded the words. Did they and could they morphologically analyze words immediately in response to the stimulus word, or were their responses a result of the request of the researcher to "tell me a little more"? While the interview texts demonstrate the care and adeptness with which the researcher conducted the interviews to discover all the children knew, verbal interviews seeking how the children decipher and define word meanings without such promptings, might help to further clarify how they decipher word meanings when they are alone. An analysis of how the children determine and define the same word meanings over time would also illuminate this developmental process.

Miller and Wakefield (1993), commend Anglin's prodigious accomplishment, but point out that there is also a need for research that demonstrates how semantic relations among clusters of words regarded as lexicalized concepts "organize and facilitate the task that children face in mastering the vocabulary of their native language" (p. 174). Miller (1978) points out that phonological access enables a listener to understand a word that is spoken if he or she knows the meaning. But, he queries, does the meaning of a word or the conceptual organization within which a word is embedded enable the speaker "to find words to express his ideas and intentions so to realize them acoustically?" (p. 60). An analysis of how children decipher and define words over time may also help to answer this question.

## Exposure to the Written Text

The experiential system of the newly school-aged child expands rapidly as the child encounters new stimuli. It is in this period of time that most learn to read and write their spoken language and a new relationship develops with the word. The child's relation to the written text is far more than simply being taught to read. Those who study poor or learning-disabled readers, for example, posit short-term memory, perceptual or verbal deficits, failure to integrate information from the sensory systems, and difficulty in "perceiving" temporal order in verbal stimuli as among the contributing factors in their participant's performances (Bakker, 1972; Bender, 1957; Birch, 1962; Brady, Shankweiler, Mann, 1983; Bryant & Bradley, 1980; Hermann, 1959; Katz & Wicklund, 1971; Orton, 1925, 1937; Vellutino, 1977/1987) Orton and Montessori (1973) stressed the necessity of the integration of all modalities to facilitate the learning process.

Rayner (1986) stresses that multiple levels of visual and linguistic processing are involved in reading. Beginning readers can process eleven character spaces to the right of fixation during a fixation pause, decoding only one or two words as they do so. Berninger(1987) points out that brain structure serves many functions and that different features of the word may be coded in multiple codes at different levels of analysis in different parts of the brain. "We must choose," she says, "between a false sense of simplicity and the pursuit of understanding the complexities of how a brain achieves the amazing feat of translating retinal stimulation from squiggles on a page into meaning" (p.417).

The relation between speech and text becomes pronounced when the child first learns to read and realizes that words on the printed page do not necessarily form a neat one-to-one correspondence with perceived spoken words. As Ehri (1979) points out, "Young children experience most words in the context of other words, and their attention is centered upon the meanings conveyed by these spoken combinations, not upon their linguistic structure" (p. 65).

Concepts related to literacy (the word, the format, the purpose) have been examined by many researchers (Vygotsky, 1962; Meltzer & Herse, 1969). Downing (1970; 1974) found that prereaders often confused a sentence or a phrase with the word unit of speech and words with sounds. (D.C., as a first grader, expressed surprise that "whipped cream" was not a single word.) Even eight year-olds confused both isolated phonemes and syllables with words, and Downing suggests that most children enter school in a state of "cognitive confusion".

Spencer (1988), giving children tasks designed to tap each of the dimensions of the concept of the word, found that tacit knowledge of the concept of the word developed for the spoken and written language concurrently. Explicit conceptualization of the spoken word developed only after the child developed explicit knowledge of the written word. She believed that the permanence and stability of written forms enabled learners to focus upon them and abstract general principles about their use.

Ehri's (1980) study suggested that the orthographic visual match of the spoken word with its written correlate affects the subsequent spelling of this stimulus word. Two different spellings of eight words, pronounced identically, were presented to the participants. Post tests revealed that when the participants misspelled stimulus words, their mistakes reflected the letter-sound connection presented in their treatment Activities, suggesting that they were storing these connections in memory.

Donaldson (1978) believes, as well, that the printed word encourages awareness of the language, of one's own thoughts, and of the development of intellectual self-control.

The development of the ability to read words, simultaneously experienced through the visual, articulatory, and auditory systems, and the ability to write these words, employing motoric skills as well, may help to explain how the school child doubles his or her rate of lexical acquisition. Just as speaking the word stabilizes perception, as Vygotsky (1988) suggested, so also may the writing and reading of the "word".

The act of writing the word, may serve to further disambiguate the spoken word and "weld" independent lexemes that are related to experientially-based concepts to other independent or novel lexemes. Initially, children's writing reflects the structures they use in speech, but as writing becomes automatized, it may supersede their speech (O'Donnell, Griffin & Norris, 1967). "Written speech [involves] the deliberate structuring of the web of

meaning" said Vygotsky (1934/1962, p. 100).

## The Impact of Literacy

Many theorists (Goody & Watt, 1968; Goody, 1987; Greenfield & Bruner, 1966; Harris, 1989; Havelock, 1963; Luria, 1981; Olson, 1994; Tulviste, 1991; Vygotsky, 1934/1962, 1978) have written extensively on the effects and consequences of literacy. Some suggest that the acquisition of literacy may have a transforming effect on memory and thought. Others provide a broad historical assessment of its influence.

Havelock (1963) writes about the shift from the Homeric epic tradition to the Socratic tradition contributing to differences in thought. He points out that the two traditions are experienced through different modalities and the lexicon and syntax of each is suited to its own requirement. Because Homeric epics were memorized and recited, the attributes of rythym, imagery, and narrative style, promoted emotional identification with the recitations rather than a critical attitude. Havelock writes that Plato was the genius, " who as a writer but not as a poet would organize...a prose of ideas; who would expound...in writing what the syntax of this prose must be, and who would explore the rules of logic which should govern it." Plato's writings, he continues, were further developed by Aristotle, and "their joint efforts created knowledge as an object and as the proper content of an educational system" (p.305).

Harris (1989) researched Greek and Roman literacy, and stressed that mass literacy did not exist in antiquity, and that only a small percentage of the

male elite were literate. Writing was used when it was useful to the writer and reader. The marks of the oral culture always remained visible as there existed a "reliance on and cultivation of the faculty of memory" (p.327). Literacy, he wrote, appeared to have assisted trade, aided in the colonization and exploitation of others, promoted religious authority, contributed to the canonization of discourse, and helped men to create wealth. He states, "there is nothing automatic about its benefits to the individual" (p.38). He makes the important point that literacy does not exist in the abstract, but is closely linked to other features of the society and culture. It is a product of forces that did not exist in antiquity.

Goody and Watt (1968) argued that alphabetic literacy was the mediating link contributing to different thought processes in the literate individual. They stressed that with the invention of a writing system, statements and records were preserved. The expressed word could be critically analyzed through the examination of this permanent representation of verbal symbols, whereby inconsistencies which flourished in the oral tradition could be remedied and thought could be further developed. This enabling process due to the written system, was instrumental in the development of a skeptical, scientific tradition which, they state, can't be determined by examining the direct impact on the novice who learns to read and write. Goody (1987) writes, "It is the written tradition, the accumulated knowledge stored in documents as well as in the mind, whether...over a few years or over a millennium..., that provides an

intervening variable between mastery of a skill and cognitive operations" (p. 222).

Olson (1994) believes that writing systems provided the concepts and categories for thinking about the structure of the spoken language. The first writing systems, he writes, were developed for mnemonic and communicative purposes, and because they were read, they provided a model for language and thought. Introspection on language and on mind are through the categories defined by our writing systems. The substitution of the signs on the basis of their phonemes is what brings words into consciousness. Because the word form becomes the model embracing the concepts and categories for thinking about the spoken form, words become things. Olson states, "Learning to read is learning to hear speech in a new way" (p.85). It is the hearing of written speech in this new way that provides the model for linguistic knowledge and changes the way we speak. "If this is true," he concludes, "writing is important to speech; it changes us from speakers to language users" (p.263). He does not suggest that the expressive and reflective powers of speech and writing are either similar or better, for both, he believes, complement the other. He does, however, believe that speech is primary in expressive power because of its illocutionary force, and writing is primary in linguistic consciousness. "Neither is overall primary" (p.265). Because Olson does not think of "reading" and literacy or "writing" and literacy as unitary phenomena, he believes that a general rule relating literacy to cognition cannot be stated. Rather, the reading , interpreting,

and writing of these script models, inspired a new attitude or "consciousness" toward language, the self, and the world, leaving us "free to revise the status of those representations on the basis of evidence" (p.280).

Greenfield and Bruner (1966) studied cultural differences on concept formation among schooled and unschooled Wolof children in Senegal, West Africa. The children were matched for age and residence, and the results indicated differences in the way they grouped objects together and talked about their experience. The researchers concluded that the unschooled children used context-dependent thought, and that the schooled children demonstrated context independent or abstract thought. The result was linked to literacy based upon presuppositions about the context-bound nature of oral speech and the context-independent nature of speech influenced by reading and writing.

Luria (1981) emphasizes that "written speech" emerges as the result of special learning . "Written speech differs from oral speech both in its origin and in its psychological structure " (p.166). In its early stages, Luria writes, the child's consciousness is not on thought but on the voluntary technical devices of designating sounds, letters, and words. It is only when these voluntary acts are automatized that they are transformed into unconscious operation. Luria regards written speech as an important device in thought processes because it is a useful means for clarifying thought processes. It involves conscious operations with linguistic categories, and the product allows revisions. He wrote, "It is a complex form of analytic activity, in which the logical structure of thought

itself is the basic object" (p.166).

Vygotsky (1934/1962, 1978) believed that the historical development of thinking is the result of the confluence of social activities and physiological functions in which the person uses the signs and sign systems of the culture. To historically study a behavior, wrote Vygotsky, is to study it in motion. In the child, "not only the use of tools is developing, but a system of movement and perception as well, the brain and the hands, the whole organism of the child. Both processes merge into one..." (cited in Tulviste, 1991) Signs and sign systems are psychological tools ( such as language, forms of numeration, algebraic formulas, gestures, maps, toys, art, or books) which the person uses and directs towards mastery of behavior. In this development of behavior elementary functions combine with new methods of thinking involving speech and other signs. This fundamental reorganization of the whole system changes the very nature of development. For example, Vygotsky tells us, "Through the prism of speech, the child not only perceives but tells about what is perceived" (pp. 299, 300). This connection between perception and speech transforms our unconscious functions into cultural ones and is part of the complex development of consciousness.

Literacy, through which the child is exposed to scientific concepts, contributes to a reorganization of the whole developmental system of the school child. The highest type of verbal thinking for Vygotsky was conceptual thinking derived from scientific knowledge, rather than from everyday knowledge. He

believed that the unit of analysis through which the development of thinking could be examined was the internal aspect of the word, the word meaning. He brilliantly pointed out that over the course of the development of word meaning, not only did the words used in thinking change, but that the methods of using words( such as, speaking, reading, writing, acting) change. These methods are defined by the culture and contribute to the historical development of thinking.

Tulviste (1991) provides an insightful work in which he presents the research of a decade in which he studied the "verbal" thinking of traditional and modern cultures. He discovered qualitative differences in thought due to differences in circumstances and problems, but he also found that there were universal types of thinking that corresponded to common types of activity. The thinking of people in modern cultures was found to be more diverse than expected, and included in addition to scientific thinking, other types of verbal thinking. Tulviste wrote, "Types of thinking correspond not to separate cultures, but to separate types of activity." Methodologically, he reminds us, that an experiment might not provide data on thinking as a whole, but on a type of thinking a person is using to address the question posed in the experiment. His thorough review of Vygotsky and other theorists who espouse the transforming effect of literacy on thought, leads him to the following conclusion which may be pertinent to the study of word development within this study. Tulviste points out that the only "obligatory consequences of becoming literate" and thus, thinking in scientific concepts, is "awareness of the 'word' as a reality *sui generis*... All

the other characteristic traits of thinking in concepts will appear as indispensable, obligatory consequences of schooling" (p. 159).

Research and theories from many different disciplines remind us that the relationship between language and thought is an intricate one. Speech and/or language is regarded as the ultimate sign or psychological tool through which humankind reflects upon its existence. The word expressed allows the world to double, and words expressed allow it to multiply. The sign system of language has come to include not only the spoken word, but the word acted, read, written, and typed. And words are not only spoken and heard, but viewed, employing different visual functions, and manipulated, using fine and gross motor skills. Disparate and dissimilar developmental systems encounter similar and dissimilar contexts differently, and the complexity of their variegated interrelation keeps hidden from view much which is worthy of consideration. It is not surprising that it is difficult to establish that language experienced in its different forms transforms thought or leads to higher psychological processes, even though many think it must. And whether it does or not, is not the point. Language skills are necessary tools with which to function in a literate world. The written text is the medium through which one's IQ, achievement tests, success in school, and employment are evaluated. To meet these and other challenges in the literate world, research is important to determine what are the necessary functions and activities that contribute to language development. The investigation of how the meanings of words develop in terms of different functions and activities may help

to clarify important issues within this huge research endeavor. The question of how we begin to disambiguate these functions and activities needs to be addressed.

## Disambiguation of Learning Processes

The written text is obviously an integral part of the modern world. Even if one does not read or write, it is difficult to escape exposure to the written text through listening to stories, speeches, radio, and through listening to and viewing videos, movies, plays, and television. A key question in this research is whether it is exposure to literacy or to the written text otherwise expressed that enhances word meaning development.

Although it is difficult to escape the written text in this culture, it can be experienced and perceived in different ways. Halliday (1985) perceptively distinguished between spoken language and written language. He reminds us that there are not only individual differences in learning styles implicit in speech and writing, but that different world views are embodied in these linguistic modes of expression. The written language, Halliday points out, is a thing that exists and provides a synoptic view that defines the world as product. Speech, on the other hand, provides a dynamic view and presents the universe as process.

Teasing apart the literacy-related activities from the word otherwise expressed may disambiguate the potentially critical contributors to the development of word meaning. Implicit within the ability to express oneself through writing is the ability to express oneself through reading. In the school

environment discussion of word meanings is often inextricably confounded with reading and writing. Is this the only means through which meaning elements of the language can be developed? Different ways of experiencing the language of the written text may enhance the meaning process, but it may also offer alternatives to those who have difficulty reading and writing. Establishing a correspondence between Activities within which word meaning is discussed and written using fine visual and graphomotoric skills and Activities within which word meaning is discussed and acted out using gross visual and motoric skills may provide a research arena within which to contrast different functions. Listening to, acting out, and viewing the meaning of the written word acted out, without reading and writing it, may offer another means through which word meaning can develop.

## Summary

The rapid development of school children's vocabulary is a well-acknowledged phenomenon. Most researchers and theorists assume that this development involves repeated encounters in different contexts. They stress the importance of reading and writing, and often recommend vocabulary instruction. Although there are a few studies which examined vocabulary development through listening to stories, there are no studies contrasting the effects of literacy and the effects of experiencing the written text through action, speech, and audition. There is a need for longitudinal developmental studies that differentiate between the different functions used for the expression of linguistic

meanings. This study was designed and undertaken to address these distinctions and to obtain data from the children's responses that might help to explain why and how children develop a sense of word meaning over time.

## Purposes and Predictions of Present Research

The purpose of the present research is to study the development of word meaning in the school-aged child. It seeks to determine and to disambiguate the critical factors contributing to this development, and to illuminate the thought processes involved in deciphering and developing a sense of a word's meaning.

It was hypothesized that the children's participation in the word encounter Activities (Written, Oral/Charade, Pretest Only, Repeated Word) would enhance word meaning development, but that this development would be the greatest in the Written Activities within both of the developmental systems studied. This hypothesis was based upon the previous research on vocabulary development and instruction of children in elementary schools and upon theories on the impact of literacy on thought processes. It was also hypothesized that word meaning would develop, not because of internal and external constraints, but because the word was relevant to the shared cognitive contexts of the participants, as proposed by Nelson (1992). Therefore, the variables of grammatical category, language frequency, book type, and word type would not influence whether or not a word developed within both child systems.

To examine these proposals, the development of word meaning within the systems of two school-aged children was studied over a six-month period. D.C., age 7 years, was in the beginning stages of reading and writing, and M.L., age 8.3 years, was proficient at both. The study was designed to compare, not the children, but the development of the word meanings within different

Activities in terms of the activities and functions experienced within each child system. Both children encountered words in four different Activities -- the Written, the Oral/Charade, the Repeated Word, and the Pretest Only. One of the six books, in which the words occurred "one" or more times, according to the Activities, was read to the children after the daily word encounter Activities, and served as a potential cognitive context in which a word could develop.

Word meaning development was studied through verbal interviews in which the children were initially pretested, post tested after four weeks, and post/post tested after five months. The children's responses to these verbal interviews were written by the researcher, audiotaped, and later coded by Activities and by meaning category, as to the content of each response. The use of the words in discourse, in play, and in school work was recorded by the researcher, as well. The recorded data provided contextual information relevant to the developmental course of the words in the study. In addition, variables which potentially might influence word meaning development, were examined. These were grammatical category, language frequency, book type, and word type.

The type of response (example, definition, synonym) given by each child was tabulated by meaning category (unknown, frontier, and known) and discussed and analyzed. A detailed description and analysis of how the children deciphered and defined the words over time was also presented.

# CHAPTER 2

## Methods

### Participants

The researcher's two school-age children participated in this study throughout a twelve-week summer period spent at the family's beach house. The children's father, who is the researcher's spouse, signed the consent form, and the children agreed to participate with the understanding that they could withdraw at any time from the study.

At the commencement of the study both children were reading and writing, but at different levels, and both children had been categorized as "gifted" by their schools based upon the Stanford-Binet Intelligence Test.

M.L. is a girl and was 8.3 years and had completed the third grade at the commencement of the study. Based upon Chall's description (see Appendix A) she was reading at Stage 3 and 4. Her performance on the Peabody Picture Vocabulary Test, assessed just prior to the study, was a standard score equivalent of 158.

D.C. is a boy and was 7.0 years and had completed the first grade at the commencement of the study. He was reading at Chall's Stage 2 or 3. His performance on the Peabody Picture Vocabulary Test was a standard score equivalent of 139.

Materials

Prior to the study, the researcher read six children's chapter books, previously unread and unfamiliar to the children, and identified 1200 words (200 words per book) and tabulated each word's frequency count across the six books. Three books were fantasy (O'Brien, R.C., The Secret of Nimh; Dahl, R., Charlie and the Great Glass Elevator; Alexander, L., The Marvelous Misadventures of Sebastian) and three books were fact-based fiction (Speare, E., The Sign of the Beaver; Speare, E., Calico Captive; Lenski, L., Indian Captive). Of these 1200 words, 20 words were selected from the book reading by the researcher ("Book Reading") for each day on the basis of the frequency count of each word over all six books and of the researcher's assessment that the words were not known or used by either child. Words that had a frequency count of less than three over all six books made up the pool of potential words which could be used in the Written, Oral/Charade, and Pretest Only Activities of the study. Words that had a frequency count of three or more over all six books were potential words which could be used in the Repeated Word Activity. The researcher constructed sets of 20 pretest sentences in which one of the 20 words was embedded in each of the sentences. One set of 20 sentences was used in the verbal interview pretests each day before the word encounter Activities.

D. C. and M.L. were privately pretested on these 20 words

embedded in sentences, and from these twenty words, 1 "unknown" and 1 "frontier" *stimulus* words were randomly assigned to the Written, Oral/Charade, and Pretest Only Activities, comprising a total of 6 stimulus words. 1 "unknown" and 1 "frontier" *stimulus* words from these 20 word pretests, which had a frequency count of "3" or more across books, were assigned to the Repeated Word Activity, adding another 2 *stimulus* words. In total, eight *stimulus* words per day were identified by the researcher. The study examines D.C.'s and M.L.'s meaning development of the *stimulus* words which were assigned to the Activities throughout the course of the study.

The Carroll, Davies, Richman (1971) word frequency analysis of 86,741 words, occurring across 17 subject categories and grades 3 through 9 in printed school English, was consulted to determine the frequency of each of these *stimulus* words in American school language use. The grammatical category of the *stimulus* words was identified, as well. A table of the *stimulus* words, common and unique to both children, with grammatical categories and word frequencies (Carroll, et al.) appears in Appendix B. Webster's New World Dictionary was used to provide definitions or synonyms for the specified words. Pretests were on forms on which the words and words embedded in sentences were typed with space between words and sentences for each child's individual answer (see sample pretest and post test in Appendix C).

Coding sheets were used to categorize the children's responses, usage and development, and a Log Book was used to provide detailed anecdotal information on each child's usage over time. Audiotape recorders were used to record the pre, post, and post/post test interviews, the word meaning discussions, the Written and Oral/Charade Activities, the book readings by the researcher, and private & shared play sessions.

Design

Each child's developing sense of the meaning of "unknown" and "frontier" *stimulus* words experienced in word encounter Activities was recorded and monitored over a six-month period. The children and the researcher experienced the word encounter Activities within two-hour word encounter sessions ("Sessions") on four days of the week over two four-week periods. In the first four-week period each child participated privately with the researcher in two Activities in which words from a book chosen for the child were experienced. These private Sessions were held in two different two-hour periods on alternating days of the week, and the order of participation was counterbalanced over each week. Both children participated in a shared Session on the other alternating days of the week, although they were each separately interviewed in the verbal pretests of the day. Three books, one to each child and one to both children, were read by the researcher over a four-week period. In the second four-week period, at the children's request, three books were read

in succession, and both children participated together with the researcher in four Sessions a week. Each daily Session, whether private or shared, consisted of a fifteen-minute verbal interview pretest on each child's understanding of the day's word meanings, the researcher's assignment of words to the four Activities of the day, the children's participation in Written and Oral/Charade Activities in which they actively experienced one "unknown" and one "frontier" word in each of these two Activities, and the Book Reading in which the Session words of the day were embedded and could again be "heard" by the children.

The intent of this study was to compare not the children, but to compare the development of word meanings within particular word encounter Activities in terms of the functions experienced within each child. Each child was thought of as a unique system, embedded in a similar learning environment, in which the stimulus words did or did not develop. The books within which the words were found and experienced served as potential conceptual domains in which the "frontier" and "unknown" words could develop. Word meaning "development" was determined by coding the children's responses to the *stimulus* words over time as "unknown", "frontier", and "known" through the use of the pre, post, and post/post test verbal interviews. The meaning categories are offered for their heuristic value, as the researcher recognizes that "conventional" understanding of word meanings are not the end points,

but part of an ongoing developmental process. The following discussion of the Activities within which the children experienced the words and their meanings in the study explains why the Activities were designed to examine the development of word meaning.

Activities. The Activities in this investigation were designed in recognition of the fact that the language of the written text can be experienced through different functions -- specifically, hearing, speaking, reading, writing, and acting. The child's experience through the use of different functions may affect whether or not word meaning develops. The functions identified within Activities are discussed below. Precisely how the children experienced the different Activities will be further elaborated in the Procedure.

The *stimulus* words experienced within the four Activities were pre, post, and post/post tested through the use of interviews in which the children verbally related what the words did or did not mean to them. The *stimulus* words of the four Activities were embedded within the six books of the study, which were read to the children by the researcher. During these Book Readings the two children listened, and, sometimes, they spoke. Thus, all the Activities of this investigation involved hearing and speaking.

The Pretest Only and the Repeated Word Activities involved only hearing and speaking. In response to the pre, post, and post/post test

interviews in which they heard the *stimulus* words and these *stimulus* words embedded in *stimulus* sentences, they often repeated the *stimulus* words in their responses. These *stimulus* words could be heard, as well, in the daily "book reading". These two Activities differed in that the children were exposed a different number of times to the words. The frequency count of the words in the Pretest Only Activity across books was 1 or 2, which means that these words were heard once or twice in the Book Readings. The only difference between the Pretest Only and the Repeated Word Activities was that the words in the latter were heard three or more times in the Book Readings.

In the Written Activity, the children heard the word, heard a dictionary definition, discussed how it was used and defined in the previous pretest interviews, and discussed what the word meant to them. In this Activity, the children read the stimulus word, and privately wrote the word in a story, conversation, joke, commercial, sentence, or poem. The frequency count of the words in this Activity across books was 1 or 2, which means that these words were heard once or twice in the Book Reading. Thus, this Activity involved, not only hearing and speaking, but also reading and writing the word in relevant contexts.

In the Oral/Charade Activity, the children heard the word, heard a dictionary definition, discussed how it was used in the previous pretest interviews, and discussed what the word meant to them. In this Activity,

the children took turns acting out the meaning of the words. For each stimulus word, they either acted out the word, or watched the word acted out and guessed the meaning and the word. The frequency count of the words in this Activity across books was 1 or 2, which means that these words were heard once or twice in the Book Reading. Thus, this Activity involved not only hearing and speaking, but also acting out and "watching and guessing" the word and its meaning acted out.

Procedure

Pretest Verbal Interviews. The children were pretested verbally and privately before the Activities of the day on selected words as to their understanding of each word selected from the day's Book Reading. (The pre, post, or post/post test interviews involved no reading or writing by the children.) Words were introduced from a set of 20 possible candidates until 4 "unknown" and 4 "frontier" words were identified. Using a pre-printed list of words with accompanying sentences for each word and a coding sheet, the researcher asked the child, "What do you think this word means?", and then named the word. If the child had "no idea" what the word meant or guessed incorrectly, the researcher read it embedded in a "disguised" sentence to control for "moderating variables" (see Table 1) (Sternberg, 1987). For example, each word was used once in the stimulus sentence in which one context clue was provided to assist the child in accessing his or her understanding of the word and in which

**Table 1.**

**Moderating Variables According To Sternberg (1987).**

1. Number of occurrences of the unknown word.

2. Variability of contexts in which multiple occurrences of the unknown word appear.

3. Importance of the unknown word to understanding the context in which it is embedded.

4. Helpfulness of surrounding context in understanding the meaning of the unknown word.

5. Density of unknown words.

6. Usefulness of previously known information in cue utilization. on the descriptive word and sentence form and coded in the appropriate category of the pre-printed coding sheet.

an incorrect word or meaning could be assigned to the word if the child had no understanding of the word. If the child had "no idea" what the word meant or gave a mistaken answer to the word and the word embedded in a sentence, it was coded, an "unknown word" (UK). If the child had an incomplete sense of a word's meaning, that is, could generate a relevant example or recognize and define it when embedded in a sentence, it was coded, a "frontier word" (F). If the child defined and used a word effectively, the researcher coded it, "known" (K), and it was not used as a *stimulus* word in the study. Any response that the child made was written by the researcher on the descriptive word and sentence form and coded in the appropriate category of the pre-printed coding sheet. The researcher interviewed each child privately in a separate room in the children's home. Each pretest interview lasted approximately fifteen minutes. The order in which each child was interviewed was counterbalanced among the Sessions of the week.

Word Selection and Assignment to Activities. Following the pretest interviews , if possible, eight words (four "frontier" and four "unknown") were chosen as *stimulus* words by the researcher. Ideally, two words (one "frontier" and one "unknown"), which had a frequency count of more than two over all six books, were assigned to the Repeated Word Activity. This was not always possible because the Repeated Activity words were already "known", perhaps due to the fact that, by the nature

of this Activity, these words had a greater language usage frequency count. These Repeated Activity words were not defined, discussed, or treated, and served as a control for the impact of repetition. The other six *stimulus* words (three "frontier" and three "unknown") were randomly assigned to the Written, Oral/Charade, and Pretest Only Activities. This was not always possible because the majority of the pretested twenty words were "frontier" or "known". In the rare instances when there were only five *stimulus* words, two words each were randomly assigned to the Written and Oral/Charade Activities, and one word was randomly assigned to the Pretest Only Activity. The Pretest Only Activity words were not defined, discussed, treated, or repeated more than two times over all six books, and served as a control for the impact of testing.

The Children's Participation in the Written and Charade Activities. Following the researcher's assignment of the words to Activities, the children and the researcher discussed the "unknown" and "frontier" *stimulus* words, which had been randomly assigned to the Written and Oral/Charade Activities The researcher reread the sentence within which the word was pretested, and the children shared what they had said on their pretest interviews. The researcher discussed the meaning of the word, and then read one definition from the dictionary. She then encouraged the children to think about what the word meanings meant to them. They were asked to relate these new meanings to any examples or

events in their lives that made sense to them. Sometimes they modified and elaborated upon the meanings expressed in the verbal interview pretests, and sometimes other comments prompted new examples. The discussions were lively, but the researcher maintained the focus upon the *stimulus* words until she was confident that each child had a good enough grasp of the meaning of the word to be able to use it in the different Activities. This discussion lasted approximately thirty minutes or six minutes per word.

In the children's reading and writing of the *stimulus* words in texts in the Written Activity, the children chose to sit at the kitchen counter with the researcher facing them. Each *stimulus* word was printed by the researcher for the children to read and copy. Each child recited the word as he or she read and wrote each of the two *stimulus* words at the top of their papers.. They were free to use the *stimulus* words within any text as long as it demonstrated that they understood the words' meanings. For the most part, the writing was done silently, although, at times, the children asked how to spell words. The children wrote stories, conversations, jokes, commercials, sentences, lists, and poems using the *stimulus* words. The children completed these writings in approximately a fifteen minute period, after which they read what they had written to the other child and the researcher. All the written work of the two children was added to the Log Book.

In the children's acting and audience participation in the Oral/Charade Activities, the children chose to use the living room in which the floor area was used for the stage and the couch was used for seating. The child, who acted out the word and its meaning, drew a word from a hat. The researcher read it and whispered the word into the child's ear. The child had five minutes to think about how he or she would demonstrate the word and its meaning and to collect props to support his or her act. The researcher was available to answer any questions regarding the performance. The child actor demonstrated or acted out the meaning of the word through pantomime and indicated the number of syllables through the use of their fingers as in the party game, "Charades". The other child in the audience had three minutes to guess which word it was. The children assigned points accordingly. Approximately, eight minutes was spent on each word. (Two "dummy" words were added to this Activity when it followed the Written Activity.)

The order of presentation of the Written and Oral/Charade Activities, of production by the individual children in pre, post, and post/post test interviews, and of their Activity productions were counterbalanced. The *stimulus* words were not used or discussed outside of the Sessions unless one of the children preempted such a discussion. Any such discussions were noted in the Log Book, as was all spontaneous usage of the words. All the pre, post, and post/post test

interviews, the word meaning discussions, the Written and Oral/Charade Activities, and the Book Readings were audiotaped and reviewed by the researcher.

Private And Shared Play. Both private and shared play sessions over the first twelve weeks of the study were audiotaped to record the use of the target words. In total, two thirty-minute private play tapes of D.C at play and twenty-five ninety-minute play tapes of D.C. and M.L. at play together were recorded and reviewed by the researcher.

