AN OBSERVATIONAL STUDY OF THE DEVELOPMENTAL SEQUENCE OF ONE-TO-ONE CORRESPONDENCE IN YOUNG CHILDREN'S COUNTING AND READING

By

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ABSTRACT

This study investigated one-to-one correspondence as a basic cognitive function of young children, by examining its application to children's counting and to their recognizing words in beginning reading. Over the course of nine months, data was gathered on a total of forty children in three settings: preschool (3.5-4.5 years), ECS (4.5-5.5 years) and grade one (5.5-7 years). As the purpose of the study was to generate hypotheses, rather than test them, an observational, rather than experimental, design was used. Children's ability to match spoken number words to objects when counting was compared to their ability to match spoken words with their written counterpart in an attempt to discover an underlying learning pattern based on one-to-one correspondence. One-to-one correspondence in reading and the child's concept of word were explored through the use of the child's own words in a key vocabulary approach based on the model of Sylvia Ashton-Warner. The responses of three children, referred to as "key incident children," were described in fuller detail as they highlighted certain points of the study.

Three major hypotheses were proposed. The first suggests a developmental continuum in a child's counting that may have a parallel continum in her reading. The second hypothesis proposes that a certain level of one-to-one correspondence in counting may be a prerequisite for beginning reading and the third deals with the possible predictive nature of the relationship. The practical value of a better understanding of one-to-one correspondence in children for teachers of both normal and special needs children is discussed. Limitations of the study and suggestions for further research are included.

(supervisor's signature)

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Note to the reader: The pronoun her has been used throughout this study to include both his and her. A choice of one to represent both was made in the interests of brevity and ease of reading.

CHAPTER 1

INTRODUCTION

PURPOSE OF THE STUDY

Current research in early childhood education has focused on the problem of how children first begin to read. Traditionally, the emphasis has been on developing tests and activities for reading readiness. Recent attention, however, has been directed toward the conceptual basis of print awareness (Hiebart, 1981; Ferreiro & Teberosky, 1982) and on how children develop a concept of word.

In past studies, children's understanding of instructions and their understanding of the term word were measured as well as their concept of word as a linguistic unit. Children are more likely, for instance, to recognize content words as words, before function words, and they may do so without attaching the label word to them (Bowey, Tunmer & Pratt, 1984).

The definition of a word is a metalinguistic property. A child's concept of word itself precedes this metalinguistic awareness (Bowey, Tunmer & Pratt, 1984). Metalinguistic awareness, as defined by Garvey (1984) is the "ability to distance oneself from the immediate use of language and to attend objectively to its form or meaning, isolating and manipulating, for example, some aspect of linguistic structure" (p. 213).

In other words, a child can know what a word is before she can define it (a metalinguistic task), just as she can know what ice cream is long before she is able to give an accurate definition of it.

Numerous studies support the position that a child's concept of word precedes metalinguistic awareness and is essential before reading begins: (Downing, 1969; Reid, 1966; Schickendanz, 1982; Henderson, 1980; Morris, 1980; Johns, 1980, Bowey & Tunmer, 1980; Lundberg & Torneus, 1978). Other studies, however, argue that either learning to read is necessary to produce lexical awareness or, from a Piagetian point of view, that the two are correlates, i.e., the emergence of general cognitive capabilities underlies reading acquisition and word consciousness (Ehri, 1979). This paper intends to explore the possibilities of this last position.

One of these general cognitive capabilities may be one-to-one correspondence. One-to-one correspondence as understood by most people is the "pairing of each element of a set uniquely with an element of another set" (Webster, 1983).

The work of Papandropoulou & Sinclair (1974) and Ferreiro & Teberosky (1982), in particular, have brought the study of word concept formation into a Piagetian framework. These word concept studies, however, have largely been done using adult words read by the child. To support these findings, an area needing further research is that of using the child's own words to reflect the development of the concept of word.