Post Test Verbal Interviews. The children were verbally interviewed as to their understanding of the *stimulus* words in the same manner as they were on the pretest verbal interviews. Words were embedded in new "disguised" *stimulus* sentences designed to control for moderating variables, and matched in length and grammatical construction with pretest sentences. Each child also retold the stories of the *stimulus* books. All post test verbal interviews were recorded and monitored in the same manner as the pretest verbal interviews. The interviews took place in 2 two-week periods immediately following each four-week period. The design of the pre and post test portion of the study is given in Table 2 for both children.

Post/Post Test Verbal Interviews. Four months after the initial twelve-week period the children were verbally interviewed as to their understanding of the *stimulus* words in the same manner as they were on

**TABLE 2.**

**Number of Pre and Post-Tested Words**

| | D. C. | | M. L. | |
|---|---|---|---|---|
| Activities | Pre | Post | Pre | Post |
| Written | 65 | 65 | 65 | 65 |
| Oral/Charade | 72 | 72 | 71 | 71 |
| Pretest Only | 68 | 68 | 51 | 51 |
| Repeated 3x's+ | 55 | 55 | 20 | 20 |
| Total | 260 | 260 | 207 | 207 |

the pre and post test verbal interviews. Approximately two-thirds of the post-tested words were randomly chosen and comprised the post/post tested word bank. Words were embedded in the same *stimulus* sentences as on the pretest administered at the beginning of this six-month study. All post/post test verbal interviews were recorded and monitored in the same manner as the pre and post test verbal interviews. The interviews took place over a four-week period in the fifth month of the study. The design of the pre, post and post/post test portion of the study is given in Table 3.

Coding.

All recorded speech samples were monitored and reviewed by the researcher, and all word usage by the children was transcribed. The children's recorded responses on pre, post, and post/post test interviews were coded in one of three categories of meaning. A word was coded as "unknown" (UK) if the child had "no idea" what the word meant as an isolated stimulus and did not express a general knowledge of the word when it was embedded in a sentence. A word was coded as "frontier" if the child had no idea what the word meant as an isolated stimulus, but when it was embedded in a sentence, he or she had "partial knowledge" (Durso & Shore, 1991) and responded with a relevant example and/or definition . This "frontier" category of meaning was further delineated into two levels of meaning (F1 or F2). The response was labeled F1

**Table 3.**

**Number Of Pre And Post-Tested Words That Were Post/Post Tested**

| | D.C. | | | M.L. | | |
|---|---|---|---|---|---|---|
| Activities | Pre | Post | Post/Post | Pre | Post | Post/Post |
| Written | 41 | 41 | 41 | 45 | 45 | 45 |
| Charade | 42 | 42 | 42 | 47 | 47 | 47 |
| Pretest Only | 38 | 38 | 38 | 42 | 42 | 42 |
| Repeated 3x's+ | 35 | 35 | 35 | 19 | 19 | 19 |
| Total | 156 | 156 | 156 | 153 | 153 | 153 |

when the child provided an explicit conventional definition for the probed word when it was embedded in a sentence and for which he or she may have generated a relevant example. The response was labeled F2 when the child expressed a general sense of the probed word when it was embedded in a sentence by providing either an example and/or a general definition. A word was coded as "known" if the child demonstrated one of two levels of meaning (K1 or K2). The response was labeled K1 when the child provided an explicit conventional definition in response to the probed word as an isolated stimulus for which he or she may have generated a relevant example. The response was labeled K2 when the child expressed a general knowledge of the probed word as an isolated stimulus and expanded this general knowledge by generating a more definitive answer when the probed word was embedded in a sentence. Each code was assigned a number for analysis (UK (1), F2 (2), F1 (3), K2 (4), K1 (5)).

In sum, the independent variables coded for each word were Activities (Written 1, Charade 2, Pretest Only 3, Repeated 3x's+, 4), Language Frequency Category (low 1, medium 2, high 3), Grammatical Category (noun 1, verb 2, adjective 3, adverb 4), Word Type (frontier 2, unknown 1), Book Type (fact-based fiction 1, fantasy fiction 2), and Pretest Scores (1,2,3). The coded dependent variables were Post Test Scores (1,2,3,4,5), and Post/Post Test Scores (1,2,3,4,5) (for randomly

chosen words).

The responses were labeled, as well, with respect to the content and type of answer each child gave to demonstrate his or her understanding of a word. For example, the children defined words by using definitions, synonyms, or examples drawn from each child's cognitive contexts. Each of these responses was coded as example, definition and/or synonym, example and definition/synonym. In total, there were 904 responses coded for content within the D.C. developmental system, and 971 within the M.L. developmental system.

Reliability. Coding reliability was established by having a colleague code all of the responses. Interrater agreement on meaning categories was 93%, and 97% on content and type of response.

# CHAPTER 3

## Results

The results will be presented for both children in three sections. The first section details the results of each child's meaning development scores of pretested words embedded in the Written, Oral/Charade, Pretest Only and Repeated Word Activities. This section presents the results of all the word meanings which were tested after a four week period, and a separate account and analysis of the results of two thirds of these pretested words, each of which was not only post tested after four weeks but in the fifth month of the study. The results of the recorded children's usage of the words by Activities is provided, as well.

The second section presents a discussion and analysis of the variables (grammatical category, language frequency, book type, and word type of each word in the study) which may explain why some word meanings did or did not develop.

The third section involves the presentation and examination of qualitative data collected over the six month period of the study. To begin with, an analysis and discussion of the content of responses each child gave with respect to each meaning category (K, F, UK) is presented. A detailed description and discussion on how D.C. and M. L. deciphered the meaning of novel words and defined other words over time within meaning categories and within Activities completes the results section.

Quantitative Analyses of Word Meaning Development

Words embedded in the Written, Oral/Charade, Pretest Only, and Repeated Word Activities were pretested at the commencement of the study and post tested after four weeks through the use of verbal interviews. Two thirds of the words post tested for each child were also post/post tested in this manner in the fifth month of the study. Meaning development for each child was analyzed by assigning a number score to each level of meaning demonstrated through these verbal interviews with each child. Only frontier words (F2 =2 and F1=3) and unknown (UK=1) pretested words (see Methods for coding) were used initially in this study. The words presented to each child are considered as the "items" (subjects) developing within each child's development system. The highest score that could be achieved per "item" word over time was five, as there were five levels of meaning assigned (UK=1, F2=2, F1=3, K2=4, K1=5).

Usage scores were determined by keeping a record of the number of times each child used the words, in speech or in writing, from any of the four Activities. Each instance was given the score of "1", and was tallied up over the six months the study was conducted. Both children used the words in daily speech, in school work, in play, and in defining other words.

The results of the development by Activities that took place over time within each child's developmental system is presented and discussed in turn.

Word Meaning Development By Activities Over Time.

To measure development by Activities over time, ANOVAS were performed on the difference scores over time from pre to post and from pre to post to post/post test and on the usage scores over time with Activities as the between "items" factor for both analyses for each child. All analyses revealed significant effects for both children. For all the analyses, results were reported as significant at $p < .05$.

D.C. Developmental System. The results of the mean scores for word meaning development for D.C. of the set of 260 pre and post tested words are presented in Table 4. The mean scores of the set of 156 pre, post and post/post tested words are presented in Table 5. Table 6 presents the difference scores from pre to post test, and Table 7 presents the difference scores from pre to post to post/post test for D.C. The ANOVA revealed significant main effects for Activities $F(3, 256) = 7.83$, for the difference scores of the 260 pre and post tested words. The ANOVAS on the 156 word set revealed significant main effects for Activities $F(3,152) = 4.90$, for the difference scores from pre to post test, and no significant main effects for Activities $F(3, 152) = 1.15$, for the difference scores from post to post post test. The ANOVA on the total difference scores from pre to post/post test on these 156 words yielded significant main effects for Activities $F(3, 152) = 4.62$. Table 8 presents the usage results for D.C. over time. (see Appendix E for the words that were used.) A significant effect was found for Activities $F(3, 256) = 6.82$, for the instances of word usage

**TABLE 4.**

**Mean Word Scores At Pretest And Post Test**

**By Activities For D.C.**

| | | Pretest | Post Test |
|---|---|---|---|
| Scores | | M (SD) | M (SD) |
| Activities | No. of Words | | |
| Written | 65 | 1.37 (.58) | 2.85 (1.76) |
| Charades | 72 | 1.29 (.50) | 2.49 (1.55) |
| Pretest Only | 68 | 1.43 (.70) | 1.72 (1.42) |
| Repeated 3x's + | 55 | 1.58 (.81) | 2.49 (1.52) |
| Overall Mean Scores | 260 | 1.41 (.69) | 2.38 (1.56) |

**TABLE 5.**

**Mean Word Scores By Activities At**

**Pretest, Post Test, and Post/Post Test For D.C.**

| Scores | | Pre M (SD) | | Post M (SD) | | Post/Post M (SD) | |
|---|---|---|---|---|---|---|---|
| Activities | | | | | | | |
| | No. of Words | | | | | | |
| Written | 41 | 1.41 | (.63) | 2.61 | (1.72) | 3.32 | (1.61) |
| Charades | 42 | 1.21 | (.44) | 2.69 | (1.75) | 3.24 | (1.61) |
| Pretest Only | 38 | 1.37 | (.63) | 1.58 | (1.37) | 2.32 | (1.70) |
| Repeated 3x's+ | 35 | 1.43 | (.66) | 2.43 | (1.62) | 2.60 | (1.64) |
| | 156 | | | | | | |
| Overall Mean Scores | | 1.35 | (.59) | 2.34 | (1.61) | 2.89 | (1.62) |

**TABLE 6.**

**Mean Difference Scores From**

**Pretest to Post Test And Per Activities For D.C.**

| Scores / Activities | No. of Words | M | (SD) |
|---|---|---|---|
| Written | 65 | 1.48 | (1.82) * |
| Charades | 72 | 1.19 | (1.51) * |
| Pretest Only | 68 | .29 | (1.31) |
| Repeated 3x's + | 55 | .91 | (1.51) * |
| | 260 | | |
| Overall Mean Difference Scores | | .97 | (1.54) |

*p < .05

## TABLE 7.

## Total Mean Difference Scores From

## Pre to Post to Post/Post Tests and Per Activities For D.C

| | | Pre to Post | | Post to Post/Post | | Total Pre to Post/Post | |
|---|---|---|---|---|---|---|---|
| Scores | | M | (SD) | M | (SD) | M | (SD) |
| Activities | No. of Words | | | | | | |
| Written | 41 | 1.22 | (1.78)* | .71 | (1.56) | 1.93 | (1.78)* |
| Charade | 42 | 1.48 | (1.77)* | .55 | (1.69) | 2.02 | (1.61)* |
| Pretest Only | 38 | .21 | (1.37) | .74 | (1.75) | .95 | (1.65) |
| Repeated 3x's + | 35 | 1.00 | (1.48)* | .14 | (1.08) | 1.14 | (1.55) |
| | 156 | | | | | | |
| Overall Mean Difference Scores | | .99 | (1.6) | .54 | (1.54) | 1.54 | (1.64) |

*p < .05

**Table 8.**

**Usage of Words By Activities For D.C. (260 words)**

| | | Number of Words Used | Instances of Word Usage |
|---|---|---|---|
| Activities | No. of Words | | |
| Written | 65 | 18 | 48 |
| Oral/Charade | 72 | 9 | 21 |
| Pretest Only | 68 | 0 | 0 |
| Repeated 3x's+ | 55 | 7 | 11 |
| Total | 260 | 34 | 80 |

over time and for Activities F (3, 256) = 8.07, for the number of words used within Activities over time.

Significant differences between the means were evaluated with the Neuman Keuls planned comparison test. Comparisons between pretest and post test and among pre, post, and post/post tested words from the Pretest Only Activity revealed no significant differences. Comparisons of the set of 260 Written, Charade and Repeated Activity words, yielded significant differences between pretest and post test, but there was no significant difference in meaning development among the words in these three Activities. Comparisons between post test and post/post test of the set of 156 Written, Charade, Pretest Only, and Repeated Word Activity words revealed no significant differences. Comparisons between pretest and post/post test of the Pretest Only and Repeated Word Activities within the 156 word set, yielded no significant differences. This same comparison for the Written and Charade Activities yielded a significant difference, but there was no significant difference in meaning development among the words between these two Activities. Comparisons between Activities of the instances of usage revealed a significant difference for only the Written Activity words. Comparisons between Activities of the number of words used within each Activity revealed significant differences as follows. The Written Activity was significant over all the Activities, the Oral/Charade Activity was significant over the Pretest Only Activity but not the

Repeated Word, and the Repeated Word Activity was not significantly different from either the Oral/Charade or the Pretest Only Activities.

In summary, the results indicate that within the D.C. developmental system, at the time of the post test, which was four weeks after the *stimulus* words were introduced or encountered, the word meanings in the Written, Charade, and Repeated Word Activities significantly developed over the word meanings in the Pretest Only Activity. Furthermore, there was no difference in the word meaning development among these three Activities. But at the time of the post/post test, which took place in the fifth month after the stimulus words were introduced or encountered, the increase in word meaning development was only significant for the Written and Charade Activity words. At this time the Pretest Only and Repeated Word Activity words revealed no significant differences between each other and between the pretest and the post/post test. These results indicate that the Repeated Word Activity, or the impact of repetition, had an initial effect on word meaning development, but that it was not enough within the D.C. developmental system to sustain the word meaning development over time. The impact of the Written and Charade Activities was substantial enough to sustain the word meaning development of these words within the D.C. developmental system over a six-month period. But there was no difference over time between the word meaning development scores in these two Activities. The usage scores revealed that D.C. used the Written Activity words significantly more than the words in the other Activities, both with

respect to instances of usage and number of words within Activities. But with respect to the number of words used within Activities, the Charade Activity words were used more than the Pretest Only words but not more than the Repeated Words. The usage of words, however, within the Repeated Word Activity did not differ from the usage of words in the Pretest Only Activity.

M.L. Developmental System. The results of the word meaning scores for M.L. of the set of 207 pre and post tested words are presented in Table 9. The word meaning scores of the set of 153 pre, post, and post/post tested words are presented in Table 10. Table 11 presents the difference scores from pre to post test, and Table 12 presents the difference scores from pre to post to post/post test for M.L. The ANOVA revealed significant main effects for Activities $F(3, 203) = 16.83$, for the difference scores of the 207 pre and post tested words. The ANOVA revealed significant main effects for Activities $F(3, 149) = 14.54$, for the difference scores for 153 words from pre to post test, and no significant main effects for Activities $F(3, 149) = .56$, for the difference scores from post to post/post test of these 153 words. The ANOVA on the total difference scores from pre to post/post test on these 153 words yielded significant main effects for Activities $F(3, 298) = 20.87$. Table 13 presents the usage results for M.L. over time. (see Appendix E for the words that were used.) A significant effect was found for Activities $F(3, 203) = 10.12$, for the instances of word usage over time and for Activities $F(3, 203) = 10.15$, for the number of words used within Activities over time.

**TABLE 9.**

**Mean Word Scores At Pretest And Post Test**

**By Activities For M.L.**

| | | Pretest | | Post Test | |
|---|---|---|---|---|---|
| | Scores | M | (SD) | M | (SD) |
| Activities | | | | | |
| | No. of Words | | | | |
| Written | 65 | 1.68 | (.80) | 3.80 | (1.55) |
| Charades | 71 | 1.44 | (.70) | 3.61 | (1.63) |
| Pretest Only | 51 | 1.65 | (.80) | 2.24 | (1.67) |
| Repeated 3x's + | 20 | 1.50 | (.61) | 2.35 | (1.71) |
| | 207 | | | | |
| Overall Mean Scores | | 1.57 | (.75) | 3.21 | (1.61) |

**TABLE 10.**

**Mean Word Scores By Activities**

**At Pretest, Post Test, and Post/Post Test For M.L.**

| Scores | | Pretest M (SD) | Post M (SD) | Post/Post M (SD) |
|---|---|---|---|---|
| Activities | | | | |
| | No. of Words | | | |
| Written | 45 | 1.61 (.79) | 3.72 (1.66) | 4.70 (1.13) |
| Charades | 47 | 1.35 (.65) | 3.48 (1.64) | 4.17 (1.34) |
| Pretest Only | 42 | 1.5 0 (.74) | 2.00 (1.55) | 2.64 (1.92) |
| Repeated 3x's+ | 19 | 1.42 (.51) | 2.21 (1.57) | 3.21 (1.59) |
| | 153 | | | |
| Overall Mean Scores | | 1.48 (.70) | 2.97 (1.59) | 3.79 (1.49) |

**TABLE 11.**

**Mean Difference Scores From**

**Pretest to Post Test And Per Activities For M.L.**

| Activities | Scores No. of Words | M | (SD) |
|---|---|---|---|
| Written | 65 | 2.12 | (1.63) * |
| Charades | 71 | 2.17 | (1.66) * |
| Pretest Only | 51 | .59 | (1.50) |
| Repeated 3x's + | 20 | .85 | (1.57) |
| | 207 | | |
| Overall Mean Difference Scores | | 1.64 | (1.59) |

*p < .05

**TABLE 12.**

**Total Mean Difference Scores From**

**Pre to Post to Post/Post Tests and Per Activities For M.L.**

| | | Pre to Post | | Post to Post/Post | | Total Pre to Post/Post | |
|---|---|---|---|---|---|---|---|
| Scores | | M | (SD) | M | (SD) | M | (SD) |
| **Activities** | | | | | | | |
| | No. of Words | | | | | | |
| Written | 45 | 2.11 | (1.75) * | .98 | (1.57) | 3.09 | (1.21) * |
| Charade | 47 | 2.11 | (1.59) * | .70 | (1.63) | 2.80 | (1.37) * |
| Pretest Only | 42 | .50 | (1.44) | .64 | (1.20) | 1.14 | (1.89) |
| Repeated 3x's + | 19 | .79 | (1.54) | 1.00 | (1.58) | 1.79 | (1.53) * |
| Overall Mean Difference Scores | 153 | 1.50 | (1.58) | .80 | (1.48) | 2.31 | (1.49) |

* $p < .05$

**Table 13.**

**Usage of Words By Activities For M.L. (207 words)**

| | Number of Words Used | | Instances of Word Usage |
|---|---|---|---|
| Activities | No. of Words | | |
| Written | 65 | 30 | 74 |
| Oral/Charade | 72 | 19 | 45 |
| Pretest Only | 68 | 4 | 9 |
| Repeated 3x's+ | 55 | 1 | 1 |
| Total Number | 207 | 54 | 129 |

Significant differences between the means were evaluated with the Neuman Keuls planned comparison test. Comparisons between pre and post tests of the Repeated Word Activity for both sets of words (207 and 153), and between post and post tests for the 153 word set, revealed no significant differences. But comparisons between the pre and post/post test means of the set of 153 words in the Repeated Word Activity revealed an effect that was significantly different from the Pretest Only Activity, the results of which were not significant, and from the Written and Charade Activities, the results of which were significant. Comparisons between pre and post tests of the Written and Charade Activities for both sets of words (207 and 153), and between pre and post/post tests for the 153 word set, yielded significant differences, which were not significantly different from each other but significantly different from the Pretest Only and Repeated Word Activities. Comparisons between post and post/post tests revealed no significant differences for any of the four Activities. Comparisons between Activities of the instances of usage and the number of words within Activities, revealed significant differences for both the Written and Oral/Charade Activity words over the Repeated Word and the Pretest Only Activity words, which were not significant. The Written Activity was, however, significant over the Oral/Charade Activity words.

In summary, the results indicate that within the M.L. developmental system, at the time of the post test, which was four weeks after the *stimulus* words were introduced or encountered, M.L.'s word meaning development with

the Written and Charade Activities was significant over the word meaning development in the Pretest Only and Repeated Word Activities. Furthermore, there was no difference in the word meaning scores between these two Activities. At the time of the post/post test, which was in the fifth month after the *stimulus* words were introduced or encountered, the impact of M.L.'s participation in the Written and Charade Activities was substantial enough to sustain word meaning over time within the M. L. developmental system. The results also indicate that the word meaning within the Repeated Word Activity developed over time so that by the post/post test, the results were significantly different over the Pretest Only Activity, although the Written and Charade Activity words were significantly different over this, the Repeated Word Activity. The usage scores revealed that M.L. used the Written Activity words significantly more than the words in the other Activities both with respect to instances of usage and the number of words used within Activities. The Oral/Charade Activities words were, however, used significantly more than the words in the Pretest Only and the Repeated Word Activities, which were not significantly used.

Summary. These findings strongly indicate that the children's participation in the word encounter activities, specifically the Written and Oral/Charade Activities, enhanced word meaning development over time. The Pretest Only Activity word meanings did not develop. The Repeated Word Activity word meanings did develop for D.C. by the four week post test as the

results indicated this Activity was not significantly different from the Written and Oral/Charade Activities at this point in time. However, by the post/post test in the fifth month of the study the results indicated that the Repeated Word Activity for D.C. no longer had a significant effect. For M.L. the Repeated Word Activity did not indicate a significant effect until the post/post test in the fifth month of the study. This Activity was significant over the Pretest Only Activity, but not over the Written and Oral/Charade Activities. All the Activities involved hearing and speaking the language, but the Written and Oral/Charade Activities differed from the Pretest Only and the Repeated Word Activities in that they involved additional functions -- specifically reading and writing in the Written Activity and acting and "watching and guessing" the act in the Oral/Charade Activity. The striking finding is that there was no difference between the word development meaning scores of the Written and the Oral/Charade Activities for both children over time. The crucial difference between the two Activities was in the functions experienced within the children's systems as they participated in each Activity. The words within the Written Activity were, however, used more frequently by both D.C. and M.L. than the words in the other Activities, although they both used the Oral/Charade Activity words significantly more than the Repeated Word and the Pretest Only Activity words. The results suggest that the children's understanding of word meanings did not necessarily imply usage. It is acknowledged that these results were noted and recorded by the researcher over the six-month course of the

study, and may not be a true representation of all of the children's usages within this period. With this in mind, this representation suggests that reading and writing may contribute to the usage of novel words over time.

Variables Potentially Affecting Word Meaning Development

The above results indicate that there were significant differences between word encounter Activities with respect to the development of the word meanings within each child's system.. Because the grammatical category, the language frequency, and the type of book in which a word is encountered, and the level of initial word type (level of word meaning, UK or F), may each influence the meaning development of a word, these variables were examined in order to explore possible factors which might account for why or why not the meanings of words developed.

Grammatical Category. The grammatical category for each word within the four Activities was coded for nouns, verbs, adjectives, and adverbs. Initially words were randomly assigned to Activities and without respect to the grammatical category of each word. Table A -1 and A -2 in the Appendix present the total number of grammatical categories per Activity for each set of words tested at the post and post/post tests and analyzed over time for D.C. and M.L., respectively.

To examine whether there were differences in word meaning development scores among the grammatical categories, the difference scores between pre and post tests and between pre and post/post tests were entered into a one-

way ANOVA with grammatical category as a between "items" factor. Table 14 presents the mean scores of word meaning by grammatical category at the pretest and post test for the first set of 260 words, and at the pre, post, and post/post test for the second set of 156 words for D.C. Table 15 presents the two sets (207 & 153) of mean scores of word meaning by grammatical category for M.L. There were no significant differences in the word meaning scores among these categories for all four sets of words tested at the post and post/post tests. It can be concluded that the grammatical category of each word does not explain the differences in word meaning scores within both child systems.

Language Frequency. The frequencies of each word (see Appendix B) were grouped into the three categories of high, medium, and low, and represent the frequencies of words found in printed school English in grades 3 through 9. The term "low frequency" refers to words occurring 0 to 24 times, "medium frequency" refers to words occurring 25 to 50 times, and "high frequency" refers to words occurring with frequencies above 50. Table A - 3 and A - 4 in the Appendix presents the total number of frequency categories per Activities for each set of words tested at the post and post/post tests and analyzed over time for D.C. and M.L.

To examine whether there were differences in word meaning development scores among the language frequency categories, the difference scores

## TABLE 14.

### Mean Word Scores Over Time By Grammatical Category

D.C.

| | 260 Word Set | | | | | 156 Word Set | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pretest | | Post | | | Pretest | | Post | | Post/Post |
| SCORES | M | (SD) | M | (SD) | | M | (SD) | M | (SD) | M (SD) |
| Grammatical Categories | No. of "items" | | | | No. of "items" | | | | | |
| nouns | 81 | 1.33 | (.55) | 2.40 | (1.63) | 51 | 1.31 | (.55) | 2.31 | (1.56) | 2.86 (1.61) |
| verbs | 78 | 1.55 | (.75) | 2.55 | (1.57) | 49 | 1.39 | (.61) | 2.53 | (1.72) | 2.88 (1.72) |
| adjectives | 64 | 1.39 | (.66) | 2.27 | (1.55) | 36 | 1.36 | (.64) | 2.19 | (1.53) | 3.05 (1.59) |
| adverbs | 37 | 1.30 | (.58) | 2.14 | (1.44) | 20 | 1.35 | (.59) | 2.20 | (1.74) | 2.70 (1.60) |
| Overall | 260 | 1.41 | (.64) | 2.38 | (1.56) | 156 | 1.35 | (.59) | 2.34 | (1.61) | 2.89 (1.62) |

## TABLE 15.

### Mean Word Scores Over Time By Grammatical Category

M.L.

| | 207 Word Set | | | | | | 153 Word Set | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Pretest | | Post | | | | Pretest | | Post | | Post/Post |
| SCORES | | M | (SD) | M | (SD) | | | M | (SD | M | (SD) | M (SD) |
| Grammatical Categories | No. of "items" | | | | | | No. of "items" | | | | | |
| nouns | 71 | 1.42 | (.64) | 3.25 | (1.68) | | 59 | 1.44 | (.62) | 3.00 | (1.65) | 3.75 (1.57) |
| verbs | 61 | 1.74 | (.83) | 2.95 | (1.57) | | 43 | 1.53 | (.83) | 2.84 | (1.59) | 3.72 (1.37) |
| adjectives | 49 | 1.63 | (.81) | 3.43 | (1.61) | | 33 | 1.39 | (.66) | 3.12 | (1.47) | 4.09 (1.35) |
| adverbs | 26 | 1.46 | (.71) | 3.27 | (1.59) | | 18 | 1.61 | (.7) | 3.05 | (1.73) | 3.55 (1.72) |
| Overall | 207 | 1.57 | (.75) | 3.21 | (1.61) | | 153 | 1.48 | (.7) | 2.99 | (1.61) | 3.79 (1.49) |

between pre and post tests and pre and post/post tests were entered into a one-way ANOVA with language frequency as a between "items" factor. Table 16 presents the mean word meaning scores by language frequency category at the pre and post tests the first set of 260 words and at the pre, post, and post/post test times for the second set of 156 words for D.C. Table 17 presents M.L.'s two sets (207 & 153) of mean word meaning scores by language frequency. There were no significant differences in the word meaning scores among these categories for all sets of words tested. It can be concluded that the language frequency category of each word does not explain the differences in word meaning scores for both child systems.

Book Type. The words in this study were derived from six children's books, three of which were fantasy fiction and three of which were fact-based fiction. Tables A - 5 and A - 6 in the Appendix presents for D.C. and M.L., respectively, the total number of words in either book type 1 or 2 for each set of words tested at the post and post/post tests and analyzed over time.

To examine whether there were differences in word meaning development scores between the two different book types, the difference scores between the pre and post-tested words and the pre and post/post tested words were entered into a one-way ANOVA with book type as a between "items" factor. Table 18 presents the mean word meaning scores by book type at the pre and post tests for the first set of tests and at the pre, post, and post/post tests for the second set of words for D.C. Table 19 presents the mean word meaning scores by

**TABLE 16.**

**Mean Word Scores Over Time By Language Frequency Category**

| | D.C. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 260 Word Set | | | | | 156 Word Set | | | | | | |
| SCORES | | Pretest | | Post | | | Pretest | | Post | | Post/Post | |
| | No. | M | (SD) | M | (SD) | No. | M | (SD) | M | (SD) | M | (SD) |
| Frequency Category | | | | | | | | | | | | |
| Low | **212** | 1.36 | (.61) | 2.31 | (1.6) | **134** | 1.29 | (.55) | 2.32 | (1.62) | 2.85 | (1.64) |
| Medium | **31** | 1.48 | (.68) | 2.58 | (1.5) | **14** | 1.71 | (.82) | 1.93 | (1.39) | 2.86 | (1.51) |
| High | **17** | 1.82 | (.98) | 2.82 | (1.7) | **8** | 1.75 | (.82) | 3.38 | (2.09) | 3.63 | (1.78) |
| Overall | **260** | 1.41 | (.64) | 2.38 | (1.6) | **156** | 1.35 | (.59) | 2.34 | (1.61) | 2.89 | (1.62) |

## TABLE 17.

### Mean Word Scores Over Time By Language Frequency Category

M.L.

| | 207 Word Set | | | | | 153 Word Set | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SCORES | | M | (SD) | M | (SD) | | M | (SD) | M | (SD) | M | (SD) |
| Frequency Category | No. | | | | | No. | | | | | | |
| Low | 190 | 1.56 | (.75) | 3.17 | (1.63) | 141 | 1.45 | (.70) | 3.02 | (1.63) | 3.79 | (1.5) |
| Medium | 11 | 1.64 | (.68) | 3.45 | (.82) | 7 | 1.71 | (.55) | 2.14 | (1.28) | 3.57 | (1.53) |
| High | 6 | 1.66 | (.82) | 3.66 | (1.31) | 5 | 1.8 | (.91) | 3.2 | (.87) | 4. | (1.25) |
| Overall | 207 | 1.57 | (.75) | 3.21 | (1.61) | 153 | 1.48 | (.7) | 2.99 | (1.59) | 3.79 | (1.49) |

**Table 18.**

**Mean Word Scores Over Time By Book Type For D.C.**

**260 Word Set**

| | Scores | Pretest M | (SD) | Post Test M | (SD) |
|---|---|---|---|---|---|
| **Book Types** | No. of "Items" | | | | |
| **Fact-Based Fiction** | 116 | 1.50 | (.71) | 2.62 | (1.67) |
| **Fantasy** | 114 | 1.33 | (.58) | 2.18 | (1.47) |
| **Overall** | 260 | 1.41 | (.64) | 2.38 | (1.56) |

**156 Word Set**

| | Scores | Pretest M | (SD) | Post M | (SD) | Post/Post M | (SD) |
|---|---|---|---|---|---|---|---|
| **Book Types** | No. of "Items" | | | | | | |
| **Fact-Based Fiction** | 70 | 1.43 | (.63) | 2.53 | (1.68) | 3.01 | (1.49) |
| **Fantasy** | 86 | 1.29 | (.55) | 2.19 | (1.57) | 2.79 | (1.73) |
| **Overall** | 156 | 2.35 | (.59) | 2.34 | (1.61) | 2.89 | (1.62) |

## Table 19.

## Mean Word Scores Over Time By Book Type For M.L.

### 207 Word Set

| Scores | | Pretest | | Post Test | |
|---|---|---|---|---|---|
| | | M | (SD) | M | (SD) |
| **Book Types** | No. of "Items" | | | | |
| **Fact-Based Fiction** | 89 | 1.49 | (.74) | 3.03 | (.75) |
| **Fantasy** | 118 | 1.63 | (1.62) | 3.34 | (1.61) |
| **Overall** | 207 | 1.57 | (.75) | 3.21 | (1.61) |

### 153 Word Set

| Scores | | Pretest | | Post | | Post/Post | |
|---|---|---|---|---|---|---|---|
| | | M | (SD) | M | (SD) | M | (SD) |
| **Book Types** | No. of "Items" | | | | | | |
| **Fact-Based Fiction** | 64 | 1.36 | (.69) | 2.97 | (1.61) | 3.55 | (1.58) |
| **Fantasy** | 89 | 1.56 | (.71) | 3.00 | (1.59) | 3.97 | (1.42) |
| **Overall** | 153 | 1.48 | (.70) | 2.99 | (1.59) | 3.79 | (1.49) |

book type for M.L. There were no significant differences in the word meaning scores among these categories for all sets of words tested. It can be concluded that the book type in which a word is found does not explain the differences in word meaning scores for both child systems.

Word Type. The word type category for each word within the four Activities was coded as a "1" for words initially tested as "unknown" and as a "2" for words initially tested as "frontier", indicating a partial understanding of word meaning. Within word type categories words were randomly assigned to Activities. The majority of the words pretested were initially coded as "unknown"; this explains why the total numbers of each word type are unequal in each set. Although within each of the "known" and "frontier" meaning categories there were two levels of meaning( K1 & K2, F1, F2) (see Methods for coding), this differentiation was not made within this word type analysis.

To examine whether there were differences in word meaning development scores among the word type categories, separate Chi Square Tests of Association testing differences in proportions were performed on the data sets within each child system. Sets of words were divided according to word types within both child systems. The word types within the sets were divided according to whether they had or had not developed to the "known" category of meaning over time.

These data are presented in Tables 20 and 21. These analyses indicate that within the D.C. . developmental system there were no significant

**TABLE 20.**

**Coded Number of Word Types Classified by Initial Meaning Category and Final "Known" Category with Proportions by Column For D.C.**

**260 Word Set From Pretest to Post Test**

| | | Initial Meaning Category: Frontier | Unknown | Row Totals |
|---|---|---|---|---|
| Final Meaning Category | "Known" | n = 22<br>p = (.26) | n = 35<br>p = (.20) | n = 57 p = (.22) |
| | Not "Known" | n = 63<br>p = (.74) | n = 140<br>p = (.80) | n = 203 p = (.78) |
| | | n = 85 | n = 175 | n = 260 |

**156 Word Set From Pretest to Post/Post Test**

| | | Initial Meaning Category: Frontier | Unknown | Row Totals |
|---|---|---|---|---|
| Final Meaning Category | "Known" | n = 18<br>p = (.39) | n = 34<br>p = (.31) | n = 52 p = (.34) |
| | Not "Known" | n = 28<br>p = (.61) | n = 76<br>p = (.69) | n = 104 p = (.66) |
| | | n = 46 | n = 110 | n = 153 |

**TABLE 21.**

**Coded Number of Word Types Classified by Initial Meaning Category and Final "Known" Category with Proportions by Column For M.L.**

**207 Word Set From Pretest to Post Test**

| | | Initial Meaning Category | | |
|---|---|---|---|---|
| | | Frontier | Unknown | Row Totals |
| Final Meaning Category | "Known" | n = 46<br>p = (.53) | n = 47<br>p = (.39) | n = 93 p = (.45) |
| | Not "Known" | n = 40<br>p = (.47) | n = 74<br>p = (.61) | n = 114 p = (.55) |
| | | n = 86 | n = 121 | n = 207 |

**153 Word Set From Pretest to Post/Post Test**

| | | Initial Meaning Category | | |
|---|---|---|---|---|
| | | Frontier | Unknown | Row Totals |
| Final Meaning Category | "Known" | n = 40<br>p = (.71) | n = 50<br>p = (.57) | n = 95 p = (.62) |
| | Not "Known" | n = 17<br>p = (.29) | n = 41<br>p = (.43) | n = 58 p = (.38) |
| | | n = 57 | n = 96 | n = 153 |

differences between the proportions of these two word types that had or had not developed to the "known" meaning category.

Within the M. L. developmental system there were no significant differences in the 153 word set. The results of the 207 word set analyzed as to the differences between proportions between the "frontier" and "unknown" categories that had or had not developed to the "known" category, was slightly significant with a $X(1) = 3.98$. Further chi square analyses on the Activities within this 207 word set revealed that this difference between the "frontier" and "unknown" categories within the Written, Oral/Charade, and Repeated Word Activities was not significant. But this distinction in the Pretest Only Activity was significant with a $X(1) = 6.19$.

Within the D.C. developmental system it can be concluded that the word type category of each word does not explain the differences in word meaning scores . It can also be concluded that the initial understanding of word meaning, whether it be at the "unknown" or "frontier" level, did not influence whether word meaning developed to the "known" state.

Within the M.L. developmental system the only significance was found within the Pretest Only Activity with respect to the "frontier" and "unknown" meaning categories that developed to the "known" level of meaning. The word meaning development within the Written, Oral/Charade, and Repeated Word Activities revealed no difference between these two categories.

Usage Variables. To examine whether there were differences in word meaning scores between the usage in the different Activities within the D.C. and M.L. developmental systems, one way ANOVAS were performed on the usage data for instances and for number of word meanings that developed within Activities with respect to grammatical category, language frequency, book type, and word type. These analyses revealed no significant differences between the Activities with respect to word meaning usage for both D.C. and M.L.

Summary. The variables, grammatical category, language frequency category, book type, and word type were examined to determine if they could account for the differences found in word meaning development and usage. With the exception of the Pretest Only Activity for M.L. with respect to the influence of initial word type, there were no significant differences in the word meaning scores among all the other variable categories within both child systems. Because M.L.'s word meaning development within Pretest Only Activity was not significant, it can be concluded that these variables do not explain the meaning differences within the significant Activities between words that developed and those that did not.

## Qualitative Analysis of Word Meaning Development

From the commencement of the study, and over the six-month period to the post/post tests which occurred in the fifth month of the study, each response to stimulus words and stimulus sentences, whether it was coded as known, unknown, or frontier, and each usage of these words by both D.C. and M.L. was

recorded.

In the first part of this analysis, these responses are labeled and tabulated by content (examples, definitions, synonyms) and by meaning categories (unknown, frontier, known). The content of these types of responses within different meaning categories is examined and discussed.

In the second part of this analysis, the focus is upon how the children deciphered the meaning of novel words and defined specific words over time within meaning categories and within Activities. The responses are examined, and patterns within the children's analyses are identified and discussed.

Content and Meaning Category of Responses

The data included in this examination are only responses that indicated the children had some idea about the meaning of the word and not responses in which they had "no idea". The content of each of these responses was coded as example, as definition and/or synonym, or as example and definition and/or synonym . Samples of each type of response are in Appendix G, H, & I. The examples the children gave reflect the contexts within which they make sense of the world. These examples and the stimulus sentences were regarded as the cognitive contexts within which each child interpreted word meaning.

The meaning category of each response was coded as " unknown", " frontier", and "known", and these were grouped by the content category of responses. If the child could generate a relevant example in response to the stimulus word, but neither voluntarily used the word in a

sentence nor provided a conventional definition and/or synonym, or if the child provided a definition and/or synonym that was general and did not support it with an example, it was not coded within the "known" meaning category. However, if the child responded with a definition and a synonym that demonstrated the child's mastery of the meaning of the word, the researcher coded that response as "known", and neither asked for an example nor recorded one unless the child volunteered it. In the coding and recording of these latter items it was assumed that the child could provide an example although he or she often did not. Words were coded as "frontier" if the child demonstrated a sense of the word's meaning after it was used in a stimulus sentence designed to control for "moderating variables" (Sternberg, 1987) (see Table 1). Words were coded as "unknown" if the child had a mistaken sense about a word's meaning in response to the stimulus word and this word used in a stimulus sentence.

This section will present the number of responses from each content per meaning category for each child. It will also focus on how each of the children responded to and defined words within each of these meaning categories (UK, F, K).

D.C.'s Responses. The results for D.C. are shown in Table 24 in terms of the coded number of responses in each content category by each meaning category. There were 344 of the total of 904 content responses categorized as "unknown", 347 as "frontier", and 213 as "known".

Of the 344 "unknown" responses, 17 were examples drawn from D.C.'s

cognitive contexts. Although these 17 are a small proportion of the total number of responses he gave over the six month period of the study, his answers are at times intriguing. For example, D.C. replied, in response to the stimulus word *simultaneously*, *"It has to do something I know about B.C. -- before Christ."* It is unclear what caused him to define the word in this way, and the stimulus sentence did not help to clarify this misunderstanding as he replied, he "didn't know" after it was presented.

Often his "unknown" responses were revealing. When asked the meaning of the word *enveloping*, he confidently said, *" I am enveloping to learn how to dunk/ In your stomach I was enveloping to be a human."* To define the word, he drew from his cognitive contexts concerning basketball and "self and mother ". His confusion of the word "developing" with *enveloping* demonstrates that he defined the word on the basis of the word and the contexts he knew, and that the distinction between "en" and "de" in the two words was not perceived or was insignificant to him.

Of the 344 "unknown" responses, 27 were both life experience examples and definitions and/or synonyms. At first glance many of these responsés are amusing. But more than that, they are testimony to the ability of the child (or the mind) to assemble what understanding he has and make sense of a word often never before encountered. *Genial* means "*magic, because genies are magical*". *Blundered* means "*to use a gun*" because a "*blunderbuss is a gun.*" This, in D.C.'s next breath, gets transformed into "*blunder means shot*". Of the 344

## TABLE 22.

### Coded Number of Responses In Content Categories

### By Meaning Categories For D. C.

| | | Content Categories | | | |
|---|---|---|---|---|---|
| | | Examples | Definition and/or Synonyms | Both Examples & Def. &/or Syn. | Row Totals |
| Meaning Categories | Unknown | 17 | 300 | 27 | 344 |
| | Frontier | 35 | 254 | 58 | 347 |
| | Known | 0 | 100 | 113 | 213 |
| | Column Totals | 52 | 654 | 198 | 904 |

"unknown" responses, 300 were definitions and/or synonyms, which strongly demonstrated that when he did not know the meaning or have a partial sense of the meaning of the word, most of his answers were guesses using definitions and/or synonyms. And these responses often demonstrated the logic between the guess and the stimulus word. *Brigand* became "*a jail on a ship*" because he knew that was the meaning of "brig". *Wheedling*, of course, means "pulling up *weeds when you see them*", if you are a seven year old boy, and "weeds" constitute the relevance of the word for you. Responses such as "*compromise*" for *improvise*, "*sensitive*" for *sensible* and "*improved*" for *approval* are understandable deductions because they sounded like words he knew.

Of the 347 responses in the "frontier" meaning category, 35 were examples, and 58 were both examples and definition and/or synonyms. D.C.'s responses in this frontier category, which included examples, more than doubled over these responses in the unknown category. Responses in this meaning category were generated with the aid of the word embedded in a stimulus sentence. The sentences provided either an additional context to bolster the child's general sense of a word or the cue which helped the child access relevant examples and word meanings. In response to the stimulus word *dynamo*, D.C. had "no idea". But to the sentence, "Rachel told me that George was a *dynamo*," he thought of his favorite hero and responded, "*An active person like Michael Jordan might be a dynamo* ."

Clearly, most of D.C.'s responses within this " frontier" meaning category

were definitions and synonyms. Of the 347 "frontier" responses, 254 were definitions and/or synonyms. This may have been so because the sentence provided a cognitive context within which he could make sense of the word. This stimulus sentence was added when either he did not respond with a meaning or after he replied with a vague example or understanding of the word's meaning. Because this context was provided, he needed only to figure out the word's meaning in relation to that sentence or in addition to what understanding he had. In response to the word *ruefully* he replied "I do not know", but to the sentence, "*Ruefully* David walked back to the house", he said "*Madly, sadly/ Yeah, sadly.*" To the word *distinguish,* he asked, "*Does it have anything to do with a fire extinguisher?*" But to the sentence, "It is impossible to *distinguish* the children", he said, "*Identify. Tell which one is which.*"

213 of the 904 content responses were in the "known" meaning category. Of these 213 responses, 113 were both examples and definitions and/or synonyms, and 100 were only definitions and/or synonyms, demonstrating that a little more than half of the responses included examples drawn from D.C.'s experiences in the world. Within this "known" level of meaning, D.C. reveals the cognitive context through which he makes sense of words in the world. He does not begin his response to the word *deceive* with a "like". Instead, he confidently states, "*The opposite of their quest/ The opposite of what they want you to do/ Bothering, insulting, lying, fibbing/ Ben made me think -- I was deceived when I thought I could get to the Olympics/ He made me*

*think wrong."*

The assertive responses within this "known" level of meaning also suggest that networks of related meanings are forming within the child's mind. Not one but several synonyms or definitions were offered in response to a word. For D. C., *agitated* developed from *"mad"* to mean "*bothered, disturbed, insulted,"* and *"anxious, jittery, and nervous." Flabbergasted* came to mean not only "*amazed* and *astonished,"* but other new and invented words, "*dumbfounded* and *dumbspoken." Malevolent* was defined as "*devilish, horrible, horrifying, scary, and mean".* And he replied in a tone of authority to the word *droves* -- *"Herds and flocks, and don't say a sentence because I'm going to say the same thing/ Droves of antelopes roamed."*

M.L.'s Responses. The results for M.L. of the coded number of responses in each content category by each meaning category are shown in Table 25. There were 141 of the total 971 content responses categorized as "unknown", 261 as "frontier", and 569 as "known".

Of the 141 "unknown" responses, only 6 were examples. These 6 responses, although few, appear to be creative guesses put together or accessed from her own world of words and cognitive contexts. When she defined the word *starlet* as "*a pretty good name for a horse, a dance or a ball outside",* she drew from her own meaningful world for at that time in her life she loved horses and often romanticized about weddings, dances, or balls. Plus, balls and dances are at night when the stars come out, and come to think of

## TABLE 23.

### Coded Number of Responses in Content Categories

### By Meaning Categories For M.L.

| | | Content Categories | | | |
|---|---|---|---|---|---|
| | | Examples | Definition and/or Synonyms | Both Examples and Def &/ or Syn | Row Totals |
| Meaning Categories | Unknown | 6 | 116 | 19 | 141 |
| | Frontier | 16 | 190 | 55 | 261 |
| | Known | 0 | 297 | 272 | 569 |
| | Column Totals | 22 | 603 | 336 | 971 |

it, *Starlet* is a pretty good name for a horse. Having encountered a word she never heard before, her interpretation was relevant to her own cognitive context. And when she quickly replied to the word *debase*, *"D-base is a program on the computer,"* not only is her interpretation relevant to her own experience with the word and her understanding of computers, but for an 8-year old child who had had no experience with the word, it is a virtually accurate identification of the word, had the word been *"D-base".*

Of the 141 "unknown" responses, 19 were responses using both examples and definitions or synonyms. Within this category, it seemed as if M.L. either responded because she mistook the word for another word, or because she believed she knew what the word meant. To the word *scrutiny* she replied, *"Mutiny/ Rebellion against a ship's captain",* but to the stimulus sentence she said, "no idea". *Cordial* meant *"Like I'm cordial to Katie and Fred or Jill and Richard -- partial."* And *voluminous* with the "v" is "*very luminous/ Lots of light/ Firecrackers are very luminous."*

Of the 141 "unknown" responses, 116 were definitions and/or synonyms, demonstrating that guessing with a synonym or definition was her response to unknown words. Again, the logic of some of the responses is apparent. *Incurring* means *"not occurring",* and *acknowledge* is a good guess for *"admonish"* because both have the same number of syllables, and begin with a short "a", and each ends with a soft *"edge" and "ish".* *Distinguish* means *"to stop or put out"* because that is what *extinguish* means. And, of course,

*outcroppings* are *"greens of overgrown plants."*

Of the 261 responses in the "frontier" meaning category, 16 were examples and 55 were both examples and definitions and/or synonyms. M. L.'s responses in the frontier category, which included life experience examples, nearly tripled over these responses in the unknown category. Responses in this meaning category were generated with the aid of the word embedded in a stimulus sentence, so M.L. had available to her an additional "crutch" to help her access meanings not readily available. When prompted at different times with the words, *infectious, coaxed* and *preservation,* she had "no idea" as to their meanings. But with the sentence, "Henry's attitude is *infectious*", she concisely stated, *"It catches on like a cold/ When he laughs, everyone laughs/"* To the word *coaxed* in the sentence, "The teacher *coaxed* the girl to come", she said, *"I coaxed -- I used something to get Dashiell to push me on the swing -- 'I'll push you if you push me/".* And to the sentence, "The *preservation* of Indian customs is important", she replied, *"To preserve something/ To keep it new so it doesn't rot away/ They preserve animals in alcohol/"* Clearly the stimulus sentences provided the contexts so that she could tap into her own relevant world within which words made sense.

Of the 261 "frontier" responses , 190 were only definitions and/or synonyms, which is almost 75% of these responses. These results indicate that the stimulus sentence within which the stimulus word was embedded provided an additional context with which M.L. gained clarity about both the words the

meanings of which she knew, but was unable to access, and the words she partially knew but could not explain. She did not recognize the word *subdue*, but when it was used in the sentence, "Mary was unable to *subdue* the child", she replied *"to stop, to calm the child down".* To the word *perseverance,* used in the sentence, "With *perseverance* he learned to read well", she expressed frustration but managed an adequate response -- *"Oh my god/ I can't explain it/ Stubbornness/ He stuck to what he was doing."* And to the sentence, "She was *engrossed* in her work" came the reply, *"Full-fledged/ Her whole self was given to her work."* Full-fledged does not mean engrossed except in the sense that the state of being engrossed is a fully-developed or mature involvement of the self. M.L.'s response here suggests that the roots of meaning often lie hidden in the contexts of sentences and self.

Of the 569 "known" responses, 297 were definitions and/or synonyms and 272 were responses using both definitions and/or synonyms and examples, demonstrating that a little less than half of the responses included examples drawn from M.L.'s experiences in the world. Within this "known" level of meaning M.L. reveals the cognitive contexts through which she makes sense of words in the world. The text of her responses are replete with references to the books and media with which she was often absorbed. In defining the word *banished* she referred to a story in Stories For Children by Isaac Bashevis Singer. *"To ban -- to forbid someone to come here/ Like Abraham and Lot in 'The Wicked City'/ Abraham -- he wasn't banned, but when he said/ This was a*

*very hateful city and everybody worshipped idols/ And he said 'REPENT, thieves, sinners, robbers, and cheats/ Or God will burn Sodom'/ That's where he was/ ...They only wished to banish this crazy uncle of Lot/ Lot was Abraham's nephew."* The data also revealed that M. L. integrated definitions, synonyms, social voices, and everyday experiences within these "known" responses. In reply to the word *astute*, she said, "*Smart, clever/ You can catch flies with sugar, not vinegar/ If a child is on a merry-go-round, and she wanted to go for a third time/ If you said, 'Can you guess what is in my pocket?'/ The child would come off."*

More than half of M.L's "known" responses were concise definitions and/or strings of related synonyms. *Blunt* was defined as *"Dull, simple/ You use the words you can/ You don't use three words when you can use two or two when you can use one."* *Wheedling* she said meant *"scheming, shrewd, and sort of manipulating/"* And often words were cross-referenced as she recited these strings of synonyms. To *flabbergasted* she replied, *"amazed, dumbfounded, in awe"*, to *stunned* -- *"amazed, flabbergasted, stupefied, in awe"*, and to *stupefied* -- *"flabbergasted, dumbfounded, amazed -- all those words -- struck stupid."* *Fugitives* were defined as *"outlaws, miscreants"*, a *rogue* as *"a vagabond, a robber, a thief"*, a *miscreant* as *"a ruffian, a vagabond, a brigand, a bandit,* and a *vagabond* as a *"rascal, varmint"* and *"wandering beggar"*. The semantic networks are evident in M.L.'s world of words.

Summary. There is a similar pattern of content responses within

meaning categories for both D.C. and M.L. When they did not know the meanings of words their responses were guesses, and these guesses most often were definitions and synonyms. When they knew what words meant, their responses demonstrated two behaviors. Either they responded quickly with a good definition and/or synonyms followed often by an example drawn from their experiences, or they responded first with the example followed by a good definition and/or synonyms. In the latter case, it seemed as if the examples stimulated the access of the definition and synonyms. Within this "known" category of meaning the children often used strings of related synonyms that over time came to be cross referenced with other synonyms used in other responses. When the children exhibited partial knowledge of word meaning by generating a response when a stimulus sentence was presented, the majority of their responses were definitions and synonyms for the sentence itself provided the context. The proportion of responses drawn from relevant cognitive contexts increased dramatically for both children within each higher level of meaning.

On the basis of the data it appears that the cognitive context has to be suggested through the context of the sentence, in the case of the frontier level of meaning, in order for the child to access a definition and/or synonym. Or the cognitive context has to be established within the child's mind in the case of the "known" category in order for the child to generate a good definition and/or synonyms. The developing network of synonyms suggest that these cognitive contexts may be expanding or that a lexicon of related word meanings is

becoming established. When the child responds quickly with a good definition and/or synonyms, it appears as if these definitions and synonyms are not only established but independent of the cognitive context. The pattern suggested is that experiences with the word relevant to the child helped to establish cognitive contexts through which word meaning became established and independent.

Deciphering and Defining Word Meanings

The children's responses as to the meaning of the words were recorded at the time of the pre, post, and post/post tests in verbal interviews which involved no reading and writing of the stimulus words. The phonology of the words, therefore, was the basis upon which D.C. and M.L. initially deciphered the meaning of novel words and defined other words. For example, the word, *wheedling*, was heard and not seen as a written word.

The children's responses reveal, and this section will detail the ways in which the children deciphered word meaning when they encountered a novel word. It will also present and examine the ways in which D.C. and M.L. defined specific words over time within meaning categories and within Activities.

Morphological Analysis. To morphologically define a word is to figure out the word's meaning through knowledge of root words and meanings, inflected words, derived words, literal compounds, and idioms. The morpheme is regarded in this study as the "minimal unit of semantic analysis" and the "smallest individually meaningful element of a language" (Anglin, 1993)

Both D.C. and M.L. morphologically deciphered the meanings of words

they had never heard and did not know. These responses were based upon the phonological similarity or the mistaken identification of the stimulus word with words that they knew. These attempts were usually unsuccessful for both children, and the responses were coded as "unknown".

For example, to the word *fodder*, both children replied, *"how a baby would say father."* In response to the word *frenzy,* D.C. accessed the words, "friend" and "France", words also beginning with "fr", and replied, *"lots of friends or a word for friendly in France."* To the word *hubbub,* he blurted, *"Hi Bub!"*, perhaps a take-off on the often-heard, "Hi Bud", a greeting his father addressed to him. M.L. replied with the word *"sterile"* to define *steroid,* confused *mutiny* with *scrutiny* and *cordial* with *partial,* and jokingly replied with the word *"poppying"* to *waning* because her papa's name is Wayne.

It was only when both children had some knowledge of the meaning of the morphological units of the words that they were able to figure out partial or whole meanings of words. For example, to the word *laboriously*, D.C. asked, *"Does it have anything to do with work and labor?"*.

M.L.'s response to the word *dendrochronologist* also illuminates this process. *"Is it a made-up word?"*, she retorted, and quickly responded, *"Some kind of scientist/ Ologist/ Psychologist means you're/ Ologist means you're a scientist/ You study Psychology/ "* Not knowing the meaning of the morphemic unit "dendro", she was unable to proceed in her analysis. But in response to the word *rejuvenator*, M.L. deciphered the meaning and replied, *"something like*

*the fountain of youth because it revives you -- the word juvenile -- to make someone young again."*

But knowledge of the morphemic units of a word does not always guarantee that putting "known" words together will supply an accurate meaning, a point illustrated in the following examples.

Initially, in reply to the word *dumbfounded,* D.C.'s understanding of the words exemplified in his response *"found and dumb",* wasn't sufficient to capture the meaning, "struck dumb". But his accrued new understanding of the meaning of the word *dumbfounded* may explain why, in the following months, he repeatedly used the word "*dumbspoken"* when he meant *dumbfounded.* He encountered a similar problem in defining the word *thickheaded,* a Pretest Only word, which he defined in the pretest as, *"Fat headed/ Good brain, big brain/ Maryse is sometimes thickheaded I Ms. Know It All/"* At the post test his response was similar -- *"A name for smarty pants or big brain."* And although D.C. accurately responded on the post test to the word *outcroppings* with, "*Oh, that's one of my favorite words/ A mineral that crops out of the ground like growing corn,"* by the post/post test he didn't know what it meant, and retorted, "*Corn is supposed to get three feet high, but it gets four feet high, so it's an outcropping."*

M.L.'s initial morphological analysis of the word *voluminous* was mistakenly based upon the word "luminous" rather than upon "*volum",* as evidenced by her response, *"very luminous, lots of light."* Having had this

pointed out to her in the Written Activity, she wrote as a written entry within the Activity, *"The voluminous and tall bookshelves in the Library of Congress made her dizzy."* And on the post test, she morphologically defined the word *voluminous* as *"many millions/ volumes."*

When D.C. and M.L. knew what the words meant when they were initially pretested, their responses often indicated that they knew the meanings of the root words. These responses usually included the morphemic units embedded within definitions and examples.

*Confusion* was defined by D.C. as *"Like when you are confused/ Mixing thoughts or things up that don't go together/ Like cornflakes on pizzas."* *Impatient* meant *"not patient/ You're waiting for your turn to read your poem, and you get impatient/ Or if you're in the lunchroom, you're impatient and want to go out to play."*

M.L. defined *discontent* as *"not content, not happy."* To elaborate her sense of the word's meaning, she continued with *"There is a Far Side one -- a cow all dressed up/ Her husband is William, and she says, 'William, I'm not content!' "*

As the children's understanding of the meaning of words developed, the way in which they defined the words also changed. The morphological units of words, at the "known" level of meaning, were identified concisely. Although the precedents to its evolution are unclear, the meaning development of the Pretest Only word *dynamo* illustrates this process for both D.C. and M. L.

At the pretest, D.C. responded to the stimulus sentence, "Rachel told me that George was a *dynamo"* with *"An active person like Michael Jordan might be a dynamo."* At the post test four weeks later, he responded to the stimulus sentence "The woman was a *dynamo* and set many goals" with "I don't remember." But at the post/post test five months later, he stated, "*Comes from the word dynamite -- daring, blasting/ A lot of energy/ Gary Devino is a dynamo/ So are one of the runners in the Olympics and Pop and you/ On Channel 11, there's a duck named Dynamo."*

M.L.'s response to the above stated pretest sentence using the word *dynamo* was, "I can't explain it/ I don't know." At the post test four weeks later, she responded to the above stated post test sentence, *"Amazing or the first name of an ace or a detective duck on Saturday morning."* And on the post/post test five months later she said, *"A superhero or someone who's dynamic/ Dynamic means you have lots of energy/ Probably came from the word dynamite or dynamite came from dynamic."*

Summary. Both D.C. and M.L. morphologically defined words based upon the phonological similarity or the mistaken identification of the stimulus words with words that they knew. It was only when they had some understanding of the meaning of the morphological units of the words that they were able to figure out partial or whole meanings of words. Even this understanding, though, did not always assure success, because the meanings of two singular morphemic units are sometimes different than the meaning of those

two units combined. The children's responses which were coded as "known" often included the morphemic units embedded within definitions and examples, and within "known" responses they often analyzed morphemic units concisely.

Responding With Definitions and Synonyms. The majority of both D.C. and M.L. responses (see Tables 23 and 24) were definitions and synonyms. Not all meanings of words developed over time, but among those that did, the progression from morphological deciphering, to definitions and/or synonyms drawn from the context of the stimulus sentence, to strings of synonyms drawn from the children's own context for the word's meaning, was often evident.

*Fodder*, on the pretest, was defined as, "*how a baby would say father.*" In the Written Activities, D.C. wrote, "*If I was a farmer, I would give fodder to the cows.*" At the post test four weeks later, D. C. said in response to the word, "*Something to feed a cow like hay.*" At the post/post test five months later he responded with, "*Stuff you feed the dogies, the cows, the colts, and the horses/ Like oats or hay.*"

*Dumbfounded* was morphologically defined on the pretest as *"Found and dumb."* In the Oral/Charade Activities, D.C. acted out the meaning, but kept on confusing it with *dumbspoken* and *dumbsided.* At the post test, he defined it as, "*The word I taught you/ Diss/ Someone dissed you out of your mind and then the other -- dumbspoken -- he can't speak.*" At school, two months later, he used his newly created word again as a word in a written entry, "*When he saw the ghost he was dumbspoken.*" Although *dumbfounded* was not a word

included in the set of words that were post/post tested, D.C. used it to define *flabbergasted.* On the post test, he stated, *"Like dumbfounded, dumbspoken/ You can't speak because you're so amazed."*

Over time inflected forms of the words, *manipulate, wheedle, scheme,* and *persuade* were used to define each other. For instance, D.C., thinking "wheed" meant "weed," said in response to the word *wheedling* on the pretest, *"pulling up the weeds when you see them."* In the Written Activities, his written entry was the following:

*Tigger was a wheedling liar.*
*Eating every sort of leaf.*
*Blunt paws and nine claws.*
*Telling everybody's beef.*

At the post test four weeks later, in response to the word *wheedling*, he said, *"manipulating".* A month later, at the dinner table he asked his father, who is an attorney and businessman, *"Did you do any wheedling today, Pop?"*
A few minutes later, he said, *"It's okay to manipulate if that's what you have to do for your job."* At the post/post test, in response to the word *wheedling,* he replied *"Manipulate and scheme/ You're scheming/ Like the barber in Sebastian was scheming, wasn't he?"*

M.L. also defined the word, *fodder,* on the pretest, as *"how a baby would say father."* In the Written Activities, M.L. wrote, *" I live on a farm. My favorite chore is feeding fodder to the cows. I love the din of dogies and colts."* At the post test four weeks later she replied, *"Food for cows and horses/ Grain or something."* At the post/post test five months later, she said, *"Food for cows and*

*horses/ Hay or grass."*

In response to the word, *outcroppings*, M.L. had said on the pretest, *"greens of overgrown plants."* As her entry in the Written Activities, she wrote, *"There were so many outcroppings in the ground you couldn't walk without stepping on one."* At the post test four weeks later, she defined *outcroppings* as, *"rocks or minerals that are sticking out of the ground."* By the post/post test five months later, she further refined her answer with the following response, *"Stone or gems stuck up from the ground/ Like limestone found in layers of the earth."*

M.L. tried to decipher the meaning of *dendrochronologist*, by drawing on her knowledge of the root unit "-ologist" of her understanding that a psychologist is a scientist. Because she did not know that the root unit "dendro-" was the defining form for tree, her response on the pretest was limited to the following, *"...Some kind of scientist/ Ologist/ Psychologist means you're/ Ologist means you're a scientist/ You study Psychology."* Her entry for the Written Activities that day, after the meaning was discussed, was the following:

*Advertisement For Dimetapp II*

> ***"I am a dendrochronologist. I had heard of a forest that had been chopped down. So I sailed across the ocean. When I got there I had forgotten my dimetapp, and they sold none there. So I had to go home and get it. When I came back the stumps were hauled away and the rest was crumbled. Life has an uncanny twist to it. I forgot my dimetapp and now my life is ruined."***

Although the word *dendrochronologist* was not post/post tested, her response on the post test four weeks later suggested she had incorporated the word's meaning within her cognitive context of study and trees. She said, *"Someone who studies trees for age and health/ Look at bark and rings in the center of*

*them."*

Often, because the children, either could not define a word or because the stimulus sentence was enough to help them access a sense of a word's meaning, their morphological analysis of the stimulus word was not revealed or nonexistent. In the latter case, the stimulus sentence provided a meaningful context to which both D. C. and M. L. responded with definitions and/or synonyms.