Concepts, like the concept of word, are based on generalizing from a host of specific examples and develop gradually as

experience with specific examples grows. How a child learns where one utterance or word ends and another begins, or how to match spoken utterances with their printed form is a complex issue. Observing how a child establishs a key vocabulary, a component of this paper, may help in understanding this process.

Teachers may take for granted that beginning readers, whether normal or developmentally delayed, know that one spoken word corresponds to one written one when, in fact, this cognitive ability may not yet be present in some beginning readers.

References to links between one-to-one correspondence in counting and in beginning reading are mentioned, in passing, in current studies (Ferreiro & Teberosky, 1982). This study seeks to investigate that link further and to compare research findings that support similarities in cognitive function.

Research suggests that the one-to-one correspondence that children use in counting objects may involve cognitive processes similar to those that children use when mapping or matching spoken words to print and developing their concept of word. Ferreiro and Teberosky (1982) explore the logic of one-to-one correspondence as it applies in both math and writing:

> This problem of establishing correspondence between elements considered to be units is not exclusive to print but is not alien to it either. One-to-one correspondence engenders some of the basic logical structures. Educational psychology in mathematics has come to realize that it has a great deal to do with the psychogenesis of the notion of number. Assuming that it has much bearing on the system of written language seems to require some justification. Our response to this is simple. Comprehending the writing system is a process of knowledge. The individual has a logical structure that serves both as the framework and as the instrument for defining the characteristics of the process. The

> individual's logic cannot be absent in any learning which takes the form of an appropriation of knowledge (p. 151).

In the realm of mathematics, children seem to establish one-to-one correspondence by counting concrete objects and by mapping the appropriate spoken number with the appropriate object or by setting up a simple correspondence between two equivalent sets. When children are forming their concept of word, that too involves mapping the appropriate spoken word with the appropriate word in print (Tunmer, Bowey & Grieve, 1983).

To continue the comparison, in mathematics, the physical manipulation of objects is crucial in stimulating active thinking. The kinesthetic level of touching, turning, rearranging objects reinforces what is happening on the cognitive level (Kamii, 1985). A parallel to this could be said to occur when beginning readers manipulate their own words in written form. When children see their own words in print (words that carry a lot of meaning for them) and they are able to carry them around on cards, trace the letters with their fingers, show them to other children, rearrange them in sentence form, a similar sort of kinesthetic support is provided to stimulate active thinking in the reading process.

Clay, as cited by Templeton (1980), supports the view of words as objects by stating that the use of the pencil is critical for young children, because it allows words to be "concretely and intellectually experienced" (p. 24). Ferreiro and Teberosky (1982) also support this notion by saying "...children in their exploration of written language....carry out a series of specific

actions similar to those they carry out on physical objects" (p.285). Written form lasts, whereas spoken language disappears. Print has a "consistency and a permanence oral language does not have" (p.285).

Given these views on correspondence, it is proposed in this study that the development of one-to-one correspondence is a basic process underlying a child's ability to read, write and count. A knowledge of word concept is one component of this process as is the manner in which children count objects. Understanding more of the relationship between correspondence in reading and correspondence in counting would be of practical value to teachers as well as add to our overall understanding of a child's cognitive development.

STATEMENT OF THE PROBLEM

This study was designed to examine the relationship between one-to-one correspondence in counting and one-to-one correspondence in mapping spoken words to written ones and to provide an analysis of this comparison.

The term mapping (used by the Nuffield Primary Math Program (1970) when matching objects in sets) refers, in this study, to the one-to-one correspondence between the spoken word and its written equivalent. This study was designed as a response to the question:

> Does mapping spoken number-words to physical objects parallel the mapping of spoken words to written ones?

A study of this nature has both a theoretical and a practical purpose. Of theoretical importance is the delineation of one-to-one correspondence as a basic thinking skill that may underlie both counting and reading behavior in young children. The particular contribution of this study is to extend previous work on one-to-one correspondence by investigating the relationship of a child's counting behavior to the same child's reading of her own written words.