For example, in the pretest, D.C. asked for a sentence in reply to the stimulus word, *agitated.* He said, *"mad",* in response to the sentence, "Ben was *agitated* and hit her." The word was experienced in the Oral/Charade Activity in which D.C. acted out the meaning for M.L. In the post test, which was four weeks later, D.C. replied, *"Bothered, disturbed, insulted."* And at the post/post test five months later, he dropped the word *insulted,* and said, *"Bothered, anxious, jittery, nervous."* In the post/post test *jittery*, an Oral/Charade Activity word, was also defined as, *"nervous"* and *"agitated."*

M.L., in response to the pretest sentence, "Mary was *flabbergasted* when he appeared at the party, " replied, *"amazed, in wonder, in awe."* This word was experienced in the Charade shared Activity with D.C. Within the session of this Activity, the dictionary definition of *flabbergast* – "to dumbfound", and the definition of *dumbfound,* "to make speechless by shocking. Amaze," was discussed. Although *dumbfounded* had been acted out by D.C. for the researcher in a private session a month earlier, and defined by him on a post

test two days earlier, M. L. appeared, at this time, not to have heard the sessions. She expressed surprise when she was told it literally meant, "struck dumb". She acted out the meaning in the shared session with D.C., and he guessed the meaning. On the post test four weeks later, M. L. replied in response to the word *flabbergasted, "amazed, dumbfounded, in awe/ You can't speak."* Two weeks later, she defined on a pretest the word, *stunned,* as "*amazed, stupefied, in awe,"* and the word, *stupefied* as "*flabbergasted, dumbfounded, amazed -- all those words -- struck stupid."* Having experienced these words in the contexts of heard sentences, of discussions, of Charades, and the "heard" reading of Charlie and the Great Glass Elevator, her responses appeared in clusters of related words, and she generated *"struck stupid"* instead of *"struck dumb."*

The meaning development of the three words, *obsequious, lackey,* and *fawning,* for M.L., demonstrates that it was not only the Written and Charade Activity words that she came to relate in clusters. *Obsequious*, as a Written Activity word, was coded as "unknown" at the pretest. *Lackey*, originally a Repeated Activity word, was dropped from the quantitative analysis because it had been defined, but was post and post/post tested, nevertheless. *Fawning* was a Repeated Activity word. All three of the words were heard within the book, The Marvelous Misadventures of Sebastian by Lloyd Alexander. At the post test, M.L. defined *obsequious* as, *"to be willing to be at your service."* In reply to the word, *lackey,* she said, *"Servants/ They'll do whatever you want.*

*Walk over coals/ No, not really/ But I think they are too eager to be at your service."* And she misdefined the word *fawning* in the following response -- *"Like I'm reading this book, The Statue of Liberty/ Kate Millet -- she's tricky, mean, and horrible."* By the post/post test five months later, M.L. said, in response to *obsequious, "Willing to serve you/ Willing to do whatever you please/ Like a lackey/ Fawning."* To the word *lackey* she responded, "*Servants who do whatever you want just to please you,"* and to the word *fawning, "a lackey is fawning/ They are always willing to do what you want, and it makes you sick."*

Summary. Both D.C. and M.L. replied with definitions and synonyms in response to the stimulus words and stimulus sentences in the study. The meaning development of specific words over time illustrate that often in the initial stages of encountering a novel word, the children guessed with definitions and/or synonyms by morphologically analyzing units of the word. As the children's knowledge of these novel words developed, the stimulus sentence was sufficient in supplying the context necessary for either child to access a definition and/or synonyms. For words initially pretested as "frontier", the children's morphological analysis was often not evident or nonexistent. Meaning development was especially evident for words within the Written and Charade Activities for both D.C. and M.L., but words within both the Pretest Only and Repeated Activities also developed for both children. In the later stages of meaning development of specific words, strings of synonyms, often

cross-referenced among each other, appeared either alone in the children's responses or embedded in cognitive contexts relevant to their worlds.

Responding With Examples From Contexts. Viewed as a whole, the children's responses revealed the contexts within which the children developed an understanding of a word's meaning. These contexts provide clues to why some word meanings developed and others did not. Their responses suggest that D.C. and M.L. approached the word learning process differently, and that words developed because they were relevant to each child's interests and developing "points of view on the world."

D.C.'s thoughts about the word learning process (see Appendix J -1 ) suggest that the meanings of words and their relationships to one another came alive as they became visually apparent to him. The word had to take its place in his world. *"Every word,"* he said, "*I always thought had a picture/ Like by the ocean or bay/ Fighting has a picture of two dinosaurs -- a tyrannosaurus and a green diplodocus."* And another time he explained that a compass rose, used in the Social Studies class (which he loved) and within which he excelled, would be a useful instrument to map words' relations to one another, such as "*useful*" and "*easy*", and he drew what he meant. The following day, he responded to the word *approval*, *"Like at first in basketball I was the worst/ But now there's a big approval."* The researcher asked, "*You mean improvement? Are you confusing improve with approve?"* to which he replied, *"Yeah/ West and Southwest they are -- improve and approve."*

The words that developed within Activities for D.C. were words that he could conceptually integrate and use within cognitive contexts that were relevant to his world. The examples he provided in response to the words (see Appendix I -1) reveal that these contexts were rooted in his everyday experiences with other people, real and imagined, within which the meanings of words grew. The written texts he heard or viewed were peripheral and not central to his experience of the words. He used words, such as *foppish, incognito, vagabond, and blunderbuss* because the words incorporated meanings that were salient to him. The word *meager* was used unconventionally by him time and time again. *"May I have a meager glass of milk?" "I would like to have just some meager time with you." "Boy, Pudgies chicken is sure more meager than yours."* And, *"She is very meager on sports, and in not being strict."*

The development over time of the word *glimpsed* is an example that illustrates this point well. This word, a Repeated Activity word, was heard three times and once as the root form, *glimpse,* in the session reading of the book, The Sign of the Beaver by Elizabeth George Spear, (see Appendix K). When D.C. first encountered the word, *glimpsed,* as a stimulus word on the pretest, he had "no idea" as to the word's meaning. In response to the stimulus sentence, "He *glimpsed* a dog moving through the trees," he replied *"In Treasure Mountain the crown comes and goes in a glimpse."* In this response D.C. used the root form and related it to a computer game he enjoyed. By the time of the post test

four weeks later, he drew from experiences that were not related to the written word, and detailed his understanding in the following reply:

> *"Like when I got my mohawk at Astor Place and you were waiting in the car/ I was with Damon/ You glimpsed my hair and didn't recognize me when I first got it/ That girl who saw our orange Volkswagen van down the driveway when she passed by, saw the van by a glimpse/ She had a lizard on her shoulder."*

It is possible that because D.C. heard the word, *glimpse,* and inflected forms of the word at least four times in the written text, he developed a clear sense of the word's meaning and his knowledge developed from the "frontier" level to the "known" level. But it is also evident in the above example, and in the response below, that the word *glimpsed* developed within contexts that were relevant to his world. To the word *glimpsed* at the post/post test five months later, he responded,

> *"Like when I was four/ Well, glimpsed means saw a faint picture/ In one of my dreams -- not in a dream -- I saw a ghostbuster that I always wanted/ I don't want it anymore/ I rolled out of bed and put my hand on it, and it wasn't there/ I always kept an eye out for it in case I found it/ Never did/ Never will."*

Within this response, D.C. defines the word in the way a dictionary never could. When he was four, his life revolved around imaginary play with plastic play figures, such as the one he refers to above, and so the word, came alive in the context of his memory of a figure only *glimpsed* but never found.

M.L.'s comments about the word learning process (see Appendix J -1) suggest that the written words she has previously encountered provide a data-base within which new words were readily integrated and subsequently expressed. Many times throughout the course of the study M.L. referred to her agent of the word understanding process as a dictionary. In response to a word

she did not know she replied, *"My dictionary has gone to the far corners of my brain and there is no prevail."*

She also expressed the belief that her mind had "a mind of its own" because words popped into her head. She said, *"You know what/ Sometimes -- people use words that they don't even want to use/ To impress people/ And miraculously it fits right in with the thing inconspicuously."* Earlier in the pretest session, she had been amazed because she thought the next word would start with an "*h*", and it did. She consciously had not realized that the pretested stimulus words had been presented to her in alphabetical order. She commented, "*But remember before I had this thought that the next thing was going to begin with "h"? Well, I think that part of my brain knew that I had an idea."*

The examples that M.L. provided (see Appendix I -2) reveal the cognitive contexts within which her understanding of words and concepts originate. Clearly, the written text has been central to her experience of words in the world for time after time, M.L.'s responses (see Appendix) rose out of literary or linguistic contexts. "*Perseus, I presume,"* she said *"stole the grey sister's eye/ This is in the Greek myths/ They groped around because they could not see." Perceive,* she said, meant *"To hear/ To get what the person means/ Like 'keifing' in Swiftly Tilting Planet or A Wrinkle In Time/ You feel it/ It's communicating without speaking."* To express the word *distinguish,* she commented, "*In this book I read was the expression -- "a chip off the old block/ A*

*woodman cut off a little piece of wood from a large piece of wood/ He said it -- "a chip off the old block" -- to distinguish it from the rest of the wood/ If a girl is like her father, we now say she is a "chip off the old block."*

Her understanding was not limited to references to fiction, for many of her responses also demonstrated that she understood words within the conceptual contexts of textbooks and classroom instruction. Her definition of DNA incorporates understanding of fruit flies, recessive and dominant genes, and a pennant square. A *neurologist* she said, was "*a scientist who studies neurons, cells, atoms, neurons, the brain, and the cerebellum.*" And faculties are *"vital faculties -- senses, responses to stimuli, life functions."* Although she may not "know" what all these words mean, or understand very well the represented conceptual domains, her responses suggest that her sense of the words' meanings reflects the initial stages in understanding words within a particular meaning base.

Summary. The examples expressed in D.C.'s and M.L.'s responses reveal the cognitive contexts within which they each developed a sense of word meanings. The responses suggest that they approached the word meaning process differently and that words developed because they were relevant to each child's cognitive contexts and "developing points of view on the world."

# CHAPTER 4

## Discussion

### Why Children Develop A Sense of Word Meaning

The first issue addressed by this research was the impact of the different functions within the Written, Oral/Charade, Pretest Only, and Repeated Word Activities on D.C.'s and M.L's development of a sense of word meaning. The aim was to contrast not the two children's developmental systems, but the development of the word meanings in terms of the functions experienced within each system through each child's participation in the different Activities .

### Do Writing and Reading Make The Difference?

Over the six-month period of this study, D. C. and M.L. developed an understanding of more words within the Written and the Oral/ Charade Activities than they did within the Pretest Only and the Repeated Word Activities. But there was no difference between the number of word meanings that developed as a result of D.C. and M.L.'s reading and writing of the words in the Written Activity and the number of word meanings that developed as a result of D.C. and M.L.'s acting out and "viewing and guessing" of the words in the Oral/Charade Activity. Thus, the results support the original hypothesis that the children's participation in the word encounter Activities would enhance word meaning development, but they fail to support the hypothesis that this development would be the greatest in the Written Activity.

Previously cited theories and research proclaiming the beneficial effects

of reading, writing, and discussion on word meaning development may well be supported by the word meaning development in the Written Activity. But the relationship between the functions of the Written Activity and the resulting development requires further explication in light of the additional findings that children can significantly develop an understanding of novel words encountered in written texts through the experience of functions in an Activity which involved neither reading nor writing. Comparisons between written and verbal or other approaches to word meaning have been made from a variety of points of view.

Halliday (1985) emphasized that there are different learning styles and world views encompassed in speaking and writing the language. In non-literate societies the spoken language serves the functions of the community. In literate societies the functions of speaking and writing are often shared, but he said, it is writing that has been lionized. This attitude, he said, has prevented us from recognizing the critical role that speech plays in learning. The results of the instant study suggest that we should further explore Halliday's contention.

Saussure ( 1916/1983) criticized the "tyranny of writing", insisting that writing exists to represent speech because the spoken form, and not the written form, is the object of thought. Vygotsky (1934/1962) and Luria (1981) both believed that speech was the most fundamental and elementary form of verbal thinking, contributing to the unity between thought and speech. Bakhtin (1984/1963), Nelson (1992), Sperber and Wilson (1986), and Wertsch (1985) emphasize speech and the voice through which word meanings develop within

socio-cultural contexts and contribute to the self's development of consciousness. Nelson (1984, 1989) has repeatedly demonstrated the development of word meanings within relevant contexts by preschool children who are not reading and writing. As the child participates with others in activities and events in which he or she functions, he or she develops a sense of the meanings of the words encountered.

But the Oral/Charade Activity involved more than speaking and hearing the word in relevant contexts. Because the written text is an integral part of the modern world, this Activity was designed to offer a different experience requiring the use of different functions with which to relate to the written text. Words were heard in the contexts of the written texts of the pre, post, and post/post tests, of the dictionary definitions, and of the session reading. In each instance, the word held center stage as a phonemic entity, but it was never read as a written word. The children and the researcher related and heard what relevance the word held for each of them, and the children took turns acting out and "viewing and guessing" the word's meaning. The acting involved pantomime and the use of fingers to indicate the number of syllables. It was this Activity, second to the Book Reading, which D.C. and M.L. most enjoyed.

Does Hearing the Words More Frequently Make A Difference?

D.C. and M.L. developed an understanding of more words in the Repeated Word Activity at different points in time than of the words in the Pretest Only Activity. Words in the Repeated Activity were pretested, heard

three or more times in the session book, and often had higher language frequencies. Understanding of these words developed because the children heard them or because they encountered them elsewhere due to their language frequencies.

By the post test, which was four weeks after the words were introduced, there was no significant difference in the development of word meanings among the Written, Oral/Charade, and Repeated Word Activities for D.C. These results support the previously cited research which demonstrates that listening to words within the context of the written text is a significant source of word meaning development. These results also indicate that after four weeks, D.C.'s participation in the Written and Oral/Charade Activities requiring the use of different functions was unnecessary. Merely hearing the words spoken in repeated contexts was enough to significantly affect his word meaning development.

Had the post test been the only one conducted, this quality of impact of the different Activities would have been the final conclusion. However, at the time of the post/post test, approximately five months after D.C.'s initial involvement with the word, his understanding of the words within this Activity was no longer significantly different from the understanding of the Pretest Only Activity words, which was never significant. These last results indicate that the impact of repetition had an initial effect on word understanding, but that it was not enough within the D.C. developmental system to sustain the word meaning

development over time. Extrapolation from these results suggests that listening to the written text may have an initial, but not a long-range effect on word meaning development.

M.L.'s understanding of the Repeated Word meanings did not significantly develop by the four-week post test, but did by the post/post test in the fifth month of the study, although it was only significant over her understanding of the Pretest Only words and not the Written and Oral/Charade words. This significant development might be explained by the fact that the higher language frequency of the words within this Activity may have increased the chances that she would encounter these words outside of the study, especially since she was an avid reader.

Although both children developed an understanding over time of some words encountered in the Pretest Only Activity, their understandings were not significant. The lack of significance of the word meaning development within both child systems indicates that hearing the word in the context of the sentences in the pretest (the impact of testing), and hearing the word once or twice in the context of the session book did not enhance the development of word meaning for D.C. and M.L. by the post or by the post/post test. The difference between the Pretest Only and the Repeated Word Activities, at the post test for D.C. and at the post/post test for M.L., might be explained by the lower language frequency count of the Pretest Only Activity words, and thus, the children's more-frequent encounters with the Repeated Activity words. If this is

so, it follows that developing lasting word meanings from listening to stories would require frequent instances of hearing the words spoken or read, thereafter.

Because both D.C. and M.L. developed an understanding of a significant number of the words in the Written and Oral/Charade Activities, the distinction among these Activities and the Repeated Word and Pretest Only Activities may help clarify which functions and activities enhance lasting word meaning development. Both the Written and Oral/Charade Activities, in addition to their unique attributes, included discussions of word meanings and dictionary definitions. This difference between them and the Pretest Only and the Repeated Word Activities may, in and of itself, account for some of the differences in the development of meaning, and would be an appropriate subject for further research.

The Pretest Only and the Repeated Word Activities involved the children's use of speech and hearing. The Written and Oral/Charade Activities both built on and shared the experience of these functions. In these respects, all four Activities were similar. What distinguishes the Written and Oral/Charade Activities from the other two and from one another, however, is the experience of different functions as the children participated in the particular task or goal of each Activity.

## Does Activity Cause Thought?

Many theorists and researchers have recognized the integrating role of

activity in the organization of psychological processes ( Luria, !981; Piaget,1978; Scribner & Cole, 1981; Tobach, 1981; Tulviste, 1991). Vygotsky (1962, 1978) perceived the developmental process as movement involving physiological functions, social activities and the signs or psychological tools of the culture. New methods of thinking, such as speaking, reading, and writing, combine with elementary functions and serve to stabilize them. This developmental process, Vygotsky said, contributes to a fundamental reorganization of the whole system and changes the very nature of development. Speech, he contended, stabilized perception. When the child speaks a word aloud for the first time, his or her perception of the world becomes conscious through the use of a psychological tool, the language of the culture.

Vygotsky saw that the transformations resulting from social activities involve other developing functions within the person. Gestures, make-believe play, drawing, and writing as were seen as "different moments in an essentially unified process of the development of written language" through which the child comes to "draw" speech. He believed that children's mastery of the written language, and the ability to read, enhanced their cultural development because through that mastery they become "aware of everything that human genius has created in the realm of the written word" (p.116).

The results obtained for D.C. and M.L. suggest that Vygotsky's concept of a "unified process of development" applies as well to meaning as it does to written language as such.

The unique activities of the Written and Oral/Charade Activities may have both served to help each child functionally integrate the psychological processes involved in understanding and remembering the meanings of the words. Writing and reading the words in relevant contexts or acting and "viewing and guessing" the words and their meanings in relevant contexts may both be means through which other more elementary and already stabilized functions, such as speaking, hearing and seeing, become integrated. Conceived of in this fashion, it is not the activity that causes thought. The activity is useful to the child in the organization of functions through which he or she focuses upon the word and its meaning. This organization within each child's system, and his or her resulting focus, may contribute to information, such as the word and its meaning, being stored in his or her memory and hence, being used in the service of his or her thought.

## Exploring Word Variables

The second issue addressed by this research was the question of which word variables affect the children's development of word meaning. The research seeks to clarify what it is about the word that determines whether children develop an understanding of the meaning of the word.

## What Is it About the Word?

The word type ( initial level of knowledge) had no influence on D.C.'s word meaning development, and minimal influence on M.L's. Within the M.L. developmental system more initially tested "frontier" level words within the

Pretest Only Activity developed to the "known" category than initially "unknown" level words. This was the Activity designed to control for the impact of testing, in which the words were heard only in the pre and post tests and in the session book. And M.L.'s word meaning development within this Activity was not significant. But there was no difference in M.L.'s word meaning development between initially tested "unknown" and "frontier" level words in the Written, Oral/Charade, and Repeated Word Activities. This finding only minimally supports the Durso and Shore (1991) finding that "frontier" words are easier to learn than "unknown" words. The results of this study suggest that if a person is only passively being exposed to words, then the likelihood is greater that he or she will learn more words that are familiar, than words that are unfamiliar or "unknown".

The findings also dramatically suggest that when D.C. and M.L. actively encountered both "frontier" and "unknown" words, the initial meaning level determined neither whether word meaning would develop, nor whether the word would develop to the "known" level.

The grammatical category, the language frequency, the book type had no influence on D.C.'s and M.L.'s word meaning development. It made no significant difference whether words were nouns, verbs, adjectives, or adverbs. "Low" language frequency words developed and became "known", as did "high" and "middle" language frequency words. Whether the words were heard or understood in fantasy or in fact-based fiction made no significant difference.

These aspects of the words do not account for the differences in D.C. and M.L.'s word meaning development between the word meanings that developed and those that did not.

## Which Words Were Used More Frequently?

The record of the children's usage over time may not represent all the words that the children used, but does indicate that the words in the Written Activity were used more often by both D.C. and M.L. The recorded data over the six-month period of the study included the use of words in everyday discourse, in play, in school work, and in defining other words in the pre, post, and post/post tests.

If the representation of D.C. and M.L.'s usage over time is accurate, this finding supports previously cited research that indicates that writing and reading do affect the sense of a word's meaning. Writing and reading functions, together with the understanding of the word as a printed word, may help to store the word in memory and contribute to its usage advantage over the usage of understood words in the other Activities.

## Does Writing Influence Which Words We Speak?

Theories about and research on children's understanding of the word as a printed entity suggests that this knowledge influences the sense of a word's meaning. Olson (1994) has pointed out that once a script as a model is assimilated, it is difficult for one to "unthink" that model. For those of us for whom reading and writing has become automatized, it is difficult to conceive of

the world without written words. But the research by Downing ( 1970, 1974) on novice readers, demonstrates, as does this study, that they confuse sentences and phrases with word units of speech and words with isolated phonemes and syllables. For example, D.C., as a first grader, expressed surprise that "whipped cream" was not a single word. Spencer's (1988) research indicates that children's explicit conceptualization of the spoken word developed only after the child developed explicit knowledge of the written word.

Ehri (1980) studied the developmental patterns of children as they learn to master printed words. She believes that as children become more familiar with the written words and with their grapheme-phoneme relationships, their orthographic images become more complete and cohesive, and an image of the word can be evoked. The research of Ehri and Wilce (1979) indicates that spelling improved the memory fcr words, and they suggest that the presence of the spellings for words in lexical memory makes the words more memorable. Hence, the understanding of the word as a symbol makes it more available for use.

Writing and reading are complex activities which involve memory, speech, audition, vision, and motor skills, which the child uses to integrate the information contained within the written text. The failure to integrate such information from the sensory systems, or to perceive the temporal order of speech contributes to the poor performance of those who are learning-disabled.

Orton and Montessori (1973) stressed the importance of these learners

exercising all the sensory modalities. Words are not only read silently, but they are read and often spelled "aloud" as the word learner writes the word. They believe that the active use of all functions in the activity of writing and reading serves to integrate the information from all the modalities.

The accrued knowledge and research is in accord with other theorists (Donaldson, 1978; Goody & Watt, 1968; Greenfield & Bruner, 1966; Luria, 1981; Vygotsky, 1978 ) who believe that writing serves to organize information. If it serves to organize information, which is then stored in memory, those stored words may, as Olson (1994) suggested, provide a model for speech and thought.

The substitution of the signs on the basis of their phonemes, Olson said, is what brings words into consciousness. Because a word is a model for the spoken form, the word becomes a thing. Reading the word written is hearing the spoken word in a new way, and this understanding changes the way we speak.

The usage results of this research indicate that it may also influence which words we use when we do speak. D.C. used twice as many words in the Written Activity as he did in the Oral/Charade Activity. And many words, such as *blunderbuss, manipulated, meager, wheedling,* and *shrewdly,* he used often. M.L. used one third more words from the Written Activity than she did in the Oral/Charade Activity. *Perseverance, wryly, intriguing, bantering,* and *incessant,* were the words M.L. used most frequently.

Although neither child enjoyed the Written Activity as much as the

Charade Activity, each was proud of their finished products, testimonies to their respective "points of view on the world". D.C. wrote the words in the contexts of what was meaningful to him -- basketball, sport heroes, an unfriendly neighbor boy, poetry, and music. M. L., using the words to explore her love of language, wrote many different kinds of entries, among these, a whole series of Dimetapp commercials. In the post and post/post verbal test interviews, both children repeated, often verbatim, the texts they had produced within the Written Activity.

A contrast between the children's usage over time of words encountered in the Written and the Oral/Charade Activities reveals we can't attribute the usage difference to grammatical category, to language frequency, to book type, or to word type because there is not a significant difference between those categories.

If D.C.'s and M.L.'s recorded word usage is an accurate representation of words used within the Activities, then their participation in the writing and reading in the Written Activity made a difference in the words they used. Writing did, indeed, influence the words they spoke.

If writing influences which words we use when we speak, the awareness of the word as a reality *sui generis* may be, as Tulviste (1991) suggested, the only "obligatory consequence of becoming literate" (p.159).

Exploring The Why And How Of Word Meaning Development

The third issue addressed by this research was the further exploration of the questions why children develop an understanding of word meanings over

time. Within the recorded texts of D.C. and M.L.'s pre, post, and post/post test verbal responses, this word learning process is examined. How both children deciphered and defined word meanings, as their senses of understanding changed over time, illuminates why word meanings developed.

What The Responses Tell Us About Levels of Understanding

The proportion of D.C.'s and M.L.'s responses drawn from relevant cognitive contexts increased dramatically as their understanding of word meanings developed. These results support the second hypothesis, that word meaning would develop, not because of internal and external constraints, but because the word was relevant to the childrens' shared cognitive contexts, as proposed by Nelson (1992) and Sperber and Wilson (1988). The researcher, D.C., and M.L. shared sufficient common structures so that all could infer the relevance of the communication. The Activities and the conceptual domains of the books provided the structure to which both D.C. and M.L. brought their own conceptual models derived from world models or event representations to bear on the interpretation of the meaning of the unfamiliar words. Meaning developed within the "sense" of the words -- all the psychological events that came to consciousness in the contexts of use (Luria, 1981; Paulen, 1928; Stanislavski, 1951, 1956; Vygotsky, 1934/1962).

As Nelson (1985, 1988) also points out, the development of a working lexicon involves not only cognitive processes but indirect and direct social guidance toward a convergence on conventional meanings. Clearly, the word

encounter Activities of the study far exceeded what normally takes place in a family setting, yet the process that Nelson defined was evident. Both D.C. and M.L. converged on conventional meanings. Responses were context-laden and referred often to what the children experienced within the Activities and to characters and happenings within the session books.

D.C.'s and M.L.'s responses revealed a similar pattern with respect to levels of understanding. When they had a good understanding of what words meant, they either responded quickly with a good definition and/or synonyms, followed often by an example drawn from their experiences, or they responded first with the example followed by a good definition and/or synonyms. When the children exhibited partial knowledge of word meaning by generating a response when a stimulus sentence was presented, the majority of their responses were definitions and synonyms. The stimulus sentence itself provided the context. When they did not know the meanings of words they usually guessed, using a definition or synonym.

D.C. and M.L. deciphered and defined the words according to their level of knowledge with respect to the words' meanings. They morphologically analyzed words, provided definitions and/or synonyms, and responded with examples from relevant contexts.

Does Morphological Decoding Help To Explain Word Meaning Development?

The responses illustrate that often in the initial stages of encountering a novel word, the children guessed with definitions and/or synonyms by

morphologically analyzing units of the word. Anglin's (1993) study lends support to the idea that morphologically analyzing word meanings may explain how a school child's vocabulary expands so rapidly. Although most of the words in this study had a lower language frequency and might be thought of as "more difficult" than Anglin's set of words, both D.C. and M.L.'s morphological decoding of words did not support his hypothesis.

Both D.C. and M.L. morphologically defined words based upon the phonological similarity or the mistaken identification of the stimulus word with words they knew. It was only when they had some knowledge of the meaning of the morphological units of the words that they were able to figure out partial or whole meanings of words. This did not always assure success, because the meanings of two singular morphemic units are sometimes different than the meaning of those two units combined. For example, both D.C. and M.L. had difficulty defining the word *outcroppings*. The children's concise understanding of morphemic units were usually embedded within "known" examples or definitions that demonstrated that their word meaning development was embedded in contexts.

Do Conceptual Domains Facilitate Word Meaning Development?

The overall majority of both D.C.'s and M.L.'s responses were definitions and synonyms. Among the meanings of words that developed over time, the progression from morphological deciphering, to definitions and/or synonyms drawn from the context of the stimulus sentence, to strings of synonyms drawn

from the children's own cognitive context for the word's meaning, was often evident. These strings of synonyms were often cross-referenced among each other and with other known words in the childrens' worlds.

Some words were clearly bound by the conceptual domains of a book or of the books in the study. For example, D.C.'s development of the words *manipulate, wheedling, shrewdly, politician, and scheming* demonstrated that his growing sense of the words developed in consideration of the behavior of different characters within the stories.

M.L. used strings of the following group of words -- *fugitives, outlaws, miscreants; rogue, vagabond, robber, thief, ruffian, brigand, bandit, rascal, varmint* -- over the course of a two-week period, approximately four weeks after the words had first been encountered. Newly understood words, such as *fugitives, miscreants, vagabond, and brigand* were strung with other words she already knew such as, *outlaws, rogue, robber, thief, bandit, and rascal.* All of these words were encountered and understood within the conceptual domain of a single session book, The Marvelous Misadventures of Sebastian by Lloyd Alexander.

Miller (1978) asks the question as to whether the conceptual organization within which a word is embedded enables a speaker to find a word to use. The children's verbal responses repeatedly demonstrate that word meanings develop because they exist in a context. Whether word meanings used in the context of a particular sentence, book, or activity always constitute a conceptual single

domain is unclear, but the responses of the children certainly indicate that they are constantly developing a sense of the meanings of words in relation to other words. If words are labels for concepts, as Saussure contended, then the use of related definitions and synonyms is a sure sign of the formation of a conceptual domain.

The data indicates that the existence of such a domain or cognitive context determined whether D.C. and M.L. had a sense of understanding with respect to the meanings of the stimulus words. In the case of the "frontier" level of meaning, in order for the child to access a definition and/or synonym, the cognitive context, suggested through the stimulus sentence, was presented. For "known" word meanings, the cognitive context was well established within the child's mind, facilitating the prompt generation of a good definition and/or synonym.

The developing network of synonyms exemplified in many of the responses of the children, suggests cognitive contexts are expanding, and that a lexicon of related word meanings is becoming established. When D. C. and M.L. responded quickly with good definitions and/or synonyms, it is suggested that these responses are independent of the cognitive contexts.

# Conclusion

## The Word And The World Otherwise Expressed

This study is but a synoptic view of D.C.'s and M.L.'s uses of words in their worlds, which defines their pasts as products. But this record of their words expressed in speech allows us to appreciate the dynamic world within which the self participates and develops a "point of view on the world." These oral testimonies reveal the sound of the words they used, what they perceived as the "sense" of the word and how they made sense of it, why they developed an understanding of some words and not others, how they perceived word meaning development, and ultimately, who they are and who they are developing to be in the world.

The words we speak and come to understand not only link our elementary functions, contributing to the unity between thought and speech, but they link us with other people in the past, the present, and the future. Speech is not a silent and solitary world for we speak in order to communicate with both the social voices that have left their impression and those with whom we coexist.

As Heidegger (1962) insisted, any analysis begins through the existential, "to be in a world." D.C. and M.L. shared similar environments, activities, brothers, parents, schools, and interests. In this 'a priori' world of theirs, they ultimately developed an understanding of words in the world through this shared context because the words were relevant to their own developing points of view. The words were ultimately understood in terms of the being of

self, and through their spoken interpretations, word meaning developed. Their voices were not just the echo of words and ideas strung together, but a semantic position in which they always responded to others within and without the self, as Bakhtin (1962) so often stated in his different works. Sperber and Wilson (1986) and Nelson (1992) both believe that words are interpreted, not because they mirror the other person's meaning, but because each person assumes that the words are relevant to the cognitive contexts or environment within which the words are spoken. The mutual contribution of each person's point of view and translation enlarges the cognitive worlds of all participants. As Bakhtin pointed out, we all speak something of a foreign language because the understanding of another is an imperfect translation in which meaning resides along the boundaries between speakers. The beauty of communication, in its many disguises, is that it informs us of different ways of being in the world. Speaking reveals the ways we think in the world. In this last analysis of being, as Vygotsky (1934/1962) wrote, thought is not "the superior authority in this process". The last "why" in the analysis is not only relevance, but motivation. "Thought is engendered by ... our desires and needs, our interests and emotions" (p.252).

D.C. and M.L. approached the word understanding process differently. Word meanings developed through shared contexts because they were relevant to each child's interests and developing "points of view on the world." As active participants in their worlds, the words were expressions whose

meanings developed because each child was interested in the words and their meanings. DC. and M.L. developed an understanding of the word meanings that reflected their worlds. These word meanings were useful tools through which they could communicate their desires, needs, interests, and emotions.

Time after time, M.L.'s responses rose out of literary or linguistic contexts; sometimes a verbatim recitation of the original context but as often the juxtaposition of a new meaning against a series of prior words or constructs. For DC, "opposite" was the case -- the words he experienced and understood through the course of the study grew meanings as they took a place in the everyday world and people, real and imagined, with which he was surrounded. Yet, the varying types of encounters with words were without significant import for either child -- clearly, meanings developed not as a result of how the words were brought to the children but rather as a result of how the children opened to them.

## The Research Endeavor

The understanding of how a word develops within the human system and of what methods influence this development at the psychological level requires a recognition of the integrating role of activity in the participant's experience and expression of word meaning. Tobach (1981, 1987) repeatedly emphasized that any research endeavor must address the questions with an understanding of the functions and activities involved in the development of the human system. The context of the word is not just the sentence, text,

situation or genre within which the word meaning is embedded. The context, Tobach emphasized, is the interface between the internal and external worlds of the participant. The development of word meaning takes place within a human system in which a confluence of variables contribute to that which is realized within that system. The internal and external functions and activities through which each child system encounters and/or uses a word to express meaning, is the context within which an understanding of how and where a sense of the word meaning develops. Meaning, use, recognition, refinement, conjugation, definition, association -- all the things we "do" with words -- are not part of a linear cardinal order, but part of a dynamic process shaped by the happenstance of context, salience and opportunity.

The investigation of how D.C and M.L. developed the sense of the meanings of words in terms of the identified activities and functions within the Activities of the study revealed that "writing and reading" and "acting and viewing and guessing" are two equally useful means through which children can develop an understanding of word meanings encountered within the written text. The study suggests that the Activity is useful to the children in the organization of functions through which they focus upon the word and its meaning. This organization and focus contributes to the word and its meaning being used in the service of thought. If this finding also applies to the general population, it may offer an alternative means through which all populations can experience the written text. Further research, in which the activities and functions of the

particular participants are identified, would substantiate this finding. Also, future research is needed to further disambiguate the Activities because it remains unclear whether it was the shared discussions regarding the meanings of the words in the Written and Oral/Charade Activities or the children's participation in the tasks or goals of these Activities that contributed to word meaning development. Additional research might clarify whether it was reading, or writing, or discussion, or acting, or speaking, or some or all, that contribute to the development of meaning within particular systems.

The recorded usage data indicates that the Written Activity did make a difference in the words that the children spoke, suggesting that writing and reading may help to organize and to store the word and its meaning in memory, and provide as Olson suggested, a model for speaking and thinking. Future research may lend support to this hypothesis.

The children's rich oral responses detailing their developing sense of word meanings suggest that individual longitudinal studies provide an important source through which to examine why and how word meaning develops in school-aged children. Future research exploring the rich data available through studies in natural environments is certain to bring us closer to an understanding of how a sense of word meaning develops, which may just, in turn, bring us closer to understanding the human systems within which the development is experienced.

## Appendix A. Chall's Reading Stages.

Stage 1. The child must learn the arbitrary set of letters and associate these with corresponding parts of spoken words through either a sight or phonic approach, and requires that he or she develop a capacity for abstraction through which new insight about the reading process is gained.

Stage 2. Skills in the previous stage are reiterated and thus consolidated. The child uses his or her knowledge and language more freely in conjunction with the decoding skills, and through the redundancy of the language used and the stories read gains in reading fluency and speed.

Stage 3. The child reads to learn new material which is clear and within one viewpoint. Knowledge of word meanings, of information, and of knowledge drawn from experience enhances the development of this stage.

Stage 4. The child deals with multiple points of view. This stage is acquired through formal education.

Stage 5. The reader reads selectively and constructs knowledge for himself or herself through analysis, synthesis, and judgment.

# Appendix B.

## THE WORDS USED IN THIS STUDY ORDERED BY ACTIVITY WITH GRAMMATICAL CATEGORY (GC) AND LANGUAGE FREQUENCY COUNT (LF)

| D.C. and M.L. | D.C. only | M.L. only | GC | LF |
|---|---|---|---|---|
| **I. Written** | | | | |
| 1. respite | | | noun | 4 |
| 2. access | | | noun | 34 |
| 3. conservably | | | adverb | 8 |
| 4. efficient | | | adjective | 94 |
| 5. wryly | | | adverb | 3 |
| 6. contour | | | noun | 42 |
| 7. incurring | | | verb | 4 |
| 8. distinguish | | | verb | 74 |
| 9. manipulated | | | verb | 6 |
| 10. outcroppings | | | noun | 3 |
| 11. coincadence | | | noun | 11 |
| 12. primeval | | | adjective | 11 |
| 13. *inexorable* | | | adjective | 2 |
| 14. loped | | | verb | 4 |
| 15. feasible | | | adjective | 8 |
| 16. anticipated | | | verb | 13 |
| 17. subsiding | | | verb | 13 |
| 18. lisivated | | | verb | 0 |
| 19. muddling | | | verb | 0 |
| 20. maggots | | | noun | 0 |
| 21. riveted | | | verb | 6 |
| 22. ambitiously | | | adverb | 35 |
| 23. droves | | | noun | 2 |
| 24. drastically | | | adverb | 8 |
| 25. dendrochronologist | | | noun | 0 |
| 26. prominent | | | adjective | 55 |
| 27. malignant | | | adjective | 4 |
| 28. lividly | | | adverb | 8 |
| 29. vagabond | | | noun | 5 |
| 30. willy nilly | | | adverb | 0 |
| 31. ferret out | | | verb | 0 |
| 32. obsequious | | | adjective | 2 |
| 33. figment | | | noun | 0 |
| 34. probity | | | noun | 0 |
| 35. veracity | | | noun | 0 |
| 36. endeavor | | | noun | 12 |
| 37. fodder | | | noun | 7 |
| 38. din | | | noun | 18 |
| 39. admonitions | | | noun | 2 |
| 40. perilous | | | adjective | 10 |
| 41. diligently | | | adverb | 5 |
| 42. placidly | | | adverb | 13 |
| 43. baubles | | | noun | 0 |
| 44. industriously | | | adverb | 8 |
| 45. blunt | | | adjective | 25 |
| 46. wheedling | | | verb | 4 |
| 47. debase | | | verb | 0 |
| 48. perseverance | | | noun | 7 |
| 49. contemptuously | | | adverb | 6 |
| | 50. uncanny | | adjective | 4 |
| | 51. mournful | | adjective | 28 |
| | 52. blunderbuss | | noun | 2 |
| | 53. lingo | | noun | 4 |
| | 54. deprived | | adjective | 18 |
| | 55. finicky | | adjective | 0 |
| | 56. scoffed | | verb | 9 |

| D.C. and M.L. | D.C. only | M.L. only | GC | LF |
|---|---|---|---|---|
| | 57. mercilessly | | adverb | 0 |
| | 58. improvise | | verb | 27 |
| | 59. shrewdly | | adverb | 6 |
| | 60. faltered | | verb | 11 |
| | 61. inspiration | | noun | 35 |
| | 62. bounty | | noun | 9 |
| | 63. disgraced | | verb | 3 |
| | 64. teeming | | verb | 17 |
| | 65. meager | | adjective | 15 |
| | | 50. incessant | adjective | 9 |
| | | 51. bantering | verb | 0 |
| | | 52. waning | verb | 6 |
| | | 53. scrupulously | adverb | 0 |
| | | 54. induced | verb | 28 |
| | | 55. intriguing | adjective | 5 |
| | | 56. surmised | verb | 2 |
| | | 57. yokels | noun | 0 |
| | | 58. mortified | verb | 4 |
| | | 59. foreboding | adjective | 0 |
| | | 60. tirade | noun | 0 |
| | | 61. voluminous | adjective | 2 |
| | | 62. frumpy | adjective | 0 |
| | | 63. railed | verb | 2 |
| | | 64. deceptively | adverb | 2 |
| | | 65. futile | adjective | 0 |
| **II. CHARADE** | | | | |
| 66. deliberately | | | adverb | 38 |
| 67. vantage | | | noun | 7 |
| 68. protruded | | | verb | 6 |
| 69. adjourned | | | verb | 5 |
| 70. scrutiny | | | noun | 5 |
| 71. flailed | | | verb | 3 |
| 72. bungled | | | verb | 3 |
| 73. skeptical | | | adjective | 10 |
| 74. denounced | | | verb | 17 |
| 75. cryptically | | | adverb | 0 |
| 76. capacity | | | noun | 63 |
| 77. agitated | | | verb | 16 |
| 78. confer | | | verb | 4 |
| 79. resume | | | verb | 6 |
| 80. commenced | | | verb | 11 |
| 81. mutation | | | noun | 9 |
| 82. astute | | | adjective | 9 |
| 83. diabolical | | | adjective | 3 |
| 84. supervise | | | verb | 9 |
| 85. flabbergasted | | | verb | 2 |
| 86. starlet | | | noun | 0 |
| 87. falsetto | | | adjective | 2 |
| 88. malevolent | | | adjective | 0 |
| 89. vindictive | | | adjective | 2 |
| 90. repent | | | verb | 6 |
| 91. jittery | | | adjective | 2 |
| 92. ecstatic | | | adjective | 7 |
| 93. anguish | | | noun | 8 |
| 94. nought | | | noun | 6 |
| 95. presto | | | adverb | 5 |
| 96. hoodwinking | | | noun | 0 |
| 97. betrothal | | | noun | 2 |
| 98. foppish | | | adjective | 0 |
| 99. incognito | | | adverb | 0 |
| 100. nefarious | | | adjective | 0 |
| 101. demise | | | noun | 0 |
| 102. terminated | | | verb | 7 |
| 103. mattock | | | noun | 0 |

| D.C. and M.L. | D.C. only | M.L. only | GC | LF |
|---|---|---|---|---|
| 104. ablutions | | | noun | 0 |
| 105. instigate | | | verb | 2 |
| 106. tethers | | | noun | 4 |
| 107. miscreant | | | noun | 0 |
| 108. harridan | | | noun | 0 |
| 109. dejected | | | verb | 4 |
| 110. strident | | | adjective | 4 |
| 111. disconsolately | | | adverb | 3 |
| 112. parley | | | noun | 2 |
| 113. contrivance | | | noun | 4 |
| 114. interceding | | | noun | 0 |
| 115. consultation | | | noun | 4 |
| 116. listlessly | | | adverb | 4 |
| 117. preservation | | | noun | 21 |
| 118. zeal | | | noun | 10 |
| 119. counsel | | | noun | 22 |
| 120. pell-mell | | | adverb | 0 |
| 121. ruefully | | | adverb | 5 |
| | 122. radiated | | verb | 2 |
| | 123. solitary | | adjective | 28 |
| | 124. vaguely | | adverb | 18 |
| | 125. bellowing | | verb | 4 |
| | 126. defiance | | noun | 15 |
| | 127. seize | | verb | 40 |
| | 128. dumbfounded | | adjective | 4 |
| | 129. pursued | | verb | 28 |
| | 130. gingerly | | adverb | 12 |
| | 131. indignantly | | adverb | 2 |
| | 132. contortions | | noun | 2 |
| | 133. comically | | adverb | 18 |
| | 134. flaunting | | verb | 0 |
| | 135. genial | | adjective | 3 |
| | 136. plunder | | verb | 5 |
| | 137. neglecting | | verb | 3 |
| | | 122. fracas | noun | 0 |
| | | 123. coy | adjective | 3 |
| | | 124. impertinence | noun | 0 |
| | | 125. meandering | verb | 9 |
| | | 126. effable | adjective | 2 |
| | | 127. surreptitiously | adverb | 0 |
| | | 128. accost | verb | 0 |
| | | 129. omit | verb | 38 |
| | | 130. cringingly | verb | 3 |
| | | 131. wistful | adjective | 5 |
| | | 132. unfathomable | adjective | 2 |
| | | 133. retch | verb | 0 |
| | | 134. pilfered | verb | 0 |
| | | 135. consternation | noun | 0 |
| | | 136. medley | noun | 7 |

## III. PRETEST ONLY

D.C. and M.L.

| | | | | |
|---|---|---|---|---|
| 138. | 137. sward | | noun | 3 |
| 139. | 138. discern | | verb | 9 |
| 140. | 139. compiled | | verb | 8 |
| 141. | 140. converged | | verb | 2 |
| 142. | 141. revive | | verb | 11 |
| 143. | 142. balmy | | adjective | 3 |
| 144. | 143. dynamo | | noun | 0 |
| 145. | 144. ventilated | | verb | 5 |
| 146. | 145. meddling | | verb | 2 |
| 147. | 146. chiseling | | verb | 55 |
| 148. | 147. precocious | | adjective | 0 |
| 149. | 148. compliance | | noun | 3 |

| D.C. and M.L. | D.C. only | M.L. only | GC | LF |
|---|---|---|---|---|
| 150. 149. quays | | | noun | 3 |
| 151. 150. invariably | | | adverb | 25 |
| 152. 151. abated | | | verb | 3 |
| 153. 152. celestial | | | adjective | 17 |
| 154. 153. relentlessly | | | adverb | 8 |
| 155. 154. scalloped | | | adjective | 3 |
| 156. 155. tarnish | | | verb | 5 |
| 157. 156. solace | | | noun | 6 |
| | 158. scarlet | | adjective | 55 |
| | 159. traces | | noun | 0 |
| | 160. giddy | | adjective | 7 |
| | 161. trice | | noun | 3 |
| | 162. amply | | adverb | 2 |
| | 163. bemused | | verb | 0 |
| | 164. comrade | | noun | 17 |
| | 165. composure | | noun | 5 |
| | 166. lodestones | | noun | 9 |
| | 167. impertinence | | noun | 0 |
| | 168. perceive | | verb | 31 |
| | 169. baffled | | verb | 18 |
| | 170. discontent | | adjective | 13 |
| | 171. incinerated | | verb | 2 |
| | 172. defective | | adjective | 14 |
| | 173. plummeted | | verb | 3 |
| | 174. deference | | noun | 2 |
| | 175. meekly | | adverb | 13 |
| | 176. network | | noun | 74 |
| | 177. sparsely | | adverb | 12 |
| | 178. eerie | | adjective | 21 |
| | 179. mystic | | noun | 8 |
| | 180. summoned | | verb | 23 |
| | 181. dim | | adjective | 75 |
| | 182. matchlock | | noun | 3 |
| | 183. surveyor | | noun | 9 |
| | 184. begrudgingly | | adverb | 3 |
| | 185. persuaded | | verb | 47 |
| | 186. detested | | verb | 6 |
| | 187. pleaded | | verb | 39 |
| | 188. thickheaded | | adjective | 0 |
| | 189. disposition | | noun | 20 |
| | 190. mocking | | adjective | 12 |
| | 191. boisterous | | adjective | 4 |
| | 192. medley | | noun | 7 |
| | 193. lustrous | | adjective | 7 |
| | 194. pliable | | adjective | 3 |
| | 195. inhabit | | verb | 10 |
| | 196. exertion | | noun | 6 |
| | 197. cunning | | adjective | 43 |
| | 198. avenge | | verb | 2 |
| | 199. precipitous | | adjective | 4 |
| | 200. prospect | | noun | 28 |
| | 201. hummocks | | noun | 3 |
| | 202. enraged | | verb | 13 |
| | 203. resolute | | adjective | 7 |
| | 204. surety | | noun | 0 |
| | 205. boggy | | adjective | 2 |
| | | 157. cordial | adjective | 3 |
| | | 158. construe | verb | 25 |
| | | 159. rite | noun | 2 |
| | | 160. infectious | adjective | 15 |
| | | 161. inkling | noun | 4 |
| | | 162. degradation | noun | 2 |
| | | 163. ruse | noun | 2 |
| | | 164. deft | adjective | 5 |
| | | 165. apparition | noun | 9 |
| | | 166. decrepit | adjective | 0 |

| D.C. and M.L. | D.C. only | M.L. only | GC | LF |
|---|---|---|---|---|
| | | 167. capriciously | adverb | 5 |
| | | 168. improbable | adjective | 2 |
| | | 169. inflicted | verb | 6 |
| | | 170. interminable | adjective | 7 |
| | | 171. persisted | verb | 16 |
| | | 172. docile | adjective | 6 |
| | | 173. devise | verb | 16 |
| | | 174. impetuously | adverb | 3 |
| | | 175. palpable | adjective | 2 |
| | | 176. command | verb | 7 |
| | | 177. plausibility | noun | 4 |
| | | 178. obstruction | noun | 2 |
| | | 179. edification | noun | 2 |
| | | 180. faculties | noun | 7 |
| | | 181. sunder | verb | 0 |
| | | 182. levity | noun | 0 |
| | | 183. recompensed | verb | 4 |
| | | 184. apprehend | verb | 3 |
| | | 185. sovereign | noun | 16 |
| | | 186. divulging | verb | 0 |
| | | 187. cuddling | noun | 4 |

## IV. REPEATED WORD

D.C. and M.L.

| | | | | |
|---|---|---|---|---|
| 206. | 188. | subdued | verb | 12 |
| 207. | 189. | presumably | adverb | 16 |
| 208. | 190. | intense | adjective | 58 |
| 209. | 191. | harrow | noun | 5 |
| 210. | 192. | biology | noun | 36 |
| 211. | 193. | fugitives | noun | 6 |
| 212. | 194. | livery | noun | 8 |
| 213. | 195. | fawning | verb | 0 |
| | | 214. delirious | adjective | 6 |
| | | 215. dreading | verb | 24 |
| | | 216. glinted | verb | 5 |
| | | 217. furrows | noun | 6 |
| | | 218. dignity | noun | 49 |
| | | 219. pry | verb | 19 |
| | | 220. astonished | verb | 49 |
| | | 221. doubtfully | adverb | 19 |
| | | 222. emerged | verb | 49 |
| | | 223. prefers | verb | 20 |
| | | 224. laboriously | adverb | 7 |
| | | 225. frenzy | noun | 20 |
| | | 226. assumed | verb | 75 |
| | | 227. exterminated | verb | 10 |
| | | 228. adjoining | verb | 21 |
| | | 229. head | verb | 22 |
| | | 230. hovering | verb | 14 |
| | | 231. precise | adjective | 99 |
| | | 232. trifle | noun | 20 |
| | | 233. vermicious | adjective | 0 |
| | | 234. brigand | noun | 0 |
| | | 235. manitou | noun | 0 |
| | | 236. sober | adjective | 24 |
| | | 237. device | noun | 137 |
| | | 238. reckoned | verb | 17 |
| | | 239. glimpsed | verb | 10 |
| | | 240. chinking | verb | 10 |
| | | 241. confidently | adverb | 13 |
| | | 242. uneasy | adjective | 37 |
| | | 243. tensed | verb | 4 |
| | | 244. despised | verb | 17 |

| D.C. and M.L. | D.C. only | M.L. only | GC | LF |
|---|---|---|---|---|
| 245. determination | | | noun | 47 |
| 246. abruptly | | | adverb | 33 |
| 247. admitted | | | verb | 100 |
| 248. stalked | | | verb | 20 |
| 249. awkward | | | adjective | 62 |
| 250. gleam | | | noun | 28 |
| 251. grudgingly | | | adverb | 4 |
| 252. discouraged | | | verb | 58 |
| 253. snare | | | noun | 26 |
| 254. protest | | | verb | 43 |
| 255. envious | | | adjective | 9 |
| 256. frantic | | | adjective | 27 |
| 257. vanished | | | verb | 72 |
| 258. scowl | | | noun | 7 |
| 259. scornful | | | adjective | 10 |
| 260. stern | | | adjective | 75 |
| | | 196. deplore | verb | 6 |
| | | 197. impresario | noun | 0 |
| | | 198. chagrin | noun | 3 |
| | | 199. vexation | noun | 3 |
| | | 200. indignation | noun | 13 |
| | | 201. rebuked | verb | 0 |
| | | 202. conceded | verb | 6 |
| | | 203. incredulously | adverb | 4 |
| | | 204. heathen | noun | 11 |
| | | 205. intrusive | adjective | 8 |
| | | 206. rebuffed | verb | 2 |
| | | 207. treacherously | adverb | 27 |

## Appendix C. Sample Pretest and Post Test Sentences.

**Pre** 1. The doorway gave access to the garden.

**Post** The tunnel gave access to the city.

**Pre** 2. The wide sward was overgrown and sunburnt.

**Post** The overgrown sward was wide and sunburnt.

**Pre** 3. The old flatulent man disgusted her.

**Post** The old flatulent woman disliked him.

**Pre** 4. The small key protruded from the hole.

**Post** The small animal protruded from the opening.

**Pre** 5. The bookcase was a small piece of lath.

**Post** The table was a smooth piece of lath.

**Pre** 6. The egregious man embarrassed his family.

**Post** The egregious woman left the party.

**Pre** 7. I'll make you a pallet in the corner of the room.

**Post** She made him a pallet in the side of the space.

**Pre** 8. Dante was delirious and could not speak or hear.

**Post** The girl was delirious and could not hear anyone.

**Pre** 9. The little creature loped along merrily.

**Post** The little animal loped down the path.

**Pre** 10. Mary was dreading the trip to the office.

**Post** Conrad was dreading the drive to the city.

## Appendix D. Sample Coding Sheet

Indian Captive Coding Sheet

| | WORDS | PRE | POST | POST/POST |
|---|---|---|---|---|
| 21. | halting | | | |
| 22. | contrivance | | | |
| 23. | interceding | | | |
| 24. | diligently | | | |
| 25. | placid | | | |
| 26. | hummocks | | | |
| 26. | enraged | | | |
| 27. | enraged | | | |
| 28. | overseers | | | |
| 29. | accusation | | | |
| 30. | cunning | | | |
| 31. | baubles | | | |
| 32. | consultations | | | |

# Appendix E. Words Used Over Course of Study By D. C. and M.L.

## E.-1. -- Words D.C. Used By Activity

| Written | Oral/Charade | Pretest Only | Repeated Word |
|---|---|---|---|
| 1. access - 2 | 1. bellowing - 1 | | 1. determination - 1 |
| 2. blunderbuss - 3 | 2. bungled - 3 | | 2. doubtfully - 1 |
| 3. coincidence - 1 | 3. dumbfounded - 3 | | 3. exterminated - 2 |
| 4. efficient - 1 | 4. foppish - 2 | | 4. reckoned - 2 |
| 5. faltered - 2 | 5. incognito - 3 | | 5. treaty - 2 |
| 6. lingo - 2 | 6. jittery - 1 | | 6. vanished - 1 |
| 7. lividly - 2 | 7. malevolent - 2 | | 7. vermicious - 2 |
| 8. lixivated - 2 | 8. preservation - 3 | | |
| 9. loped - 3 | 9. presto - 3 | | |
| 10. manipulated - 11 | | | |
| 11. meager - 4 | | | |
| 12. outcroppings - 1 | | | |
| 13. respite - 1 | | | |
| 14. scoffed - 1 | | | |
| 15. shrewdly - 5 | | | |
| 16. teeming - 3 | | | |
| 17. uncanny - 1 | | | |
| 18. wheedling - 3 | | | |

## E. - 2. -- Words M.L. Used By Activities

| Written | Oral/Charade | Pretest Only | Repeated Word |
|---|---|---|---|
| 1. access - 2 | 1. agitated - 3 | 1. deft - 2 | 1. fawning |
| 2. ambitiously - 3 | 2. bungled - 2 | 2. impetuous - 1 | |
| 3. bantering - 4 | 3. capacity - 3 | 3. persisted - 2 | |
| 4. baubles - 3 | 4. dejected - 1 | 4. precocious - 4 | |
| 5. coincidence - 2 | 5. deliberately - 2 | | |
| 6. deceptive - 1 | 6. diabolical - 3 | | |
| 7. diligent - 1 | 7. ecstatic - 4 | | |
| 8. distinguish - 2 | 8. flabbergasted - 2 | | |
| 9. drastically - 3 | 9. fracas - 3 | | |
| 10. droves - 2 | 10. hoodwinking - 1 | | |
| 11. efficient - 2 | 11. impertinence - 3 | | |
| 12. endeavor- 2 | 12. instigate - 3 | | |
| 13. frumpy - 4 | 13. meandering - 1 | | |
| 14. incessant - 5 | 14. miscreant - 1 | | |
| 15. intriguing - 4 | 15. preservation - 2 | | |
| 16. lividly - 2 | 16. resume - 2 | | |
| 17. lixivated - 2 | 17. ruefully - 2 | | |
| 18. loped - 4 | 18. starlet - 3 | | |
| 19. manipulate - 5 | 19. wistful - 4 | | |
| 20. mortified - 3 | | | |
| 21. outcroppings - 1 | | | |
| 22. perilous - 1 | | | |
| 23. perseverance - 4 | | | |
| 24. probity - 1 | | | |
| 25. prominent - 2 | | | |
| 26. respite - 2 | | | |
| 27. vagabond - 3 | | | |
| 28. willy nilly - 1 | | | |
| 29. wryly - 3 | | | |
| 30. yokels - 2 | | | |

## Appendix F.

## Words Used In The Study By Child, Word Type, Book, Activity And "Final" Meaning Category At Post And Post/Post Tests.

On the following pages the words in **bold** print in the 260 and 207 word sets are the words that were **"known"** at the time of the post test. The words in ***bold italic*** print are the words from the 156 and 153 word sets that were **"known"** at the post/post tests.

The words from the 156 and 153 word sets that did not become known are the words in front of the numbers corresponding to the words that were post tested within the 260 and 207 word sets.