With respect to the practical issues, this study was designed, first, to determine if mapping spoken numbers to physical objects (counting) precedes the mapping of spoken words to print, since counting is more concrete. The manipulation of concrete objects, like blocks, would seem to be easier than manipulating symbols, that is, written words that represent thoughts/spoken words. Although, if we are dealing with a basic cognitive process, development in the two areas may parallel each other in some form.

Second, this study was designed to help teachers gain insight into the reading process. If it were demonstrated that one-to-one correspondence in counting precedes one-to-one correspondence in reading, that one might say that a child who lacked one-to-one correspondence with counting objects might not have one-to-one correspondence with print, and consequently might be lacking a concept of word. Even the language experience approach, according to Harste, Woodward & Burke (1984) assumes a spoken language to written language correspondence. If word concept (implied in one-to-one correspondence) is necessary for reading, then a teacher

would not expect a child at this level to be ready for formal reading instruction.

A third area of practical significance for this study lies in the area of special education. Studies (Henderson, 1980; Reid, 1978) indicate that most special needs children follow the same developmental patterns as normal children, but at a much slower pace. Understanding how normal children begin to read and write might be one way of assisting the special needs teacher in planning developmentally appropriate reading activities, by identifying where a special needs child is on a normal continuum of beginning reading/writing.

Ashton-Warner's (1963) key vocabulary approach was chosen for this study rather than adult imposed vocabulary since, whenever an adult poses a task for a child to do, a note of ambiguity may be introduced. It is sometimes difficult to be sure that what the child is asked to do is understood by her in the same way that the adult understands it.

Hiebart (1981) points out that research is available on the acquisition of reading skills in formal instruction, but little on the naturalistic learning of reading. Looking at the reading process through the child's spontaneous writing may be one way to make reading research more naturalistic. Recent studies (Torrey, 1979; Dyson, 1984; Templeton, 1980; Morris, 1980; Gelman and Gallistel, 1978) support the use of a child's own words as more accurately reflecting cognitive abilities in beginning reading.

> One of the main questions in this study is: How does the way a child goes about establishing a key vocabulary reflect her knowledge of word concept and one-to-one correspondence?

The key vocabulary approach used in this study, as a basis for children writing their own first readers, involves words of particular interest to each child elicited by the researcher, written on word cards and eventually typed in small books to be used as a vehicle for observing the child's mapping of oral words to their printed form. The term reading/writing, which appears throughout this study, is used to represent this process.

By observing how the child goes about this task of establishing a key vocabulary, it may be possible to determine where the child stands in relation to the development of word concept and the subsequent one-to-one correspondence. These observations will be compared with the child's grasp of one-to-one correspondence in counting as demonstrated during regular math asignments or play as well as during structured counting exercises. Parallels between the development of one-to-one correspondence in both domains will be sought.

In addition to the key vocabulary activities in this study, samples of spontaneously written language may also be collected and analyzed for one-to-one correspondence (with Ferreiro & Teberosky's (1982) proposed levels of writing in mind) to more fully round out an understanding of the developmental reading level of each child. Support for this approach comes from Ehri (1979) who mentions the "influence which learning to write has on

the emergence of word consciousness, word identity"...."caused by the child's attempts to adapt to the productions of printed language" (p.28).

At least two other questions arise as components of the major thesis question. They relate to the manner in which children point when they count and read and whether a child who exhibits one-to-one correspondence with small groups of objects and/or words maintains that one-to-one correspondence as the groups increase in size.

Chapter Two contains a review of the literature on one-to-one correspondence and word concept as it relates to this study and clarifies how the questions to be addressed arise from that review. Chapter Three outlines the design of this study as it relates to addressing the questions posed in Chapter Two. A description and analysis of the data and their pertinence to each question posed in the thesis are presented in Chapter Four. Chapter Five contains a data discussion and an additional analysis of "key incident children." Chapter Six contains a summary of the research problem, methods and findings. A discussion follows of the hypotheses generated from the data and their possible implications. Limitations of the study are also noted.