### Books in the Study

1. The Secret of Nimh by R. C. O'Brien
2. The Sign of the Beaver by E. Speare -- D.C.
2. Calico Captive by E. Speare -- M.L.
3. Charlie and the Great Glass Elevator by R. Dahl
4. Indian Captive by L. Lenski
5. The Marvelous Misadventures of Sebastian by L. Alexander

### Initial Word Types Of Meaning Categories

Unknown (UK) -- 1

Frontier (F) -- 2

### Final Meaning Categories

Unknown (UK) -- 1

Frontier (F) -- 2

Known (K) -- 3

**D.C. Written Activity**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 1. respite | *1. **respite*** | 1 | 1 |
| 2. **access** | | 1 | 1 |
| 3. conceivably | | 1 | 1 |
| 4. efficient | | 1 | 1 |
| 5. wryly | | 1 | 1 |
| 6. contour | | 1 | 1 |
| 7. incurring | | 1 | 1 |
| 8. distinguish | 2. | 1 | 1 |
| 9. **manipulated** | 3. ***manipulated*** | 1 | 1 |
| 10. **outcroppings** | 4. | 1 | 1 |
| 11. **coincidence** | | 1 | 1 |
| 12. primeval | | 1 | 1 |
| 13. inexorable | | 1 | 1 |
| 14. **loped** | 5. ***loped*** | 2 | 1 |
| 15. feasible | 6. | 2 | 1 |
| 16. anticipated | | 2 | 1 |
| 17. subsiding | 7. | 2 | 1 |
| 18. **lixivated** | 8. ***lixivated*** | 1 | 3 |
| 19. muddling | | 2 | 3 |
| 20. **maggots** | | 1 | 3 |
| 21. riveted | 9. | 2 | 3 |
| 22. ambitiously | 10. | 1 | 3 |
| 23. **droves** | | 2 | 3 |
| 24. drastically | 11. | 2 | 3 |
| 25. contemptuously | | 1 | 3 |
| 26. uncanny | 12.***uncanny*** | 1 | 3 |
| 27. **dendrochronologist** | | 1 | 3 |
| 28. prominent | 13. | 1 | 3 |
| 29. malignant | | 1 | 3 |
| 30. lividly | 14. ***lividly*** | 1 | 5 |
| 31. vagabond | 15. ***vagabond*** | 2 | 5 |
| 32. willy nilly | | 2 | 5 |
| 33. **ferret out** | 16. | 2 | 5 |
| 34. obsequious | 17. | 1 | 5 |
| 35. figment | 18. | 2 | 5 |
| 36. probity | 19. ***probity*** | 1 | 5 |
| 37. veracity | 20. | 1 | 5 |
| 38. endeavor | 21. | 2 | 5 |
| 39. **mournful** | | 1 | 2 |

**Written Activity (continued) -- D.C.**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 40. **blunderbuss** | | 1 | 2 |
| 41. **lingo** | | 2 | 2 |
| 42. deprived | 22. | 1 | 2 |
| 43. finicky | | 1 | 2 |
| 44. scoffed | | 2 | 2 |
| 45. **mercilessly** | 23. ***mercilessly*** | 2 | 2 |
| 46. improvise | 24. | 2 | 2 |
| 47. **shrewdly** | 25. ***shrewdly*** | 1 | 2 |
| 48. **faltered** | 26. ***faltered*** | 1 | 2 |
| 49. inspiration | 27. | 2 | 2 |
| 50. bounty | 28. | 1 | 2 |
| 51. **disgraced** | | 2 | 2 |
| 52. **teeming** | | 1 | 2 |
| 53. **meager** | 29. ***meager*** | 1 | 2 |
| 54. **fodder** | 30. ***fodder*** | 1 | 4 |
| 55. **din** | 31. ***din*** | 1 | 4 |
| 56. admonitions | 32. | 1 | 4 |
| 57. perilous | 33. | 1 | 4 |
| 58. diligently | 34. | 2 | 4 |
| 59. placidly | 35. | 1 | 4 |
| 60. baubles | 36. | 1 | 4 |
| 61. industriously | 37. | 1 | 4 |
| 62. blunt | 38. ***blunt*** | 2 | 4 |
| 63. **wheedling** | 39. ***wheedling*** | 1 | 4 |
| 64. debase | 40. ***debase*** | 1 | 4 |
| 65. perseverance | 41. | 1 | 4 |

**Oral/Charade Activity -- D.C.**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 1. deliberately | | 1 | 1 |
| 2. vantage | 1. ***vantage*** | 1 | 1 |
| 3. **protruded** | 2. ***protruded*** | 1 | 1 |
| 4. adjourned | | 1 | 1 |
| 5. radiated | | 2 | 1 |
| 6. scrutiny | 3. | 1 | 1 |
| 7. flailed | 4. | 1 | 1 |
| 8. **bungled** | 5.. ***bungled*** | 1 | 1 |
| 9. skeptical | | 1 | 1 |
| 10. denounced | 6. | 1 | 1 |
| 11. cryptically | 7. | 1 | 1 |
| 12. capacity | | 2 | 1 |
| 13. **agitated** | 8. ***agitated*** | 2 | 1 |
| 14. confer | | 1 | 1 |
| 15. resume | | 1 | 1 |
| 16. commenced | | 2 | 1 |
| 17. mutation | | 2 | 1 |
| 18. astute | 9. | 2 | 1 |
| 19. diabolical | 10. | 1 | 3 |
| 20. supervise | | 1 | 3 |
| 21. **flabbergasted** | | 2 | 3 |
| 22. **starlet** | 11. ***starlet*** | 1 | 3 |
| 23. falsetto | | 1 | 3 |
| 24. **malevolent** | 12. | 1 | 3 |
| 25. vindictive | 13. ***vindictive*** | 1 | 3 |
| 26. repent | | 2 | 3 |
| 27. jittery | 14. ***jittery*** | 2 | 3 |
| 28. ecstatic | | 1 | 3 |
| 29. anguish | 15. | 1 | 3 |
| 30. nought | | 2 | 3 |
| 31. **presto** | 16. ***presto*** | 1 | 5 |
| 32. hoodwinking | 17. ***hoodwinking*** | 1 | 5 |
| 33. betrothal | 18. | 1 | 5 |
| 34. **foppish** | 19. ***foppish*** | 1 | 5 |
| 35. **incognito** | 20. ***incognito*** | 1 | 5 |
| 36. nefarious | | 1 | 5 |
| 37. demise | | 1 | 5 |
| 38. terminated | 21. ***terminated*** | 2 | 5 |
| 39. **mattock** | 22. ***mattock*** | 1 | 5 |

**Oral/Charade Activity (continued) -- D.C.**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 40. ablutions | 23. | 1 | 5 |
| 41. instigate | 24. | 1 | 5 |
| 42. tethers | 25. | 1 | 5 |
| 43. miscreant | 26. | 1 | 5 |
| 44. harridan | 27. | 1 | 5 |
| 45. ruefully | 28. | 1 | 2 |
| 46. solitary | | 1 | 2 |
| 47. vaguely | | 1 | 2 |
| 48. **bellowing** | 29. ***bellowing*** | 2 | 2 |
| 49. defiance | 30. | 1 | 2 |
| 50. **seize** | | 2 | 2 |
| 51. **dumbfounded** | | 1 | 2 |
| 52. pursued | 31. | 1 | 2 |
| 53. gingerly | | 1 | 2 |
| 54. indignantly | 32. | 2 | 2 |
| 55. contortions | | 2 | 2 |
| 56. **comically** | 33. | 1 | 2 |
| 57. flaunting | 34. | 1 | 2 |
| 58. **genial** | 35. | 1 | 2 |
| 59. plunder | 36. | 2 | 2 |
| 60. neglecting | | 1 | 2 |
| 61. dejected | 37. | 1 | 4 |
| 62. strident | | 2 | 4 |
| 63. disconsolately | | 1 | 4 |
| 64. parley | 38. | 1 | 4 |
| 65. contrivance | | 2 | 4 |
| 66. interceding | 39. | 1 | 4 |
| 67. consultation | 40. | 2 | 4 |
| 68. listlessly | | 1 | 4 |
| 69. **preservation** | 41. ***preservation*** | 2 | 4 |
| 70. zeal | | 1 | 4 |
| 71. counsel | | 1 | 4 |
| 72. pell-mell | 42. ***pell-mell*** | 1 | 4 |

**Pretest Only Activity -- D.C.**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 1. perceive | | 1 | 1 |
| 2. sward | 1. | 1 | 1 |
| 3. baffled | 2. | 1 | 1 |
| 4. compiled | | 1 | 1 |
| 5. discontent | 3. | 1 | 1 |
| 6. incinerated | 4. | 1 | 1 |
| 7. defective | 5. | 1 | 1 |
| 8. plummeted | | 1 | 1 |
| 9. deference | | 1 | 1 |
| 10. discern | | 2 | 1 |
| 11. meekly | 6. | 1 | 1 |
| 12. network | | 2 | 1 |
| 13. converged | | 2 | 1 |
| 14. revive | | 2 | 1 |
| 15. invariably | 7. | 1 | 5 |
| 16. meddling | 8. ***meddling*** | 1 | 3 |
| 17. chiseling | | 1 | 3 |
| 18. ventilated | 9. ***ventilated*** | 1 | 3 |
| 19. balmy | | 1 | 3 |
| 20. eerie | 10. ***eerie*** | 2 | 3 |
| 21. dynamo | 11. ***dynamo*** | 2 | 3 |
| 22. mystic | | 1 | 1 |
| 23. summoned | | 2 | 1 |
| 24. **dim** | 12 | 2 | 2 |
| 25. matchlock | 13. | 1 | 2 |
| 26. surveyor | | 2 | 2 |
| 27. begrudgingly | | 1 | 2 |
| 28. persuaded | 14. | 2 | 2 |
| 29. detested | 15. | 1 | 2 |
| 30. **pleaded** | | 1 | 2 |
| 31. thickheaded | 16. | 1 | 2 |
| 32. disposition | 17. | 1 | 2 |
| 33. mocking | | 2 | 2 |
| 34. boisterous | 18. | 1 | 2 |
| 35. medley | 19. | 1 | 2 |
| 36. lustrous | 20. | 1 | 2 |
| 37. **pliable** | 21. ***pliable*** | 2 | 2 |
| 38. inhabit | 22. ***inhabit*** | 1 | 4 |
| 39. exertion | 23. | 1 | 4 |

**Pretest Only Activity (continued) -- D.C.**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 40. **cunning** | | 2 | 4 |
| 41. **avenge** | | 2 | 4 |
| 42. precipitous | | 1 | 4 |
| 43. prospect | | 1 | 4 |
| 44. hummocks | | 1 | 4 |
| 45. enraged | 24. | 2 | 4 |
| 46. abated | 25. | 2 | 5 |
| 47. celestial | | 1 | 5 |
| 48. resolute | 26. | 1 | 4 |
| 49. relentlessly | | 1 | 5 |
| 50. scalloped | | 1 | 5 |
| 51. tarnish | 27.. | 1 | 5 |
| 52. solace | | 1 | 5 |
| 53. **surety** | 28. | 2 | 4 |
| 54. **boggy** | | 2 | 4 |
| 55. scarlet | 29. ***scarlet*** | 2 | 5 |
| 56. fracas | 30. | 1 | 5 |
| 57. giddy | 31. | 1 | 5 |
| 58. trice | 32. ***trice*** | 1 | 5 |
| 59. amply | 33. ***amply*** | 1 | 5 |
| 60. sparsely | 34. | 1 | 1 |
| 61. bemused | 35. | 2 | 5 |
| 62. quays | 36. | 1 | 5 |
| 63. comrade | 37. | 2 | 5 |
| 64. precocious | 38. | 1 | 5 |
| 65. composure | | 1 | 5 |
| 66. lodestones | | 1 | 5 |
| 67. impertinence | | 1 | 5 |
| 68. compliance | | 1 | 5 |

**Repeated Word Activity -- D.C.**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 1. subdued | 1. | 1 | 1 |
| 2. dreading | 2. | 1 | 1 |
| 3. presumably | 3. | 1 | 1 |
| 4. dignity | | 1 | 1 |
| 5. furrows | 4. | 1 | 1 |
| 6. intense | 5. | 1 | 1 |
| 7. pry | 6. | 1 | 1 |
| 8. harrrow | | 1 | 1 |
| 9. **astonished** | | 2 | 1 |
| 10. doubtfully | | 2 | 1 |
| 11. emerged | | 1 | 1 |
| 12. biology | | 1 | 1 |
| 13. **prefers** | **7. *prefers*** | 2 | 1 |
| 14. laboriously | 8. | 2 | 1 |
| 15. frenzy | 9. | 2 | 1 |
| 16. assumed | | 2 | 1 |
| 17. heed | 10. | 1 | 4 |
| 18. hovering | 11. | 1 | 3 |
| 19. precise | 12. | 1 | 3 |
| 20. **trifle** | **13. *trifle*** | 1 | 3 |
| 21. **vermicious** | **14. *vermicious*** | 1 | 3 |
| 22. livery | 15. | 1 | 5 |
| 23. brigand | 16. | 1 | 5 |
| 24. fawning | 17. | 1 | 5 |
| 25. fugitives | **18. *fugitives*** | 1 | 5 |
| 26. manitou | 19. | 1 | 2 |
| 27. sober | | 1 | 2 |
| 28. **advice** | **20. *advice*** | 2 | 2 |
| 29. reckoned | | 2 | 2 |
| 30. **glimpsed** | **21. *glimpsed*** | 2 | 2 |
| 31. **chinking** | 22. | 1 | 2 |
| 32. **confidently** | | 1 | 2 |
| 33. uneasy | 23. | 2 | 2 |
| 34. **determination** | **24. *determination*** | 2 | 2 |
| 35. tensed | | 1 | 2 |
| 36. despised | | 2 | 2 |
| 37. abruptly | 25. | 2 | 2 |
| 38. **admitted** | | 1 | 2 |
| 39. stalked | 26. | 1 | 2 |

**Repeated Word Activity (continued) -- D.C.**

| 260 Word Set | 156 Word Set | Word Type | Book |
|---|---|---|---|
| 40. awkward | | 1 | 2 |
| 41. gleam | 27. | 2 | 2 |
| 42. glinted | | 2 | 2 |
| 43. grudgingly | | 2 | 2 |
| 44. discouraged | | 2 | 2 |
| 45. snare | 28. | 2 | 2 |
| 46. protest | 29. | 1 | 2 |
| 47. envious | 30. | 2 | 2 |
| 48. frantic | | 2 | 2 |
| 49. **vanished** | **31. *vanished*** | 2 | 2 |
| 50. exterminated | 32. | 1 | 1 |
| 51. **scowl** | **33. *scowl*** | 1 | 2 |
| 52. **delirious** | 34. | 1 | 1 |
| 53. scornful | . | 2 | 2 |
| 54. stern | | 2 | 2 |
| 55. adjoined | 35. ***adjoining*** | 1 | 4 |

| M.L. 207 Word Set | Written Activity 153 Word Set | Word Type | Book |
|---|---|---|---|
| 1. **respite** | 1. ***respite*** | 2 | 1 |
| 2. **access** | | 1 | 1 |
| 3. conceivably | | 1 | 1 |
| 4. **efficient** | | 2 | 1 |
| 5. **wryly** | 2. ***wryly*** | 1 | 1 |
| 6. contour | **3. *contour*** | 2 | 1 |
| 7. incurring | | 2 | 1 |
| 8. **distinguish** | 4. ***distinguish*** | 1 | 1 |
| 9. **manipulate** | 5. ***manipulate*** | 2 | 1 |
| 10. **outcroppings** | 6. ***outcroppings*** | 1 | 1 |
| 11. **coincidence** | 7. ***coincidence*** | 2 | 1 |
| 12. **primeval** | | 2 | 1 |
| 13. **inexorable** | | 1 | 1 |
| 14. **loped** | 8. ***loped*** | 1 | 1 |
| 15. **feasible** | 9. ***feasible*** | 2 | 1 |
| 16. **anticipate** | | 2 | 1 |
| 17. **subsiding** | 10.***subsiding*** | 2 | 1 |
| 18. **lixivated** | 11. ***lixivated*** | 1 | 3 |
| 19. muddling | 12. ***muddling*** | 2 | 3 |
| 20. **maggots** | 13. ***maggots*** | 1 | 3 |
| 21. riveted | 14. ***riveted*** | 2 | 3 |
| 22. ambitiously | 15. ***ambitiously*** | 1 | 3 |
| 23. **droves** | | 2 | 3 |
| 24. drastically | 16. ***drastically*** | 1 | 3 |
| 25. **contempt** | | 1 | 3 |
| 26. **dendrochronologist** | | 1 | 3 |
| 27. prominent | 17. ***prominent*** | 2 | 3 |
| 28. malignant | 18. ***malignant*** | 2 | 3 |
| 29. **lividly** | 19. ***lividly*** | 2 | 5 |
| 30. vagabond | 20. ***vagabond*** | 2 | 5 |
| 31. **willy nilly** | | 1 | 5 |
| 32. **ferret out** | 21. ***ferret out*** | 2 | 5 |
| 33. **obsequious** | 22. ***obsequious*** | 1 | 5 |
| 34. **figment** | 23. ***figment*** | 2 | 5 |
| 35. probity | 24. | 1 | 5 |
| 36. veracity | 25. ***veracity*** | 1 | 5 |
| 37. **endeavor** | | 2 | 5 |
| 38. **fodder** | 38. ***fodder*** | 1 | 4 |

**Written Activity (continued) -- M.L.**

| 207 Word Set | 153 Word Set | Word Type | Book |
|---|---|---|---|
| 39. **din** | | 2 | 4 |
| 40. admonitions | 27. ***admonitions*** | 1 | 4 |
| 41. **perilous** | 28. ***perilous*** | 2 | 4 |
| 42. diligently | 29. ***diligently*** | 2 | 4 |
| 43. **placidly** | 30. ***placidly*** | 1 | 4 |
| 44. **baubles** | 31. ***baubles*** | 1 | 4 |
| 45. industriously | 32. ***industriously*** | 2 | 4 |
| 46. **blunt** | 33. ***blunt*** | 2 | 4 |
| 47. **wheedling** | 34. ***wheedling*** | 1 | 4 |
| 48. debase | 35. ***debase*** | 1 | 4 |
| 49. **persevered** | 36. ***persevered*** | 2 | 4 |
| 50. **incessant** | **37.** ***incessant*** | 2 | 2 |
| 51. **bantering** | | 1 | 2 |
| 52. waning | | 2 | 2 |
| 53. scrupulously | 38. ***scrupulously*** | 1 | 2 |
| 54. induced | 39. | 2 | 2 |
| 55. intriguing | 40. ***intriguing*** | 1 | 2 |
| 56. surmised | | 2 | 2 |
| 57. yokels | 41. ***yokels*** | 1 | 2 |
| 58. mortified | 42. | 1 | 2 |
| 59. **foreboding** | | 1 | 2 |
| 60. tirade | | 1 | 2 |
| 61. **voluminous** | 43. ***voluminous*** | 1 | 2 |
| 62. **frumpy** | 44. | 1 | 2 |
| 63. **railed** | | 2 | 2 |
| 64. **deceptive** | 45. | 2 | 2 |
| 65. futile | | 1 | 2 |

Oral/Charade Activity -- M.L.

| 207 Word Set | 153 Word Set | Word Type | Book |
|---|---|---|---|
| 1. **deliberately** | | 1 | 1 |
| 2. **vantage** | 1. ***vantage*** | 1 | 1 |
| 3. **protruded** | 2. ***protruded*** | 1 | 1 |
| 4. adjourned | | 1 | 1 |
| 5. **scrutiny** | 3. | 1 | 1 |
| 6. flailed | 4. ***flailed*** | 1 | 1 |
| 7. bungled | 5. ***bungled*** | 1 | 1 |
| 8. skeptical | 6. | 1 | 1 |
| 9. denounced | 7. | 1 | 1 |
| 10. cryptically | 8. | 1 | 1 |
| 11. **capacity** | | 1 | 1 |
| 12. **agitated** | 9. ***agitated*** | 2 | 1 |
| 13. **confer** | | 2 | 1 |
| 14. **resume** | | 2 | 1 |
| 15. commenced | | 2 | 1 |
| 16. **mutation** | | 1 | 1 |
| 17. **astute** | 10.***astute*** | 2 | 1 |
| 18. diabolical | 11.***diabolical*** | 1 | 3 |
| 19. supervise | | 2 | 3 |
| 20. **flabbergasted** | | 2 | 3 |
| 21. **starlet** | 12. ***starlet*** | 1 | 3 |
| 22. **falsetto** | 13. ***falsetto*** | 2 | 3 |
| 23. malevolent | 14. ***malevolent*** | 1 | 3 |
| 24. vindictive | 15. ***vindictive*** | 1 | 3 |
| 25. **repent** | | 2 | 3 |
| 26. **jittery** | 16. ***jittery*** | 1 | 3 |
| 27. ecstatic | 17. ***ecstatic*** | 1 | 3 |
| 28. anguish | 18. ***anguish*** | 2 | 3 |
| 29. **nought** | | 3 | 3 |
| 30. **presto** | 19. ***presto*** | 2 | 5 |
| 31. **hoodwinking** | 20. ***hoodwinking*** | 1 | 5 |
| 32. **betrothal** | 21. ***betrothal*** | 1 | 5 |
| 33. **foppish** | 22. ***foppish*** | 1 | 5 |
| 34. **incognito** | 23. ***incognito*** | 2 | 5 |
| 35. **nefarious** | | 1 | 5 |
| 36. **demise** | | 2 | 5 |
| 37. terminated | 24. ***terminated*** | 2 | 5 |
| 38. mattock | 25. ***mattock*** | 1 | 5 |
| 39. ablutions | 26. ***ablutions*** | 1 | 5 |

**Oral/Charade Activity (continued) -- M.L.**

| | | | |
|---|---|---|---|
| 40. instigate | 27. | 1 | 5 |
| 41. tethers | 28. | 2 | 5 |
| 42. miscreant | 29. ***miscreant*** | 2 | 5 |
| 43. **harridan** | | 1 | 5 |
| 44. **dejected** | 30. ***dejected*** | 1 | 4 |
| 45. strident | | 1 | 4 |
| 46. disconsolately | | 1 | 4 |
| 47. parley | 31. ***parley*** | 1 | 4 |
| 48. **contrivance** | 32. ***contrivance*** | 1 | 4 |
| 49. **interceding** | 33. ***interceding*** | 1 | 4 |
| 50. consultation | 34. ***consultation*** | 1 | 4 |
| 51. **listlessly** | 35. | 2 | 4 |
| 52. **preservation** | 36. ***preservation*** | 2 | 4 |
| 53. **zeal** | 37. | 1 | 4 |
| 54. counsel | 38. | 1 | 4 |
| 55. **pell-mell** | 39. ***pell-mell*** | 2 | 4 |
| 56. **ruefully** | | 1 | 2 |
| 57. **fracas** | | 2 | 2 |
| 58. coy | | 1 | 2 |
| 59. **impertinence** | | 1 | 2 |
| 60. **meandering** | 40. ***meandering*** | 1 | 2 |
| 61. **affable** | | 2 | 2 |
| 62. surreptitiously | 41.***surreptitiously*** | 1 | 2 |
| 63. **accost** | 42. | 1 | 2 |
| 64. omit | | 2 | 2 |
| 65. cringing | 43. | 2 | 2 |
| 66. wistful | 44. ***wistful*** | 1 | 2 |
| 67. unfathomable | | 1 | 2 |
| 68. **wretch** | 45. ***wretch*** | 1 | 2 |
| 69. pilfered | 46. | 1 | 2 |
| 70. consternation | | 1 | 2 |
| 71. **medley** | 47. **medley** | 2 | 2 |

**Pretest Only Activity -- M.L.**

| 207 Word Set | 153 Word Set | Word Type | Book |
|---|---|---|---|
| 1. sward | 1. | 1 | 1 |
| 2. discern | 2. | 2 | 1 |
| 3. **compiled** | 3. | 2 | 1 |
| 4. converged | 4. | 1 | 1 |
| 5. **revive** | | 2 | 1 |
| 6. balmy | 5. ***balmy*** | 2 | 3 |
| 7. dynamo | 6. ***dynamo*** | 1 | 3 |
| 8. ventilated | 7. ***ventilated*** | 2 | 3 |
| 9. **meddling** | 8. ***meddling*** | 1 | 3 |
| 10. chiseling | 9. | 2 | 3 |
| 11. **precocious** | 10. ***precocious*** | 2 | 3 |
| 12. compliance | 11. | 1 | 5 |
| 13. quays | 12. | 1 | 5 |
| 14. invariably | 13. | 2 | 5 |
| 15. abated | 14. ***abated*** | 1 | 4 |
| 16. celestial | 15. | 1 | 4 |
| 17. relentlessly | 16. | 1 | 4 |
| 18. **scalloped** | | 2 | 4 |
| 19. **tarnish** | 17. **tarnish** | 1 | 4 |
| 20. solace | 18. | 1 | 4 |
| 21. cordial | 19. | 1 | 1 |
| 22. construe | 20. | 2 | 3 |
| 23. rite | 21. | 1 | 4 |
| 24. **infectious** | | 2 | 4 |
| 25. **inkling** | 22. | 2 | 2 |
| 26. degradation | 23. | 1 | 2 |
| 27. ruse | 24. | 1 | 2 |
| 28. deft | | 2 | 2 |
| 29. apparition | 25. | 1 | 2 |
| 30. decrepit | 26. ***decrepit*** | 2 | 2 |
| 31. capricious | 27. | 1 | 2 |
| 32. improbable | | 2 | 2 |
| 33. inflicted | | 2 | 2 |
| 34. interminable | 28. ***interminable*** | 1 | 2 |
| 35. persisted | 29. ***persisted*** | 1 | 2 |
| 36. docile | 30. | 1 | 2 |
| 37. devise | | 2 | 2 |
| 38. impetuously | 31. ***impetuously*** | 2 | 2 |
| 39. palpable | | 1 | 2 |

**Pretest Only Activity (continued) -- M.L.**

| 207 Word Set | 153 Word Set | Word Type | Book |
|---|---|---|---|
| 40. commend | | 2 | 5 |
| 41. plausiblity | 32. | 1 | 5 |
| 42. obstruction | 33. | 2 | 5 |
| 43. **edification** | 34. ***edification*** | 2 | 5 |
| 44. faculties | 35. | 2 | 5 |
| 45. sunder | 36. | 1 | 5 |
| 46. levity | 37. | 1 | 5 |
| 47. recompensed | 38. | 1 | 5 |
| 48. apprehend | 39. | 2 | 5 |
| 49. sovereign | 40. | 1 | 5 |
| 50. divulging | 41. | 1 | 5 |
| 51. cudgling | 42. | 1 | 5 |

**Repeated Word Activity -- M.L.**

| 207 Word Set | 153 Word Set | Word Type | Book |
|---|---|---|---|
| 1. subdued | 1. ***subdued*** | 1 | 1 |
| 2. **presumably** | | 2 | 1 |
| 3. intense | 2. ***intense*** | 2 | 1 |
| 4. **harrow** | 3. ***harrow*** | 2 | 1 |
| 5. **biology** | 4. ***biology*** | 2 | 1 |
| 6. fugitives | 5. ***fugitives*** | 2 | 5 |
| 7. livery | 6. | 1 | 5 |
| 8. fawning | 7. ***fawning*** | 1 | 5 |
| 9. deplore | 8. | 2 | 5 |
| 10. **impresario** | 9. ***impresario*** | 1 | 5 |
| 11. chagrin | 10. | 2 | 2 |
| 12. vexation | 11. | 1 | 2 |
| 13. indignation | 12. | 2 | 2 |
| 14. rebuked | 13. ***rebuked*** | 2 | 2 |
| 15. conceded | 14. ***conceded*** | 1 | 2 |
| 16. **incredulously** | 15. | 1 | 2 |
| 17. heathen | 16. ***heathen*** | 1 | 4 |
| 18. intrusive | 17. ***intrusive*** | 1 | 4 |
| 19. rebuffed | 18. | 1 | 2 |
| 20. treacherously | 19. | 1 | 2 |

## Appendix G. Examples of How D.C. & M.L. Morphologically Deciphered Meaning.

***On The Basis Of Morphology, Based on Phonological Similarity Or the Mistaken Identification With Words The Children Knew***

*(To indicate different entries over time the diagonal ("/") is used. Words in italics were words in the study used by the children to define other words or in discourse.)*

**D.C.**

approval -- "improved"
avenge -- "like revenge"
blunderbuss -- "a mechanical blunder" [blender?]
(pretest word) "a blunder that's busted" (pretest after sentence)
blundered -- "to use a gun. *Blunderbuss* is a gun.
Blunder means shot."
brigand -- " a jail on a ship"
cryptically -- "cruelly, since I know of krypton"
dejected -- "not included, unincluded" [rejected?]
denounced -- "announced"
domain --" a Spanish word for David"
discern -- "concern" (pretest)
distinguish -- "extinguish"/"identify"
dumbfounded -- "found and dumb"
dynamo -- "comes from dynamite -- daring, blasting"
eavesdrop --"a gooey drop of me."
engrossed -- "to have gross vegetables on your farm"
entangled -- "not tangled"
enveloping -- "developing"
falter -- "has to do with falling water"
finicky -- "trickery"
fodder -- "a baby says that for father"
frenzy -- "lots of friends or a word for friendly
in France"
furrows -- "burrows"
genial -- "magic, because genies are magical"
ghastly -- "something to do with gasping"
hubbub -- "a short name for 'Hi Bub'"
illogical -- "very sick"
improvise -- "compromise"
intense -- "in a tent"
laboriously -- "work, labor"

ordeal --" a deal with Oriental people"
sensitive -"sensible"
starlet -- "almost a star"
wavering -- "has to do with waving -- wailing -- I mean weeping"
wheedling -- "pulling up the weeds when you see them"

**M.L.**

deceptively -- "deceit, deceive"
defective -- "not effective"
dendrochronologist -- "some kind of scientist -- ologist -- Psychologist, means you're -- Ologist means you're a scientist -- You study Psychology"
debase -- "D -base is a program on the computer"
discontent -- "not content, not happy"
fodder -- "how a baby would say father"
forbode -- "forbid"
incurring -- "not occurring"
interceding -- "to go between"
medley --" interesting stuff you could meddle with"
nought -- "a fancy way of saying not or dis -- fancy way to say it with a French accent"
rejuvenator -- "something like the fountain of youth because it revives you -- the word juvenile -- to make someone young again"
steroids -- "sterile"
vermicious -- "vicious and vermin put together"
voluminous -- "very luminous -- lots of light" (pretest) -- "many millions/ volumes/" (post test) [WR,UK, 7/2]
waning -- "poppying" (joke -- father's name - Wayne)

## Appendix H. SEMANTIC RELATIONSHIPS AMONG WORDS.

*(To indicate different entries over time the diagonal ("/") is used. Words in italics are words in the study used by the children)*

### Appendix H - 1 Examples of How D.C. Used Synonyms Over Time.

access – "permission"
agitated – "mad"/"bothered, disturbed, insulted"/ "bothered, anxious, jittery, nervous"
ambitious – "*shrewd*"
astonished –" amazed"
astute – "smart"
avenge – "like revenge, angry, mad – bring after"
awkward – "not skillful, not daring"
blunderbuss – "gun"
blundered – "messed up" (post/post test)(See morphological analysis above)
blunt – "dull, speak plainly"
brigand – "criminal"
brutal – "scary, horrifying"
capacity – "brains, smarts, able"
comical – "hilarious"
commercial – "advertisements, gimmicks"
comrade – "buddy, friend, pal"
conceivably – "possibly"
cordial – "polite"
dependable – "Something to do with
pledgiance [allegiance]. A pledge, a trust. Trusty."
deliberately –"purposely"
derogatory – "insulting"
desperadoes – "bad guys, Mexican cowboys, robbers"
din – "constant noise"
discern – "*translate*" (post test) (See morphological analysis above)
disgraced – "furious, insulted"
dreading – "hating"
droves – "herds, flocks, groups"
efficient – "*shrewd*"
egregious – "rude"
faltered – "stumbled"
feasible – "possible, possibility"
flabbergasted – "*dumfounded, dumbspoken*, amazed"
foppish – "overdressed"
frenzy – "hurry"
futile – "impossible"
genial – "magical"/ "nicely"
gleam – "shining, jealous"
heated –"*radiated*"
hoodwinking – "tricking"
humiliation –"mad, furious"
incognito – "in disguise"
incredibly – "amazingly"

indignant – "mad, like *livid*"
jabber – "to talk a lot"
jittery – "nervous"
lixivated – "got killed, lixquinated"
loopy – "active, squiggly, squirmy, flexible"
malevolent – "devilish, horrible, horrifying, scary,mean"
manipulated – "control"
meager – "a little"
meddling – "to mess in, big nose"
mocking – "*scoffing*"
monitor – "listen, tape record"
muddling – "messing up, *bungling*"
mutation – "change forever"
omen – "superstition"
pallet – "bed"
parley – "treaty, meeting"
perceive – "*reckon*"
petrified – "very hard, very scared"
pliable – "bendable, not breakable"/ "bendable, not rigid"
plunder – "burn and damage"
preservation – "saved"/ "save, saving"
presto – "at once"
presumably – "probably"
probity – "honesty"
prominent – "important"
protest – "hate, comment"
relieved – "*respite,* rested"
respite – "relief, rest"/ "relief"
sensation – "feelings"
shrewd – "*efficient*, clever"
sober – "serious"
supervise – "decide, *improvise*"
terminate – "end"
thickheaded – "fat headed. Good brain. Big brain."
uncanny – "weird, crazy"
vagabond – "a wandering beggar"
vantage – "advantage"
vanish – "disappear"
vermicious – "mean and evil"
vindictive – "mean and evil"
wheedling – "*manipulating*"/ "*manipulate* & scheme"

## Appendix H - 2. Examples of How M. L. Used Synonyms Over Time.

acknowledge -- "opposite of ignore"
agitated -- "*provoked*"/ "annoyed, mad, angry, bothered"
approximately -- "estimate"
astonished -- "amazed"
baffled -- "confused"
bantering -- "taunt, tease, bother playfully"
betrothal -- "marriage"
bothersome -- "aggravating"
capacity -- "skill, intelligence, capability, measurement"
commercial -- "advertisement"
contempt -- "hatred, superior"
contrivance -- "invention, gadget"
coy -- "deceptive"
deceptively -- "trickery, deceit, deceive" (See morphological analysis above)
decrepit -- "ramshackle"
defective -- "not effective. something wrong with it."
deft -- "good, quick, nifty"
dejected -- "sad"/ "feel upset, down"
demise -- "death and downfall"
depend -- "rely on"
derogatory -- "superior, imperious, sassy, mean"
diabolical -- "evil, devilish"
din -- "incessant noise, sound"
discern -- "figure out"
dotty -- "crazy, *uncanny*, poppycock
droves -- "herds, hoards, lots of them"
edification -- "education"
engrossed -- "full-fledged"
exterminate -- "kill"
falsetto -- "a high voice"
figment -- "a bit, a piece"
flabbergasted -- "amazed, *dumbfounded*, in awe"
fretfully -- "worrying, nervous, anxious, aggravated"
fugitives -- "outlaws, *miscreants*"
gingerly -- "suspiciously, carefully"
haughty -- "conceited"
hoodwinking -- "trickery -- a dirty trick -- no playful, naughty"/ "tricking"
hubbub -- "chaos, talking, gibberish"
impertinence -- "rudeness"
impetuously -- "impulsively"
incognito -- "in disguise"
incredulously -- "amazingly"
indignant -- "insulted"
intense -- "incessant"
interlude -- "like an intermission"
intruder -- "trespasser"
jittery -- "nervous, anxious"
lividly -- "mad and enraging -- dark blue and purple with rage"
-- "white and purple in the face"

lixivated -- "liquidated"
loopy -- "crazy, weird, *uncanny*"
maggots -- "larvae of flies"
malevolent -- "evil"
malignant -- "mean, evil, *diabolical*"
meandering -- "wandering"
meddling -- "messing, *bungling*, poking your nose in my business"
miscreant -- "a ruffian, a *vagabond*, a *brigand*. a bandit"
mortified -- "embarrassed, really embarrassed"
muddling -- "messing up, *bungling*"
mutation -- " a permanent change"
mystic -- "a drink"/ "a drink, a psychic, a fortune teller"
nefarious -- "very evil and mean"
obsequious -- "*fawning*"
outlandish -- "rude, rotten, stinky"
pell-mell -- "ziggity-zaggity"
perceive -- "premonition"
perilous -- "very dangerous"
perseverance -- "stubborness"/ "stubborness, ambition"
petrified -- "scared"
placid -- "calm, plain"/ plain-spoken, plain, dull, peaceful"
practical -- "sensible"
presumably -- "probably"
prevail -- "succeed"
probity -- "honesty"
provoked -- "taunted, bothered"
reaction -- "response"
recommending -- "advising"
relished -- "loved, cherished"
respite -- "peace, relaxation, quiet"
revive -- "*respite*, refreshen"
rogue -- " a *vagabond*, a robber, a thief/"
ruse -- "trick"
scrupulously -- "carefully"
scrutiny -- "carefully"
sumptuous -- "delicious, beautiful, wonderful, luxurious, comfortable"
spite -- "mean, wickedness, evil, jealousy"
staggering -- " a large amount, a little *uncanny*, bright, incredible, mind-blowing, brilliant, clever"
stunned -- "*amazed, flabbergasted , stupefied*, in awe"
stupefied -- " *flabbergasted, dumbfounded*, amazed --
all those words -- struck stupid/"
subsiding -- "fading"
surreptitious -- "secretly"
tirade -- "an angry lecture"
tranquil -- "peaceful"
trice -- "in a jiffy, *presto*"
typical -- "regular"
uncanny -- "dotty, poppycock, silly, crazy, weird"
vagabond -- "rascal, varmint"/ "wandering beggar"
vantage -- "advantage"
veracity -- "truth, *probity*"
vermicious -- "evil, mean"
vindictive -- "evil, *shrewd*"

waning -- "failing, dimming"
wheedling -- "scheming, shrewd, and sort of *manipulating*"
willy nilly -- "no matter what"
wistful -- "dreaming, wishing, wanting"
wryly -- "cleverly, tricky"/ "sharply, cleverly, smartly"

## Appendix I. RESPONSES USING EXAMPLES DERIVED FROM COGNITIVE CONTEXTS.

(Information in parenthesis pertains the event when the response was recorded) [Information in brackets refers to Activity or source, meaning level, and date of initial encounter of the word] *Information in italics are written entries in Written Activity or use of a stimulus word.*

### Appendix I - 1. D. C.'s Examples Over Time.

**D.C.**

access – "gases" (pretest word) "air" (pretest sentence)

-- "Easy/ Permission/ Something about telling where it is and giving permission/ Like access to your room/ The kitchen gives access to the laundry room/" (post test) [WR,UK, 6/22]

-- " I am a boy/ I like sports and Nintendo, and I do not give *access* to my room and things/ I am kind- hearted and like poetry/" (written usage at school, 10/1)

admitted -- "Honestly told. I know that's right because it's in Matthew, Mark, Luke, and John, (a book Maryse read to him) It's very similar/ To be honest/ It's like you're an honest boy/ (post test)[REP, F, 6/30]

advice -- "Say I was in a car driving and you asked me where to go/ You were giving us advice when we were starting the town (lego town).(post test) [WR,F, 6/23]
--"Easy/ You just gave me advice to dump this out (box of legoes). Suggesting, I think/" (post/post test)

ambitious *Written Activity entry on 7/7*
*"Droves of ambitious antelopes in my eye*
*People say why why why*
*Do you stare at the sky sky sky*
*With such amazement"*

-- "Never waste your time/ Shrewd/"
(post test) [WR, UK, 7/7]

antidote -- "They cannot make an antidote so that Grandma Mitchell can live."

astonished -- " Like 'Ahhhh!' "

bellowing -- "Matt remembered this bee hive and couldn't stop thinking about the honey/ When he tried to get it, the bears attacked him/ He was *bellowing* and jumped into the water/ He was struggling in the water and Sachness and Attean rescued him and took care of him until he got better from the bee stings/ (retelling of story in post test) [CH, F, 6/25]/

blunderbuss -- "That is so easy, Mommy/ A gun with a short nozzle/ " (post test) [ WR,UK, 6/23]

*– Written entry in school on 10/28*
*"Blunderbuss bats break brooms."*

– "Easy! Easy! It is a gun – an old-fashioned one definitely/ Not as big as a big, big musket, but it's like it/" (post/post test)

blunt – "Dull/ You speak plainly/ You speak what you mean/ You say 'You smell!' instead of 'You should take a bath'/" (post/post test) [WR, F, 8/12]

bounty – "Anything to do with Paradise? Because it's a candybar/"

brutal – "Scary, horrifying murder of Jimmy the Jaguar Jackknife Jerusalem Johnny Jones!" (pretest)

bungles – "She *bungles* in being strict/ (usage - 8/4)

coincidence – "This was a little joke that was made by Maryse/ She said, 'What a coincident. I hate you too'/ " (pretest)

*Written entry on 7/15 – "What a coincidence that I picked the same thing as my Grandfather."*

– "Mommy, Mommy, that could just be a coincident/" (usage after Maryse and I were talking about ESP and dreams that came true)

–"Like things happening at the same time/"
(post test) [WR,F, 7/15]

commercial – *Written Activity entry on 7/6–*
*"I want to be in the commercial for Nike Air."*

– "Advertisements, gimmicks/ A building that sells stuff/ ATT would be a commercial building that they sell at and advertise/ " (post test) [WR,F, 7/6 ]

commute – "Go around/ Travel from place to place/ Commuter capsule – Dallas, Texas, North America, Earth, to the Space Hotel/" (reference to book in study) (post/post test) [

confidently – "Say I already got my Air Jordans, and it's the first day at L.I.S.G. and I'm going to stay there for the whole day/ I step confidently into the room/"
(post test)[ REP,UK, 6/23]

contempt – *Written Activity entry–*
*"I have contempt against skinheads!!!!!!!"*

control – "Like if somebody said, 'Control yourself' to somebody who is converging to the cafeteria." [as in control group] – "The scared people in 'What About Bob?' [video]. The control group is the group who does the new medicine, and the scientific group doesn't. It uses the old medicine."(pretest)

cryptically –"Cruelly/ Since I know of krypton/"
(post/post test, 12/27 ) [CH, UK, 7/15]

debase – "Take away somebody/ You put them down/" (post/post test) [WR, UK, 8/12]

deceive – "The opposite of their quest. The opposite of what they want you to do. Bothering, insulting, lying, fibbing. Ben [a friend from school] made me think – I was deceived when I thought I could get to the Olympics. He made me think wrong." (pretest)

dendrochronologist – *Written Activity entry on 8/4*
*"Born 3/13/63*
*The Story of David Robinson 1*
*When David was a kid he wanted to be an athlete. His friends wanted to be dendrochronologists. Although he had an uncanny sense of the past, he liked to act in the present. So he became an athlete."*

– "Oh my god! A person who studies rings in trees to see how old they are and junk/" (post test) [WR, UK, 8/4]

determined – "I'm determined to get at least on my college basketball team/" (post test) [REP,F, 6/25]

diligently – *Written Activity entry –*
*"There's a placid pig in the wine bottle*
*Snorting very loud*
*Diligently trying to get out!"*

dim – "I've heard it in a sentence – the dim of the night – the darkness." (pretest)

disgraced – "Once I got into the sugar bowl/ Our babysitter, Patricia/ I got sugar all over me/ I was a disgrace/ A very bad mess/ If she was mad, she would say, 'You're a disgrace/ I was embarrassed/ It is not good"/ (post test) [WR,F, 7/14]

drastically – *Written Activity entry*
*"Dan drastically dived denting Dave's diving board."*

dreading –"You're bearing it and you need help/ You want to get out of there/ Hating/" (post/post test)[PRE, UK, 6/22]

droves *Written Activity entry on 7/31*
*"Droves of ambitious antelopes in my eye*
*People say why why why*
*Do you stare at the sky sky sky*
*With such amazement*

– "Herds and flocks, and don't say a sentence because I'm going to say the same thing/ Groups/ Droves of antelopes roamed/ (post test)
[WR, F, 7/31]

dumbfounded – "The word I taught you/ Diss/ Someone dissed you out of your mind and then the other – dumbspoken – he can't speak/"(post test) [CH,UK, 7/22]

– *Written entry in school on 10/23*
*"When he saw the ghost, he was dumbspoken."*

dynamo – "An active person like Michael Jordan might be a dynamo/" (PRE, F, 7/30)
– "Comes from the word dynamite – daring, blasting/ A lot of energy/ Gary Devino is a

dynamo/ So are one of the runners in the Olympics and Pop and you/ On Channel 11, there's a duck named Dynamo/ (post/post test)

efficient -- "Shrewd/ Doing a little bit of everything but not wasting your time/ (post test) [ WR,UK,7/7]

endeavor -- *Written entry -- "The greatest endeavor of my life was the backwards layup."*

enveloping -- "I am enveloping to learn how to dunk. [He loves basketball.] Learning. In your stomach I was enveloping to be a human." (pretest)

faltered -- "Stumbled/ Stumbled on a word/ Fred faltered and fainted/ (sentence used in written work) (post test ) [WR, UK, 7/9)]

-- "You *faltered*!" (he said when a friend tripped on the phone wire) (usage 7/30)
-- "Oh, Mommy, you *faltered*! Are you alright?" (usage after I tripped on deck -- 8/8)

flabbergasted -- "Like *dumbfounded, dumbspoken*, you can't speak because you're so amazed/" (post test) [CH, F, 7/29]

fodder -- "Something to feed a cow like hay/" (post test) (see "1" above) [WR, UK, 8/6]
-- "Stuff you feed the dogies, the cows, the colts, and the horses/ Like oats or hay/" (post/post test)

foppish -- "What are you wearing that for? (Maryse has a towel wrapped around her head after showering) It's ridiculous/ You look *incognito* and *foppish*/"(usage, 9/8) [CH, UK, 8/17]

fugitives -- "Outlaws who were in the Sebastian book (the book in the study) -- Nicholas, Sebastian, Nicholas' band, and Princess Isabelle/" (post/post test) [REP, UK, 8/13]

furrows -- "Burrows. Something to do with hibernating -- something to do with coming out of their burrows from hibernating."(pretest)

genial -- "Nicely/ Like a genie/ Magically/ Gene is a genial man/" (post test) [CH,F, 7/14]

gleam -- " A jealous eye/ Shining/" (pretest)

glimpsed -- "In Treasure Mountain (a computer game) the crown comes and goes in a glimpse/" (pretest after sentence)

--"Like when I got my mohawk at Astor Place and you were waiting in the car/ I was with Damon/ You glimpsed my hair and didn't recognize me when I first got it/ That girl who saw our orange volkswagen van down the driveway when she passed by, saw the van by a glimpse/ She had a lizard on her shoulder/ (post test) [ REP,F, 6/23]

-- "Like when I was four/ Well, glimpsed means saw a faint picture/ In one of my dreams -- not in a dream -- I saw a ghostbuster (play figure) that I always wanted/ I don't want it anymore/ I rolled out of bed and put my hand on it, and it wasn't there/ I always kept an eye out for it in case I found it/ Never did/ Never will/" (post/post test)

hoodwinking – "Tricking/ At the town Sebastian wanted to go to there was hoodwinking/" (post/post test) [CH, UK, 8/17]

humiliation – "Mad, furious. Has to do with one of your feelings." (pretest)

illusion – "This looks like orange, and it's pink. You are in the middle of the desert and you see an ice cream stand or a water fountain."(pretest)

improvise – "Marysee, Marysee, let's *improvise*/ We can use all the dining room chairs and get some blankets and sheets from Mommy/" (usage during play, 9/9) [WR, F, 6/7]

jittery – "Like uh, uh, uh – nervous/ In the movie, "My Cousin Vinnie" one of the guy's lawyers was jittery/ Sometimes when you stutter, you're jittery because you're nervous/" (post/post test) [CH, UK, 8/3]

lingo – "Yeah! Me and Gene have a lingo/ A language/" (post test)[ WR,F, 6/25]

literally –"Really so terribly much/ I literally want to get done with this so I can have play time/"

lixivated – *Written Activity entry on 7/29*
*"Charles Barclay is muddling with madness. After the last dunk Barclay lixivated one of Angola's teammates with a jab in his side."*

– "Now tell me what you want to do/
– "We need to capture the evil force/ With the sword we will *lixivate* the power of Vader/" (usage from private play with Star War figures on 11/17) [WR, UK, 7/29]

– "Kill somebody with water/ Get killed and disappear/" (post/post test)

livid – "Purplish and whitish in the face/" (post/post test) [WR, F, 8/17]

loopy – "Oh, my god! That's really hard! Active, squiggly, squirmy, flexible/ I don't know/ I don't really use those kinds of words/" (post test) [PRE, UK, 8/24]

loped – *Written Activity entry on 6/22 – "Kris Kros lopes and jokes but they don't give access so you better watch out for Kris Kros."*

"Yeah! I know that – like going like this/ (He strides across the room with arms swinging.) But, Mommy, I'll also give you the sentence I did for loped/
Lopes/ 'Kriss Kross lopes and jokes/ But he gives no access so you better watch out for Kriss Cross'/"
(post test) [WR, F, 6/22]

– "Look, Mommy, he's loping/" (Pointed to picture of the book, Too Many Rabbits, he was reading on 7/20)

– *Written entry in school on 11/17*
*"I loped across the room."*

– "That is easy/ With his arms swinging, somebody was happily walking or sort of skipping/"

maggots -- *Written Activity entry* --
*"Maggots made Max mad making Mark mad/"*

malevolent -- "Devilish/ Like the knids were malevolent -- horrible, horrifying, scary, mean/"
(knids were evil creatures in book in study)
(post test) [CH, UK, 7/30]

malignant -- *Written Activity entry* --
*"Malignant mad Mardron made Max mean/"*

manipulated -- "Made the game/ Used rules that he knew so he could win/ He was a cheater/"
(Pretest after sentence, 7/8)

*--Written Activity entry on 7/8) "I want to manipulate Josh."*

-- "She is a *manipulating* child" (usage to define a carefree and smart child, 7/14)

**-- "I am not *manipulating* for you, Maryse", and he walked away. (usage after Maryse asked me for more orange. She was seated far enough away that she needed to get up. Dashiell was standing in the middle and she gave him a pleading look.)**

**-- "I know it's *manipulating*, but would you get me a drink of water?" (usage after coming in from basketball practice, 7/27)**

-- " Easy! Say I was lying down like this. She manipulated me by asking me to get her a corn muffin/ It means to control/" (post test) [WR, F, 7/8]

-- (Came in crying and angry, and blurted out)
"Josh is such a *manipulator*/ Michael and I were playing fine and then he comes along! He takes him aside and starts whispering in his ear/ Next thing I know Michael is gone and they're playing a trick on me/ It's just not fair! He's always *manipulating* everything/ I'm gonna' get him back!" (usage -7/31)

-- "It's okay to *manipulate* if that's what you have to do for your job/" (usage at the dinner table after he asked his father if he did any wheedling, and his father answered/) [WR, F, 7/8]

-- "*Wheedle.* You could manipulate things which means to move them around well/ Or you could say/ Like Kevin Rody manipulated for a cake/ Tricked and planned for it/ (post/post test)

-- "Asked, begged/ It's kind of *manipulating*/" **(Usage on post/post test, 12/28, to define persuaded)** -- "A person who *manipulates* a tiny bit/ They work for the government/ Clinton/ Aunt Marcia was/ George Bush, Clinton, Hilary Clinton, Barbara Bush/" (Usage on post/post test, 12/29, to define politician)

-- " *Manipulate* and scheme/ You're scheming/ Like the barber in Sebastian (character from book in study) was scheming, wasn't he?" (usage on post/post test to define wheedling)

mattock -- "Gardening tool which pulls up loose dirt/"
(post test) [CH, UK, 8/7]

meager – "May I have a *meager* glass of milk?"
(usage – 8/3) [WR, UK, 7/16]

– " I would like to have just some *meager* time with you/" (usage - evening of 8/3)

– "She is very *meager* on sports and on not being strict." She bungles in being strict/ She embarrasses herself/" (usage – 8/4)

– "Boy, Pudgies chicken is sure more meager than yours/"

meddling – "To mess in/ Don't meddle with my papers/ People call anyone "big nose" because they meddle/ (post/post test) [PRE,UK,8/15]

mercilessly – "Not with any mercy/ Even though we're not – we didn't know each other/ And we were fighting/ I don't forgive/" (post test) [ WR,F, 7/2]

mocking – "In a tone, like 'HA!' Something to do with *scoffing (Wr, F. 6/30)*/" (pretest - 7/7)

muddling – *Written Activity entry on 7/29*
*"Charles Barclay is muddling with madness. After the last dunk Barclay lixivated one of Angolas' teammates with a jab in his side."*

mutation – "Like a scientist made up ooze and a rat & a ninja turtle were mutating." (pretest)[Source – TV show – Teenage Mutant Ninja Turtles]

negotiate – "Figure something out/ Agree/ Say right here was a table and we were negotiating how many hours we can play/ One person could also negotiate how many minutes you have to play/ " [Source – Used by father. (UK at pretest)]

network – "Something that's on TV, like news/"
(pretest)

neurologist – "A Parkinson's disease doctor/" (pretest) [Source – his grandmother had Parkinson's disease]

outcroppings *Written entry on 7/13*
***– "If a nail was a mineral and it grew out of the ground, it would be an outcropping."***

**– "Oh that's one of my favorite words/ A mineral that crops out of the ground like growing corn/" (post test) [ WR,UK, 7/13 ]**

**– "Corn is supposed to get three feet high, but it gets four feet high, so it's an outcropping/"**
**(post/post test)**

perceive – "Rain come soon/ Reckon soon, by golly/"
(post test) [Source – Repeat of what character in book in study said.]

perseverance -- *Written Activity entry*
-- *"Perseverance List -- Louis Pasteur - rabies medicine*
*Christopher Columbus -- America*

prefer -- "Say I like pepperoni pizza, but I prefer pepperoni with sausage/" (post) [REP, F, 7/24]

-- "Like Tom said, 'Thank you for the chocolate ice cream, but next time can I please have marshmallow ice cream. I prefer it.' (D.C.)
-- "Does it mean you like it better?"--
-- "But, Mom, I don't like salmon steak, and I'd prefer asparagus, but I don't like it." (post post)

preservation -- "I'm going to go ask that man [the man loading the vending machine] to *preserve* one of the bags for me next week/" (usage after asking me if he could have some barbecue potato chips, and I told him "no".) (usage on 10/13) [CH, F, 8/12 ]

-- *Written entry in story at school on 11/11*
*"They lived in a nature preserve and were all friends...*(story about boys who found the criminal who was guilty of chopping down trees)*...Many weeks later the boys received a medal. And the nature preserve was safe from that criminal."*

-- "To do something to save it/ Like somebody wanted a painting and they didn't have any money/ They would have to do something to save it/"
(post/post test)

presto -- "The cat/ At once/ Of course, we couldn't forget one of the main stars!" (Presto was the name of the cat in one of the books of the study) (post test)
[CH, F, 8/17]

-- "*Presto*! And they *vanished* [REP, F, 7/7]
just like that/ (usage from play with M.L. on 11/21)

-- "At once! There was the part where Sebastian (the character in the book in the study) saves Presto, the cat, from a fit/" (post/post test)

-- "In a second/ Like *presto*/"(usage to define trice on post/post test after sentence)

primeval -- "I know what I said/ It was something to do with the olden times, but I don't know what it really means/ When it was B.C./ The B.C. spot/ A spot looks like/ With castles and knights/
--"Castles are after Christ/"--
-- "Oh yeah/ Dinosaurs, lions and tigers and bears/ Oh my/ Lions, and tigers, and bears/ Oh my!/"
--"Do you think so?--
--"No/ But they have ancestors, though/"
--"Who have ancestors?"--
--"The lions and tigers and bears and squirrels/"
The dinosaurs didn't have any ancestors, but the lions and tigers and bears and squirrels did -- slo and walruses/"
--"The what?"
--"There is something that begins with 'slo'/
A sloth/ Yeah/ There were sharks, there were ( )/

There were mean dinosaurs/ There were gentle dinosaurs/ There were slow dinosaurs/ There were fast dinosaurs/ There were big, big dinosaurs/
(post test) [WR, UK, 6/24]

probity – *Written Activity entry – "Once there was a figment bear named Andrew. He lived in a hollow redwood in Westchester. One day he met a rabbit who had probity. Said he, 'I will repay you if you do not eat me.' So Andrew spared him."*

prominent – *Written Activity entry on 8/5*
*" Jessie was a prominent person in class."*

–"Pop's a prominent person in the play/ Important/" (post test) [WR, F, 8/5]

– He was given a part that sticks out from other parts/ I thought of Pop when he stole the play/"(post/post test)

protruding – "Easy/ That was one of my favorite words I did/ Like I'm protruding from under the table/Silly! That was probably the best one I did/ (post test) [CH,UK, 6/22)]

reckon – "I reckon we're not in Kansas anymore/"
(pretest)

recommending – "You'd rather get 'Rocky Road' – have it/ I'd rather have 'Rocky Road' than vanilla ice cream/ "He was saying 'Why don't you go to that restaurant instead of that restaurant, because that restaurant is better than that restaurant/"

research – "Say I was Grandma [he lies down] and they were doing research on my body/ Study/ You do research on children/ Ethel does research on apes/"(pretest)

respite – "When I go into your dressing room, I have respite from the sun, the rain – the climate/ I get relief/" (post/post test, 12/27) [WR, UK, 6/24]

retreated – "Someone was walking and he saw a big giant and he said, "RETREAT – Move back!" (pretest)

riveted – *Written Activity entry*
*"Ren ran with riveted eyes on Reeny/"*

scoffed – *Written entry on 6/30*
*"Josh scoffs at me probably because he's jealous of me."*

Used to define mocking on 7/7 – "In a tone, like 'HA!'/ Something to do with *scoffing*."[WR, F, 6/30]

–"You think that you're better than the other person/ I pretended I had aces at cards/" (post test)

– "Sachness gave him a crutch, and then Attean *scoffed*/ Sachness wanted Attean to learn to read and asked Matt to teach him/" (Used in retelling of story at end of post test period).

– "Like I remember the sentence you used the word in/ When you scoff at someone you

laugh at them/ (he demonstrates) Attean (Indian boy in book in study) *scoffed* at/ What was his name? It was three letters/ What was it? (D.C.)
– "It started with an 'M'/"–
– "MATT – Attean scoffed at Matt/" (post/post test, 12/28)

scornful – "You would be mad at me/ Pop would be mad at me if I gave you or him a scornful face/ (He demonstrates the face) (post test) [REP,F, 6/30 ]

scowl – "A bad look on your face." (post test) [REP, UK, 6/30]
– "A look – a mean look/" (post/post test, 12/28)

sensation – "Feelings/ Can I do all the five senses? – hearing, smelling, tasting, touching, seeing/"

sensible – "Like Maryse is really sensible/ Like Maryse sees a sad movie and she cries/" (pretest)

starlet – "Like almost a star, but not quite/ You're a kid and you're a star/ You're like 'Stars on Stage'–Katie Kimbel and Jamie of Gavin (friends who are stage bound and child actors) (post test)[CH, UK, 7/29]

–"Mostly a woman/ A famous actress/ A famous young person/ They're not famous until they become stars/" (post/post test)

suspended – "When Pop and his friends crossed over the Stanley River on the ice and his parents saw them, they were suspended/" (pretest)

teeming – "Oh, that's one of my favorite words/ Filled with/ The lake is teeming with fish/" (post test) [ WR,F, 7/16 ]

– "Mommy, the ocean must be *teeming* with fish/ Just look at all those birds out there/
(usage – 8/7)

thickheaded – "Fat headed/ Good brain, big brain/ Maryse is sometimes thickheaded/ Ms. Know It All/" (pretest)

– " A name for smarty pants or big brain/
(post test) [PRE, UK, 7/2]

translate – "You can translate on the telephone/ You can get each other/ The teacher could not talk in Spanish/ A kid named Julio translated English to this kid, Omar/" (pretest)

uncanny – ***Written Activity entry on 8/4***
***"Born 3/13/63***
***The Story of David Robinson 1***
***When David was a kid he wanted to be an athlete. His friends wanted to be dendrochronologists. Although he had an uncanny sense of the past, he liked to act in the present. So he became an athlete."***

– "Mom, I don't know about that/ There's something uncanny about those phone calls/" (usage on 12/12 referring to phone calls in which people hung up) [WR,F, 8/4]

-- "Weird/ Sort of crazy/ Once I made up a poem about uncanny Annie --
Uncanny Annie was no manny
She needed to live in a panny
At least that's what she thought/"

vanished -- "Say I just appeared like a wizard and told him what you're supposed to do/ And vanish away/ Go away so quickly that you don't know where the person is/ (post test) [REP,F,7/7]

-- "*Presto!* And they *vanished* like that/" (usage in play with M.L. on 11/21) [REP, F, 7/7]

-- "Like the story 'The Headless Horseman' Bram Bone said the headless horseman would go in a flash of light/ It means it will go so fast -- just disappear/" (post/post test)

vantage -- "Good spot/ Advantage/ A giant has advantages/ Other people are jealous of me/ (post test) [CH, F, 6/24]

-- "I do not know/ Does it have anything to do with advantage? You believe in yourself/ You have hope/ Maryse had hope in herself/ (post/post test response after word) "I was watching 'Hidden Dune' (a play)I was at a certain vantage point/ At a certain point/ It's a good place/" (response after sentence)

version -- "I want the version of shoes Kevin has called, Flights-Nikki Air" (pretest)

wavering -- "Looking back and forth/ I was looking at all the different kind of shoes before I chose/" (pretest)

wheedling -- *Written Activity entry on 8/19*
-- *"Tigger was a wheedling liar.*
*Eating every sort of leaf.*
*Blunt paws and nine claws.*
*Telling everybody's beef.*

--"Did you do any wheedling today, Pop?" (usage during dinner, 9/16) [WR, UK, 8/19]

willy nilly -- "Like you wake up and put on underwear, brush teeth, eat breakfast, put on your shoes, pants, get out to see what it feels like outside/" (post test) [WR, F, 8/17] (perhaps confused with pell-mell)

## Appendix I - 2. M.L.'s Examples Over Time.

access – "To make way or to lead the way/ I did a poem/ 'People lope around the room/ They may access the way to the garden/ They may access the way to the moon/ But really do hope they leave/ '

Give me access to your room/ Let me come into your room/" (post test) [ WR,UK, 6/22]

agitated – "Was mad, was provoked/ He was very provoked, and he hit her/" (Pretest after sentence)

– "Annoyed, mad, angry, bothered/ I am always agitated when Dashiell bothers me/" (post test) [CH,F, 6/29]

ambitious – *Written Activity entry on 7/31.*
*"Advertisement for Dimetap"*
*Droves of animals were crossing the plains. I had fought ambitiously all my life for this picture. Then it happened. I sneezed. All the animals ran away. I forgot my Dimetap and now my life is ruined.*

–"Oh, I am ambitious/ Like you work hard all your life/ (She repeats the dimetapp commercial she wrote in the written session – see above)
(post test) [ WR, UK, 7/31]

– "You want to set high goals for yourself/ You want to be challenged/ You set challenges for yourself/" (post/post test)

approximately – "Estimate/ About 6/" (pretest)

astute – "Smart, clever/ You can catch flies with sugar, not vinegar/ If a child is on a merry-go-round, and she wanted to go for a third time/ If the girl said, 'no', the child would hang on/ If you said, 'Can you guess what is in my pocket?'/ The child would come off/" (post test) [CH,F, 7/8]

banished – "To ban – to forbid someone to come here/ Like Abraham and Lot in 'The Wicked City'/ Abraham – he wasn't banned, but when he said/ This was a very hateful city and everybody worshipped idols/ And he said 'REPENT, thieves, sinners, robbers, and cheats'/ Or God will burn Sodom/ That's where he was/ After – in the morning/ They only wished to banish this crazy uncle of Lot/ Lot was Abraham's nephew/ (pretest )
[Source –Short Story by Isaac Singer Bashevis Singer]

bantering – *Written Activity entry on 6/23 –*
*The incessant bantering made children shout with laughter.*
*An incessant bantering sound*
*Would be heard from the ground*
*This teasing noise*
*Was about a bunch of toys*
*And this teasing sound was*
*certainly from a fairy mound*

betrothal – "You're going to be married to this person/" (post test) [CH, UK, 8/17]
– "Marriage/" (post/post test)

brigand – "In the book I'm reading, The Jedora, she saves the brigand's, the *vagabond's life/" (WR, F, 8/7)* (post test) [REP, F, 8/18]

blunt – "Dull, simple/ You use the words you can/ You don't use three words when you can use two or two when you can use one/" (post/post test) [WR, F, 8/12]

capacity – "What you could take/ Her capacity was little and she could do little/ Also the measurement of liquid/ Skill, intelligence, capability/ Your original sentence [pretest] was 'The child does not have the capacity to work that puzzle/ " (post test)[CH, F, 6/22]

capricious – "It means changing a lot/ Like Billy (hairstylist at wedding) was capricious / He changed our hair once and our flowers twice/" (post test) [PRE, UK, 7/9]

coincidence – "On the days when there is a lot of seaglass – it's just a coincidence/" (Pretest)

–"Two things that happen at once/ If two cars crashed/ Two grandparents with two children and two grandchildren were the same age/ The cars were the same/ The oil, the grandmothers' perfume/ The grandfathers' suits were the same, and came from the same store/ They all liked the same things/ And the grandmas detested lumpy potatos/ That is a lot of coincidences!/" (post test) [ WR, F, 7/15]

commercial – "An advertisement/ Papa's building is/ It's not exactly/ It's whatever sells something/"(post test) [ WR, F, 7/6]

commute – "A commuter college is a place where students don't live there/ They go back and forth from home to school, school to home, everyday/ Commute means to go back and forth/" (post/post test) [pretest - k]

compelled – "She was compelled to shout out, 'I found red!', when she found a red piece of sea glass. I would too!" (pretest)

contritely – "Mrs. Frisby said with her voice, ' I should've thought of that, and now Timothy got even worse'/ Sadly, scared, and blaming herself/"(pretest)

control – "She tried to control her joy, but she could not/ To put a leash on it/ To put in order/" [as in control group] –"Which group gets tested first/ There's an experimental and a control group/ They try out the medicine on two different groups/ They both try out different medicines for the same disease so they see what is good or not/"
–"Does it matter which group gets what medicine?"–
–"It does matter which group gets what/ One group gets an already tested medicine/ That's the control one/ And the other one gets the non-perfect one, the new one/ That's the experimental group/ If that works better than the other one, they both get to try it/ But if the other one works better they keep on putting them, the experimental group, with different medicines/
–"Do other people use experimental and control groups besides those who try out medicine?"–
–"Yes/ Like control groups for the environment/ They keep on seeking better plans/ They have a little sod area and they see what seed works better/ The one that works better they use or they try to put forth/ Get it?"