GLOSSARY OF TERMS

COGNITIVE FUNCTION	the act or process of knowing (Webster, 1983)
CONSERVATION OF NUMBER	a number remains identical with itself whatever the distribution of the units of which it is composed (Piaget & Szeminska, 1952). In this study, children demonstrate that eight objects are always eight objects regardless of how they are arranged in space.
CONCEPTUAL CORRESPONDENCE	operational correspondence with lasting equivalence (Piaget & Szeminska, 1952). In this study the same definition as conservation of number (above) would apply. When counting with conceptual correspondence, children do not skip objects or count the same ones twice as they have an awareness of quantity. Used in contrast to perceptual correspondence.

KEY INCIDENT — concrete examples that clarify the principles being discussed, described in detail.

KEY VOCABULARY — approach developed by Sylvia Ashton-Warner (1963). The use of a child's own, most meaningful words, as a basis for writing and reading her first readers.

MAPPING — an object in one set matches uniquely with an object in a corresponding set; one specific spoken word corresponds to one written word.

METALINGUISTIC AWARENESS — ability to distance oneself from the immediate use of language and to attend objectively to its form or meaning, isolating and manipulating, for example, some aspect of linguistic structure (Garvey, 1984). Words seen as part of a meaningful whole, understood as elements of a sentence (Papandropoulou & Sinclair,1974) In other words, in this study, "Can a child give a definition of a term?"

ONE-TO-ONE CORRESPONDENCE — the pairing of each element in a set uniquely with an element of another set with lasting equivalence. In this study, this phrase generally refers to matching a spoken number

to its corresponding object or a spoken word to its printed form.

PECKING — the pointing and touching children do when counting objects/dots/ fingers even when the amounts (like dots on a die or fingers on a hand) are already known (Kamii, 1985).

PERCEPTUAL CORRESPONDENCE — one-to-one correspondence based on appearances, not on an understanding of number. Once appearances are altered, one-to-one correspondence ceases to exist (Piaget & Szeminska, 1952). In this study, objects are rearranged in space, children with perceptual correspondence may count some items twice and/or may not count others. Numbers are used as labels rather than as representing a definite quantity.

WORD CONCEPT — recognizing individual spoken words as having matching written form (as demonstrated by one-to- one correspondence) before being able to give a definition of what a word is.

CHAPTER 2

REVIEW OF THE LITERATURE

INTRODUCTION

How children form their concept of word has been widely discussed. This chapter reviews the literature on word concept as it relates, in particular, to the child's use of one-to-one correspondence in forming that concept. To clarify this relationship, many facets of one-to-one correspondence will be considered. The issues to be explored will be presented in the following order:

> The first issue to be addressed is that of mapping and its relationship to the concept of word and a child's own writing. How a child's writing, either done by herself or dictated to an adult, gives a good indication of her concept of word will be explored and her ability to map spoken words to print will be discussed.
>
> Comparisons of the cognitive basis of one-to-one correspondence in counting and in reading will be attempted on a practical level. The "pecking" that children do when counting and the pointing that they do

when reading may possibly be indicators of the same cognitive process.

The perceptual grasp of one-to-one correspondence as delineated by Piaget (1952) will be observed as it relates to conceptual understanding in both counting and reading. A child may recognize, perceptually, the number five (as a label) but not necessarily realize, conceptually, that five means an inclusive quantity of five things. This perceptual-conceptual contrast may apply to how children view words as they are beginning to read.

A comparison of Kamii's (1985) levels of one-to-one correspondence in mathematics with Ferreiro & Teberosky's (1982) levels of one-to-one correspondence in writing may help clarify correspondence as a cognitive function. One wonders if the steps children go through in counting parallel what happens in writing and in their development of word concept, as this would highlight the cognitive importance of one-to-one correspondence.

MAPPING AND THE CONCEPT OF WORD

Studies investigating the mapping of oral words to print have determined that mapping is an important element in beginning reading (Tunmer, Bowey & Grieve, 1983). Children do not come to grade one automatically knowing what a word is - visually or aurally. McNinch (1974) found that the correct perception of aural words was a significant predictor of reading achievement and that it may, in fact, be a prerequisite to learning to read. Written language maps onto spoken language at the level of the word when children realize that "one specific spoken word corresponds to one written word" (Tunmer, Bowey & Grieve, 1983, p. 569).

Ferreiro & Teberosky's (1982) studies have documented that children begin to read when they recognize that text and speech match, that print does not just label or tell about objects/people, but all of what the reader says is represented in writing. In the final stage of forming a concept of word, children realize that the order of the text in print has a one-to-one correspondence with the order of speech production (Miller-Jones & Gallagher, 1983).

Papandropoulou & Sinclair, in their 1974 study, emphasized the slow development in the child of the concept of word from indifferentiation between words to understanding words as a meaningful part of a larger unit. One-to-one correspondence develops between the ages of five and seven, but words are not seen as part of a meaningful whole until a child reaches age seven

or eight. Words are understood as elements of a sentence still later, between the ages of eight and ten.

By way of summary, it may be helpful to take a look at levels of beginning writing (Ferreiro & Teberosky, 1982; Ferreiro, 1978):

Level 1 The familiar scribble which carries meaning for the young writer. If an object is bigger, longer or older, there will be larger or longer scribbles.

Level 2 Writing must look different to convey different meanings. Scribbles become strings of somewhat recognizable letters. Since the child has a limited number of letters she can write, they are put in a variety of different orders to mean different things.

Level 3 Each letter stands for one syllable. The child changes from viewing her writing as representing meaning overall to representing sound segments of speech, a beginning of one-to-one correspondence.

Level 4 The notion of letters standing for syllables conflicts with an awareness of letters having their own sounds.

Level 5 Alphabetic writing. Children have broken the phonetic code and now sound out the words they are writing.

These levels serve as another perspective on the beginning development of one-to-one correspondence. At the first level, scribbles are not always differentiated into distinct parts and more than one spoken word may be mapped to one scribble. At the second level, spoken words begin to be mapped with the child's own written words even though the spelling is hardly conventional. During levels 3 - 5, children begin to take notice of mapping specific speech sounds to letters. Ferreiro & Teberosky go on to explain how one-to-one correspondence at the phonetic level develops, a more advanced stage for children, not explored in this study. Spontaneous writing samples will be collected, however, to be analyzed at the first and second levels using specific characteristics mentioned by Ferreiro & Teberosky's and described in this chapter (Table I).

Most studies have been done using words generated by adults, which could introduce variables other than word concept, such as lack of understanding of the directions or lack of interest. This study proposes the use of the child's own words as being more truly reflective of her concept of word. One way to tap the spontaneous words of children is to use an approach pioneered by Ashton-Warner (1963) in her work with young Maori children in New Zealand. The children were asked to tell the adult their

favorite, most powerful words to be written by the adult on word cards; these were used as a basis for their first readers.

Using this key vocabulary approach to investigate one-to-one correspondence leads to the first question:

> How does the way a child goes about establishing a key vocabulary reflect her knowledge of word concept and one-to-one correspondence in reading?

Before relating the two areas of word concept and one-to-one correspondence, however, it may be helpful to take a closer look at studies on one-to-one correspondence in counting and why correspondence may be considered a cognitive base for learning.

THE COGNITIVE BASIS OF ONE-TO-ONE CORRESPONDENCE

Children have a persistent habit of pointing to objects when they count, referred to by Kamii (1985) as "pecking." Although some children may know simple addition combinations by heart, they will continue to "peck" the dots on dice or count blocks or fingers if given the chance.