—"Are there any other groups?"—
—"Basically, there are quite a lot of people who do — farmers, environmentals/ People who try to find out secrets to things/ Biologists, psychologists, and scientists/" (Pretest)

debase — "D -base is a program on the computer/"
(post test) [WR, UK, 8/13]

deft — "Good, quick, nifty/ You would sew very deft like/ Remember the hitchhiker in 'The Hitchhiker' by Roald Dahl? The fingerswift [fingersmith] — he had very deft fingers/"
(post test) [ PRE,F, 7/14]

dejected — "Sad, you don't feel very well/ Something has happened, or you don't feel very well/(post test) [CH, UK, 8/6]

dendrochronologist — "Is it a made up word? Some kind of scientist/ Ologist/ Psychologist means your're/ Ologist means you're a scientist/ You study Psychology/" (pretest)

—*Written Activity entry on 8/4*
*Advertisement For Dimetapp II*
*"I am a dendrochronologist. I had heard of a forest that had been chopped down. So I sailed across the ocean. When I got there I had forgotten my dimetapp and they sold none there. So I had to go home and get it.. When I came back the stumps were hauled away and the rest was crumbled. Life has an uncanny twist to it. I forgot my dimetapp and now my life is ruined."*

— "Someone who studies trees for age and health/ Look at bark and rings in the center of them/ (post test) [WR, UK, 8/4]

diabolical —"Evil, devilish/ If you give a diabolical laugh — Hah, hah, hah, huh! (she demonstrates)/"(post/post test) [CH,UK, 8/5]

discontent — "Not content, not happy/ There is a Far Side one — a cow all dressed up/ Her husband is William, and she says, 'William, I'm not content!' " (pretest)

disheveled — "Like in 'What About Bob?', Lee Marvin was disheveled for the surprise party/"
(pretest) [Source — Movie]

distinguished — "Tell them apart/ Like twins/ (post test) [ WR, UK, 7/8]

—"In this book I read was the expression — "a chip off the old block/ A woodman cut off a little piece of wood from a large piece of wood/ He said it — "a chip off the old block" — to distinguish it from the rest of the wood. If a girl is like her father, we now say she is a "chip off the old block."

DNA — "DNA is two strands — one from the mother and one from the father, and they have the genes on them for what they are going to be like in a fly/ The mother has one white eye and one red eye and the other one has white eyes/ They will probably all come out with white eyes/"
—"Why?'
-"Because of the (pause) Ohwah! Something square/ The (pause)
—"What does it mean? One gene is what over the other?"—
— "Well, take this box/ Mommy, I want to draw this/"
— "Okay, draw it on the back/"

– " Okay/"
– "I didn't know you knew about this/"
– "Oh, I do know/ It's in science/"
– [ draws it on back] "Oh, it's a pennant square!" (pretest)

dynamo – "A superhero or someone who's dynamic/ Dynamic means you have lots of energy/ Probably came from the word dynamite or dynamite came from dynamic/"

efficient – (I wash washing her hair while she was taking a bath) She commented, "What is the word I'm looking for? EFFICIENT! That is an efficient way to take a bathe and wash my hair/" (usage) [WR, F, 7/1]

– *Written entry in school on 10/19*
*"Class representatives have to be organized. They must not lose their note-taking book. It would be efficient if they take neat notes. If the notes are messy and disorganized, the representative may have a hard time telling class about the meeting."*

emphatically – "Showing a lot of emphasis and detail/ Emphasizing pain or sorrow/ Really showing it/(pretest)

engrossed – "Full-fledged/ Her whole self was given to her work/" (pretest after sentence)

– "If I was so engrossed in this book, when you talk to me, I wouldn't hear what you said/ To concentrate on it so much/ (post test) [PRE,F, 7/8 ]

exertion – "To put yourself to the limits/ You do as much as you can/ You have a lot of energy and you use it/" (post/post test) [PRE, UK, 8/6]

exterminate – "Kill/ Like you exterminate cockroaches with Raid/" (pretest)

faculties – "Does she complete her vital faculties well? Senses, responses to stimuli, life functions/"(post test) [PRE, UK, 8/17]

falsetto – "A high voice/ With a false face, a false horse, and a falsetto voice/" (post test) [CH, F, 7/30]

faltered – *Written entry in school - 10/13*
*"He showed valor when there were storms, food shortages, and fear of death on the ship's voyage, and his courage never faltered."*

fawning – "A lackey is fawning/ They are always willing to do what you want and it makes you sick/"(post/ post test) [REP, UK, 8/17]

– "Willing to serve you/ Willing to do whatever you please/ Like a lackey – *fawning*/" (usage to define obsequious on post/post test)

flabbergasted – "Amazed, *dumfounded*, in awe – you can't speak." (post test) [CH, F, 7/29]

fodder – "Food for cows and horses/ Grain or something/" (post test)(See "1" above) [WR, UK, 8/6]
– "Food for cows and horses/ Hay or grass/"
(post/post test)

forbode – *Written Activity entry on 6/30*
*"She was mortified at the foreboding look he gave her. This weather forebodes me to leave Jenny's."*

frumpy – "Nadine is a frumpy woman/ Messed up/ Doesn't wear things that match/ Her hair is hardly ever combed/ She has been making that sweater for four years/ Get it?/ You are not frumpy/ (post test)[WR, UK, 7/14]

furrows – "The furrows in the ground caused Mrs. Frisby [character in book in study] to trip/ Furrows are the place you plant seeds/"(pretest)

groping – "Perseus, I presume, stole the grey sister's eye/ This is in the Greek myths/ They groped around because they could not see/ " (pretest)

haughty – "What I am sometimes – conceited/" (pretest)

impertinence – " 'Such impertinence!' Rudeness/ If I said (she uses a high voice), 'You are the ugliest, fattest woman I have ever seen!" (post test)[CH,UK, 7/14)]

illusion – "All the pages are flipping like in a flip book/ Like someone waving a hand/ It looks like a moving picture if you flip it/" (pretest)

indulgent – "He was so indulgent in his work/ He was paying attention/ Like sometimes when you are on the computer, you are so indulged, you don't hear me/" (pretest)

infectious – "It catches on like a cold/ When he laughs, everyone laughs." (pretest after sentence, 8/12)

inkling – "Is it a little bird? Little, small/ The Irishman said, 'Why he's only a little inkling/" (post/post test response to word) "Idea, thought/" (post/post test response to sentence) [PRE, F, 7/2]

intense – "Incessant/ The incessant scratching sound or drone of bees made her dizzy/" (pretest)
– "The intense heat/ There's lots of it/ Hard/ If a person is intense — 'OH NO! You've got to tell me! There is no way you're getting out of this!' Girard in school yells at people when they throw the ball at him, and he doesn't catch it. And he yells at them when he throws it, and they don't catch it/ (post/post)

intriguing – *Written Activity entry on 7/7--*
*"The museum was intriguing and beckoned me to go on."*

"Beckoning you/ You're left on a cliff hangar." (post/post test, 12/28)
[WR, UK, 7/7]

intruder – "He intruded on her party/ He wasn't invited/ To go someplace you're not invited/ You're a trespasser/ (post test) [ REP,UK, 7/2]

listlessly – "Sick with dark circles/ Anything to do with *dejected, wistful*, aimless/
(post test)[CH, F, 8/11]

liquivated – "Liquidated, turned to liquid/ That's our definition for it/" (post test)
[WR, UK, 7/29]

– "Liquidated/ Turned to liquid/ We said it meant 'made to disappear with water'/" (post/post test, 12/29)

loped – "With swinging stride with swinging arms taking large steps/" (She demonstrates.) (post test) [ WR,F, 6/22]

– "That was one of our first words/ Happy stride/ Swinging arms/" (she demonstrates)

medley – "Things of different varieties/ Like on our shelves was a medley of different things/ They didn't have anything to do with one another/" (post test) [CH,F, 7/2]

manipulated – "Tricked into doing something/ I manipulated Rachel/ I challenged her puppet, and she ended up putting away all the books we both took out/" (post test) [ WR, F, ]

meddling – "Messing with/ It means muddling/ Poke your nose in someone else's business/ If the someone else is you, it's not really meddling/" (post/post test) [PRE,UK, 8/5]

medley – "A bunch of different things/ A lego, a case to a cassette, a top to a money holder/ Those three things could be a medley of things/ Probably/ It's usually more/" (post/post test, 12/28 ) [CH, F, 6/2]

mortified – *Written Activity entry on 6/30*
*"She was mortified at the foreboding look he gave her.*
*He was mortified when he was beaten up by a girl."*

mutation – "The turtle, Beebop and Rock Steady are mutations/ Because of something wrong with parents – to change in some way that isn't pretty, but it could be pretty/"(pretest) [CH, F, 7/6]

mystic – "A drink/ It's also a person who magically can see into the future/ It's like a psychic – an Egyptian woman – a fortune teller/" (post test)[Pre, F, 7/30]

negotiated – "There are two people who want to figure out something/ On Lamb Chops, they talked about an allowance of more than a penny/ She told Sherry she wanted a hundred dollars. Charles horse became her negotiator/ He negotiates with Sherry/ They list expenses/ What about the other $95? It's miscellaneous/ Charlie Horse tells what the employer wants and what she'll give/ It ends up with $.10/ " [Source – Used by father (UK on pretest) Also, Lamb Chops on Channel 13]

neurologist – "A scientist who studies neurons, cells, atoms, neurons, the brain, and the cerebellum/" (pretest)

obsequious – "Willing to serve you/ Willing to do whatever you please/ Like a lackey/ *Fawning*/"(post/post test) [WR, UK, 8/18]

omen – "Sign/ Like if a black cat crosses your path or mirrors break/ Omens of bad luck/ A good omen for Noah were the dove and the leaf – of land/" (pretest)

outcroppings – "Rocks of minerals that are sticking out of the ground/" (post test) [ WR,UK, 7/13]

– "Stone or gems stuck up from the ground/ Like limestone found in layers of the earth/"(post/post test)

parasite – "Like a tick or a flea/ Something that annoys someone/ Bothers, aggravates, eats your flesh/ (pretest)

pell-mell – "Ziggity-zaggity/ Every which way/ He wouldn't do it in an orderly fashion/" (post test)[CH, F, 8/13]

–"All over the place/ Sort of crazy/ Put shirt on, pants on, eat breakfast, take bus, put on shoes at work – then your jacket/ To do something in not any particular order/"(post/post test)

perceive – "To hear/ To get what the person means/ Like 'keifing' in Swiftly Tilting Planet or A Wrinkle in Time. You feel it/ It's communicating without speaking/

perilous – "You are full of danger/ You smoke or do drugs/ A famine, infestations of locus, hunger, pain/ Like the seven deadly sins or plagues/ (post test)[WR, F, 8/7]

perseverance – "Oh my god/ I can't explain it/ Stubborness/ He stuck to what he was doing/(pretest after sentence)

– *Written Activity entry – "Perseverance List – Marie Curie (She didn't let them debase her because she was a woman. Wright Brothers (People said that since humans did not have wings they could not fly.)*

– "Stubbornness, ambition/" (post test)

– *Written entry in school - 10/13*
*"Although he had villainous qualities, when the going got rough, he persevered."*
[WR, F, 8/13]

– "You stick with it/ If you have something you're doing, you're not going to stop until you're done/" (post/post test)

persisted – "Keep on going without stopping/ If you make a mistake, you try over again/ That's one meaning/ Another meaning is to be *persistent*/ You keep asking until someone tells you where it is if it is a surprise/" (post/post) [PRE, UK, 6/23]

petrified – "Scared/ In a petrified forest the wood is dead and it looks like they have dead faces/ In cartoons they use petrified forests/" (pretest, K)

–"Scared to death/ If there is petrified wood, it's been so cold, it gets as hard as stone, and it is stone/" (post/post test)

politician – "Someone who works with a government/
They are *manipulative*/ They sometimes take care of people/ George Bush didn't really take care of us/ Examples of politicians are Bill Clinton, Mario Cuomo, George Bush, Calvin Coolidge, Abraham Lincoln, George Washington, and Aunt Marcia/ (post/post test) [pretest, K, 7/31]

precocious – "Handle emotions well/ Know when to show them/ Controlled them for age/ Precocious means more mature than average for your age/"
(post test) [PRE, F, 8/20]

–"Highly developed for your age in any one of many ways/ Everyone says / I don't mean to brag/ But I think it's true/ Everybody says I'm precocious in my vocabulary/ Chris Diaz is precocious in music/ And Lizzie is precocious in art/ And Hesed is precocious in trivial things/" (post/post test)

prefer – " 'I would prefer the red velvet', said Madame DuQuane/" (pretest) [ Source – old dignified female character from a book in the study.]

preservation – "To preserve something/ To keep it so it doesn't rot away/ They preserve animals in alcohol/" (pretest after sentence, 8/12)

– "To preserve/ To keep it new so it doesn't run away after it dies/ A mummy is preserved/" (post test) (CH, F, 8/12]

– "To keep it/ Like land/ You're keeping land clean and safe/ You can preserve food, but it's not what we're talking about/" (post/post test)

presumably – "Probably. Lady Aberlin, I presume!"(pretest)
[Source – TV show – Mr. Roger's Neighborhood]

primeval – "A primeval forest would be an early forest before the beginning of time - B.C./"
(post test) [WR, UK, 6/24]

process – "To process a paper – to fax. Different parts working together/"

prominent – "Something that sticks out/ A prominent nose/ If you are a prominent person, you stick out/ You are important/ (post/post test) [WR, UK, 8/5]

protruded – "It means only the tip/ I have this hole/ My finger is a mole/ It's a snake and the very tip of the snake protruded from the hole/ You could see it/ It showed/
(post test) [CH, UK, 6/22]

– "What is that *protruding* from Club Glitter?" (She nonchalantly asked in reference to child's fort erected on the beach – 6/25)

provoked – "taunted, bantered – no taunted/ Believe me I know! This provoked her very much and she sent her out of the room/ It means bother/" (pretest)

purification – "On Yom Kippur you have to atone for your sins..... (pretest)
– "Making sure that something is clean/ Like if you purify milk, you get all the dirt out/"
(post/post test)

radiated – "Like come out from the center/ This is the radiation point and my fingers are coming out from the radiation point/" (She points to the center)
(post test) [CH, F, 7/1]

railed – "Chattered, talked, and complained on and on/ 'And This and This and This! And then – my father would have given me this/ Talk about Tough Fathers!" ( post test) [ WR, F, 7/14]

reaction -- "If Grandma died, I would cry and be mad/
It's a response/" (pretest)

recommending -- "Advising to give or buy/ Recommend a product/ (pretest)

rejuvenator -- "Something like the fountain of youth because it revives you/ The word juvenile/
To make someone young again/ (pretest)

relished -- "Loved it/ If you eat something with great relish/ In the book, Ginger Pie, this kid
thinks its catsup or mustard/

revive -- "To have *respite [WR, UK, 6/24]* / To refreshen your mind -- to lose all your
worries/" (pretest after sentence, 7/15) [PRE, F, 7/15]

-- "In Batman, cats revived catwoman/ Brought her to life/" (post test) [Source -- Movie]

scrupulously -- (UK) *Written Activity entry on 6/25*
*"Shelly scrupulously shussed Sarah."*

--"Carefully looking for mistakes/ Making sure you don't make mistakes/ (post/post
test) [WR, UK, 6/25]

scrutiny -- "He checked his test with scrutiny/ Carefully/" (post test) [CH, UK, 7/1]

simultaneously -- "We had that in school in a Wrinkle In Time when the children were
bouncing the ball and jumping at the same time/ (pretest)

spite -- "Mean, wickedness, evil, jealousy/ Out of spite Snow White's godmother gave her the
poison apple/ (pretest)

staggering -- "A large amount/ A person with a staggering weight would be Walter
Hudson/ New, like in "Big", a mechanical comic book which is quite staggering -- a
little uncanny, bright, incredible, mind-blowing/ If somebody has done the
impossible/ So brilliant and clever/" (post test) [PRE, F, 7/29]

-- "Such a surprise/ Amazing or walking around and tripping/" (post/post test)

starlet -- "A pretty good name for a horse, a dance or a ball outside/" (pretest)

-- "A starlet is just becoming a star/ They are just starting to be famous/"
(post test) [CH, UK, 7/29]

-- "Someone who is going to become a star/ Usually a woman in her twenties or teens/"
(post/post test) [CH, UK, 7/29]

steroids -- "Some type of medicine to make them do better -- to not get drowsy -- give them
an antidote/ If you are given the wrong medicine and you drink a concoction and it
blows you up/ You have to find an antidote to turn it around/ (pretest)

subsiding -- "Fading/ When I got in the tub, my hand was hurting like crazy, but then the pain
was subsiding/ It felt moderately okay/ (post test) [ WR,F, 7/1]

tirade – *Written Activity entry on 7/2*
*"Their father's speech sounded more like a tirade."*

uncanny – "It is an English word/ I asked Poppa/ It sort of means poppycock – crazy – Peter Pan poppycock – unbelievable/ (pretest after sentence)

vantage – "It was the best place to see the game/ Advantage and vantage are one of the world's mysteries/ They mean exactly the same thing/ (post test) [CH, F, 6/24]

ventilated – "Like in Nimh/ The way they escaped was through the ventilation pipe/"

voluminous – "very luminous/ Lots of light/ Fire crackers are very luminous/" (pretest)

*–Written Activity entry on 7/2*
*"The voluminous and tall bookshelves in the Library of Congress made her dizzy."*

– "many millions/ volumes (post test)
[WR, UK, 7/2]

waning – *(F) Written Activity entry on 6/25–*
*"With her laughter waning*
*She went into airplane training*
*Her train went mad*
*And we are all sad*
*Because she got an "F" in training"*

wistful – "When I think of that word, I think of another word – misty/ You're lonely and wishing you could do something, and your head is in the clouds/" (post/post) [CH, F, 6/30]

wryly – *Written Activity entry on 7/24 – "Rachel wryly said to Dash, "You know what you are? You are a paramecium. A paramecium is a one-celled animal with lots of hair sticking out of it. So is Ben."*

– "She like said, 'Is that so? Then why yesterday did you say that the wolf was the most ferocious thing you saw when it was just a little cub? It's a matter of being at the place at the right time/ (post test) [WR, UK, 7/24]

## Appendix J. The Children's Thoughts About The Word Learning Process.

### Appendix J - 1. D.C.'s Thoughts

"Every word I always thought had a picture/ Like by the ocean or bay/ Fighting has a picture of two dinosaurs -- a tyrannosaurus and a green diplodocus/"

12/27 Conversation with Mother

-- I'm just asking/ I know what easy and useful mean, but do they have anything close?"

-- What, honey?

-- I know what easy and useful mean, but are they close//

-- "Useful/ Something easy and something useful? No/ Something could be easy to do and it wouldn't be useful/ Useful means you can us it for something/ It's good for something/ It could be easy and useful too, but they don't necessarily have to be/ They don't mean the same thing/ They mean different things/

-- "Are they close though?"

-- "No/"

-- "At all? One tiny//

-- "No/ Nothing to do with one another/ Something could be easy and useful, but they don't mean the same thing at all/

-- "So -- they're opposites/"

-- "So! That doesn't mean that/ Okay, that's true/ They're not opposites/ But they don't have anything to do with one another/"

-- "So they're//

-- "There are not only words that mean the same thing or similar things of the opposite/ There are lots of other words that just don't have any relation to one another/ And 'useful' and 'easy' don't have any relation to one another unless it happens to be that something is easy and useful, but they're only relation is that thing that you're doing/

-- "But, Mom//

-- "It's easy to set the table/ It's also useful to set the table/"

-- "So, Mommy, Mommy wait/ Wait//

-- "C'mon/ We have a lot to do/"

-- " It is/ Say there was a compass rose (he loves Social Studies)/ And 'useful' was at the top/ And 'easy' was at the East/ And so that's pretty far away/ It's like that/

-- "No/ It doesn't have anything to do with that -- no relation/"
(The following day I listened to the tape to clarify and questioned him about it again. He said he meant that the e compass rose would be a 'useful' instrument to map a word's relation to another, and he drew what he meant.

**useful**
**N**

**hard** **easy**
**W** **E**

**worthless**
**S**

**12/29**

(In defining the word approval on post/post test)

"Like at first in basketball I was the worst/ But now there's a big approval/"
--"You mean improvement? Are you confusing improve with approve?"
--"Yeah/ West and Southwest they are -- improve and approval/"

**Appendix J - 2. M.L.'s Thoughts About The Word Learning Process.**

" No idea/ My dictionary has gone to the far corners of my brain and there is no prevail/"
-- "What does that mean?"
-- " Did not succeed/"

--"You know what/ Sometimes -- people use words that they don't even want to use/ To impress people/
And miraculously it fits right in with the thing inconspicuously/"
--"Do you know what that means?"
--"Unnoticeable/ But remember before I had this thought that the next thing was going to begin with "h"? Well, I think that part of my brain knew that I had an idea/ [Words were alphabetized but she didn't
know it.]

*--Written entry from her speech in her campaign for U.S. president on 11/7*
*"Read to your children. It will give them ideas. They will learn. They will have higher vocabulary levels.*

## Appendix K

### Sentences Within Which D.C. Heard Repeated Stimulus Word *Glimpse*

### In Researcher's Reading of Book, Sign of the Beaver

p. 9 -- "Twice he had glimpsed a deer moving through the trees just out of range of his rifle."

p. 23-- "Peering in, he could just glimpse, far inside, the golden mass of honeycomb."

p. 87-- "For the first time Matt glimpsed how it might be for them, watching their old hunting grounds taken over by white settlers and by white traders demanding more skins than the woods could provide."

p. 121-"Twice he had glimpsed a caribou moving through the trees, but he had little hope of bringing down any large animal with his light arrows."

# Appendix L. Tables of Words in Variable Categories For D.C. and M.L.

**Table A-1**

**Number of Grammatical Categories In Activities**

**For Sets of Post and Post/Post Tested Words**

| | Post-Tested Only Words | | | | | Post and Post/Post-Tested Words | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 260 Word Set | | | | D.C. | 156 Word Set | | | | |
| | Grammatical Categories | | | | | | | | | |
| Activities | N. | V. | Adj. | Adv. | Total | N. | V. | Adj. | Adv. | Total |
| Written | 22 | 16 | 15 | 12 | 65 | 14 | 11 | 9 | 7 | 41 |
| Charade | 23 | 22 | 16 | 11 | 72 | 15 | 12 | 8 | 7 | 42 |
| Pretest | 22 | 18 | 21 | 7 | 68 | 11 | 12 | 12 | 3 | 38 |
| Rep 3x's+ | 14 | 22 | 12 | 7 | 55 | 11 | 14 | 7 | 3 | 35 |
| Total | 81 | 78 | 64 | 37 | 260 | 51 | 49 | 36 | 20 | 156 |

**Table A-2**

**Number of Grammatical Categories In Activities**

**For Sets of Post and Post/Post Tested Words**

M. L.

| | Post-Tested Only Words (207 Word Set) | | | | | Post and Post/Post-Tested Words (153 Word Set) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Grammatical Categories | | | | | | | | | |
| Activities | N. | V. | Adj. | Adv. | Total | N. | V. | Adj. | Adv. | Total |
| Written | 20 | 18 | 18 | 9 | 65 | 16 | 11 | 12 | 7 | 46 |
| Charade | 25 | 19 | 17 | 10 | 71 | 18 | 13 | 10 | 5 | 46 |
| Pretest | 17 | 18 | 12 | 4 | 51 | 16 | 13 | 9 | 4 | 42 |
| Rep. 3x's+ | 9 | 6 | 2 | 3 | 20 | 9 | 6 | 2 | 2 | 19 |
| Total | 71 | 61 | 49 | 26 | 207 | 59 | 43 | 33 | 18 | 153 |

**TABLE A-3**

**Number of Language Frequency Categories For Sets of Post and Post-Post Tested Words**

| | Post Tested Only Words | | | | Post and Post/Post -Tested Words | | | |
|---|---|---|---|---|---|---|---|---|
| | D. C. | | | | | | | |
| | 260 Word Set | | | | 156 Word Set | | | |
| | Language Frequency Categories | | | | | | | |
| | Low (1) | Medium (2) | High (3) | | Low (1) | Medium (2) | High (3) | |
| Activities | | | | Total | | | | |
| Written | 55 | 8 | 2 | 65 | 37 | 2 | 2 | 41 |
| Charade | 64 | 7 | 1 | 72 | 42 | 0 | 0 | 42 |
| Pretest Only | 58 | 6 | 4 | 68 | 33 | 3 | 2 | 38 |
| Rep. 3x's + | 35 | 10 | 10 | 55 | 22 | 9 | 4 | 35 |
| Total | 212 | 31 | 17 | 260 | 134 | 14 | 8 | 156 |

## TABLE A-4

### Number of Language Frequency Categories For Sets of Post and Post-Post Tested Words

| | Post Tested Only Words | | | | Post and Post/Post -Tested Words | | | |
|---|---|---|---|---|---|---|---|---|
| | M. L. | | | | | | | |
| | 207 Word Set | | | | 153 Word Set | | | |
| | Language Frequency Categories | | | | | | | |
| | Low (1) | Medium (2) | High (3) | | Low (1) | Medium(2) | High(3) | |
| Activities | | | | Total | | | | Total |
| Written | 56 | 6 | 3 | 65 | 40 | 4 | 2 | 46 |
| Charade | 68 | 2 | 1 | 71 | 46 | 0 | 0 | 46 |
| Pretest Only | 49 | 1 | 1 | 51 | 39 | 2 | 1 | 42 |
| Rep. 3 x's + | 17 | 2 | 1 | 20 | 16 | 1 | 2 | 19 |
| Total | 190 | 11 | 6 | 207 | 141 | 7 | 5 | 153 |

TABLE A-5

Number Of Words In Book Types By Activities

For Sets of Post and Post/Post Tested Words

**D.C.**

Post-Tested Only Words — Post & Post/Post-Tested Words

Book Types

260 Word Set — 156 Word Set

| | Fact | Fantasy | Total | Fact | Fantasy | Total |
|---|---|---|---|---|---|---|
| Activities | | | | | | |
| Written | 27 | 38 | **65** | 20 | 21 | **41** |
| Charade | 28 | 44 | **72** | 15 | 27 | **42** |
| Pretest | 31 | 37 | **68** | 17 | 21 | **38** |
| Rep. 3X's+ | 30 | 25 | **55** | 18 | 17 | **35** |
| Total | 116 | 144 | **260** | 70 | 86 | **156** |

TABLE A-6

Number Of Words In Book Types By Activities

For Sets of Post and Post/Post Tested Words

**M.L.**

| Post Tested Only Words | | | | Post & Post/Post-Tested Words | | |
|---|---|---|---|---|---|---|
| Book Types | | | | | | |
| 207 Word Test | | | | 153 Word Test | | |
| | Fact | Fantasy | Total | Fact | Fantasy | Total |
| Activities | | | | | | |
| Written | 28 | 37 | **65** | 20 | 26 | **46** |
| Charade | 28 | 43 | **71** | 18 | 28 | **46** |
| Pretest | 23 | 28 | **51** | 16 | 26 | **42** |
| Rep. 3X's+ | 10 | 10 | **20** | 10 | 9 | **19** |
| Total | 89 | 118 | **207** | 64 | 89 | **153** |

CHAPTER 5

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