This behavior may be an indication of the need to establish the use of a basic cognitive function that may apply in all areas of learning, not just counting. The relationship between advances in counting and advances in writing involve not direct links but rather, procedures fundamental to both domains (Ferreiro &

Teberosky, 1982). Perhaps one-to-one correspondence is one of these procedures. Ferreiro & Teberosky go on to state that one-to-one correspondence in mathematics is a logical framework that serves in acquiring knowledge, be it numbers or words: "The individual has a logical structure that serves both as the framework and as the instrument for defining the characteristics of the process" (p. 151), although, as their studies are based on qualitative research, they provide little experimental evidence that this is indeed the case.

When children are establishing correspondence between number names and counted objects, they sometimes count the same object twice or repeat the same number twice. The same behavior applies with words when children write (Ferreiro & Teberosky, 1982). For example, when children are trying to establish correspondence between a spoken word and its written form, they may point to one word, such as RECORD, say "record player," point to PLAYER, and repeat "player" a second time, trying to make the words they know to be in the text come out even with the words they are saying.

Although Gelman & Gallistel's (1978) approach to teaching mathematics would probably look very different from Kamii's in an actual classroom setting, their study provides additional support for counting as indicative of a basic cognitive function. They "...postulate the one-one principle as a component of the cognitive structure underlying the development of counting behavior" (p. 90) and discuss the importance of counting as providing "the representation of reality upon which the reasoning

principles operate. That is, counting serves to connect a set of reasoning principles to reality" (p. 161).

Perhaps one-to-one correspondence is one of these reasoning principles that counting reflects. One of the characteristics of the early counting children do is described by Kamii (1985) as "pecking." When "pecking," children point to or touch concrete objects or markings as they count even when they can demonstrate that they know the sum without "pecking." This "pecking" may be needed as a reinforcement of a reasoning principle until the child reaches a stage where the reinforcement is no longer needed, "pecking" goes underground and counting is done quickly and visually. This same procedure may be at work when children point as they read and then gradually eliminate their need to point as one-to-one correspondence in reading becomes firmly established.

This could perhaps be compared to the way in which language, used aloud by the child to self-direct when doing a task, will go "underground" when no longer needed. However, when a task is difficult or a person under stress, this self-directing language surfaces again to help accomplish a task, as even adults can attest (Garvey, 1984). Perhaps under the same conditions, anyone will revert to "pecking" as well. If I stepped on a land mine, for instance, I would probably want to touch every toe as I counted just to make sure they were all there or if I were trying to pinpoint a bank account error, I would not only say the figures aloud, but point to each as I did so.

This discussion leads us to a second question:

> Does the "pecking" behavior of young children in counting parallel, in some way, the pointing that they do in reading and how does this relate to their level of one-to-one correspondence?

This question assumes that these two types of pointing are efforts to establish one-to-one correspondence more firmly.

Now that we have looked at one-to-one correspondence in cognitive terms, it may be helpful to examine one-to-one correspondence as it develops from the perceptual to the conceptual level.

PERCEPTUAL ONE-TO-ONE CORRESPONDENCE

Correspondence is said to be perceptual at first, based on appearance rather than on understanding. Children make equivalent sets, but once the sets are rearranged, the equivalence is lost and the child no longer perceives a one-to-one correspondence (Piaget, 1952). The equivalence depended on appearance, not on an understanding of number. Perceptually, children may be able to count ten beads on an abacus, matching the equivalent sets of ten beads and ten appropriate number words. However, if the one-to-one correspondence has a perceptual basis, the child may not be able

to count ten beads if they are laid out on the table in random order.

According to Kamii (1985), at one stage (approximately age six), four or five objects can be distinguished perceptually and do not require one-to-one counting correspondence. Gelman & Gallistel (1978), in their experimental studies which involved training children to do tasks, state that two and three-year-olds can map spoken and written words if there are less than five words. Perhaps the same perceptual element is at work in both cases. Perhaps young children can "read" the names of people in their family because they are perceptually very familiar with them, but five or more words in a sentence would be an altogether different task, similar to asking a toddler, who knows there are five people in his family, to count five objects in a set. Children may seem ready for reading when they "read" one to four words at a stretch, when in reality, they may be at a perceptual level and not yet actually reading. Children may write and "read" a list of favorite people, but not recognize the same word when it is written by an adult, or typed. Perhaps one-to-one correspondence becomes firm when the child recognizes the word wherever she sees it, even in a string of more than five words.

Just as there is a perceptual level of one-to-one correspondence in counting five numbers or less, one wonders if the same principle would apply in reading. Does a child read three or four words on a page, pointing to each appropriately with one-to-one correspondence and yet, when given the same words in a

longer string (about 8-10 words), no longer maintain the one-to-one correspondence? This leads us to the third question of interest to this study regarding perceptual as opposed to conceptual correspondence:

> Is there a parallel between perceptual one-to-one correspondence in counting and perceptual one-to-one correspondence in reading/writing? If so, do they occur simultaneously or does one precede the other as children move from the perceptual level of one-to-one correspondence to the conceptual level?

Now that we have discussed one-to-one correspondence, we can attempt to relate how it might develop in counting with how it might develop in the language area of writing/reading/word concept.

COMPARISON OF STEPS IN ONE-TO-ONE CORRESPONDENCE IN COUNTING AND WRITING

A comparison (Table I) of the steps in acquiring an understanding of number, as explained by Kamii (1985), with Ferreiro & Teberosky's (1982) steps of one-to-one correspondence in writing and Papandroupoulou & Sinclair's (1974) metalinguistic levels suggests an underlying cognitive function or principle that

may operate in different areas of learning at different ages, but in comparable sequence. Tentatively that function or principle may be described as the basis for one-to-one correspondence.

Counting - Kamii

As one reads through Kamii's book, Young Children Reinvent Arithmetic; Implications of Piaget's Theory, it is possible to infer four steps in a child's understanding of one-to-one correspondence of number that parallel Ferreiro & Teberosky's steps in acquiring one-to-one correspondence in writing. Although Kamii does not formally summarize the steps she discusses throughout her book (1985) that relate to the development of one-to-one correspondence in counting, an outline of four steps in the development of one-to-one correspondence seems to emerge from these pages.

In the first step, the symbol for a quantity is the same thing as for a number. Symbols such as oooo and //// represent the idea of four. These marks are signifiers that bear a "figurative resemblance to the thing represented and can be invented by the child" (Kamii, 1985, p.52). In a similar way, one could say young writers spontaneously use scribble writing () whereby they imitate the fluency and style of the adult writer and can "read" what it says before they are aware of individual words.

Next (step two), Kamii states that children use the printed eight, 8 and the spoken word "eight," but that these are signs

which require social transmission, that is teaching, since they are conventions that bear no resemblance to the thing represented. Children recognize and say these words without being able to establish one-to-one correspondence with objects. In a possible third step, children begin to establish a one-to-one correspondence up to number eight, but on a perceptual level only. When objects are rearranged, the sets lose their equivalence and one-to-one correspondence is no longer apparent to the child. On this level, the child can appropriately point to the eighth block and call it number eight, but is not yet aware that that number eight includes the other seven blocks.

In a popular game where children try to guess a number, some first graders understand that if the teachers says that the number is bigger than five, one to four are eliminated. Others will continue to guess 1, 2, 3, 4 even when it is explained to them. Evidently these latter children are at the stage where they see five as number five only, as a label, and not as inclusive of the first four numbers.

Eventually, children establish one-to-one correspondence up to eight and beyond, that is firmly in place no matter how the objects are rearranged (step four). They realize that any number is labeled what it is because it includes the quantity of all the numbers that went before it.

Writing - Ferreiro & Teberosky

The following is a very simplified version of Ferreiro and Teberosky's writing stages adapted for purposes of this paper. Their explanations and examples, including transition stages, are much too comprehensive to include here. The reader is directed to chapter three of their book, Literacy Before Schooling (1982), for a more detailed explanation.

Written language, according to Ferreiro & Teberosky (1982), can be viewed as an object in that it has a permanence and consistency that oral language does not have. This objectivity allows "children in their exploration of written language to carry out a series of specific actions similar to those they carry out on physical objects" (Ferreiro & Teberosky, 1982, p.285). In the beginning stages of writing, they explain that for the young child, the print and the picture represent the same thing; they are just "different forms for representing the same meaning" (p. 85). For example, when young children are presented with a picture of a teddy bear with TOY written under it and asked "Where is there something to read?" they will point as often to the picture as to the print. When asked "What does it say here?" they respond as if the question were "What is this?" The meaning comes from the illustration and is then applied to the text. This beginning step, one of identity, has picture and print convey an identical message, just as the symbols oooo and //// are numbers, different forms for representing the same quantity.

In the next step, children view print as a label for a picture. For example, when children at this level are presented with a picture of a dog running with some cans behind him and a text that says THE DOG RUNS, they may insist that the text says DOG only. The text gets its meaning from the picture, not from its combination of letters or words. This seems to parallel the step in counting where the number represents a quantity as a label, but one-to-one correspondence is not present, just as one-to-one correspondence with the spoken-written message is not present.

The next step in writing occurs when children begin to consider some of the graphic properties of print. For example, when a child is presented with a picture of a man smoking a pipe with the text, PIPE, she might say that it reads PAPA. When asked if it could say "Papa is smoking," she responds, "No, because it's very small and doesn't fit" (Ferreiro & Teberosky, 1982, p.60). Some children will guess a word, notice that the beginning letter does not confirm their guess, and then say that they don't know. The meaning of print is still dependent on the picture and a distinction is made between what is written and what can be read. For example, a child looking at a picture of a duck in a pond labeled THE DUCK SWIMS may say "duck" when the adult points to DUCK and "stream" when the adult points to SWIM. When asked what it says altogether, she may respond with "The duck goes down a stream," then look at the words again and say "The duck falls in the stream" (Ferreiro & Teberosky, 1982, p.79). "In differentiating between what is written and what can be read, the

thematic content is predicted rather than the text itself (p.86). This seems to parallel the perceptual level in mathematics. Just as perceptual one-to-one correspondence depends on what the child sees rather than on an understanding of what the number eight actually means (its inclusiveness of the first seven), the print has no meaning in itself, but is dependent on the picture for its meaning.

Finally, the one-to-one correspondence that is established in counting, regardless of any perceptual differences, may parallel one-to-one correspondence in writing. Ferreiro and Teberosky (1982) point out that initially one-to-one correspondence occurs for syllables of names or syntactically for subject-predicate/subject-verb-object of sentences. Gradually one spoken word is mapped onto one written one.

Metalinguistic Levels - Papandropoulou & Sinclair

Papandropoulou & Sinclair (1974) studied the metalinguistic awareness of children by asking What Is A Word? In the discussion of their results, they posed some interesting questions:

> Is it possible to interpret the different types of answers given by children from a developmental perspective?
>
> What is the link between development of metalinguistic competence and cognitive development in general? (p.248)

When their four levels are placed side by side with Kamii's (1985) and Ferreiro & Teberosky's (1982) levels in mathematics and writing, it is striking how similar the cognitive features are, despite the fact that metalinguistic levels develop much more slowly, often not reaching completion until ages eight or ten.

At the first level (approximately age four or five), the child identifies words with the things or actions they represent. The word for elephant should be much longer than the word for ant or tarantula because an elephant is much bigger.

Between ages five and seven, approximately, (the second step on the table), a word is a label or name for something. A word must represent a real object; a description of an action "I go home" is one word. Articles and prepositions are not words because they are too short and do not say or name anything.

On the next level, (approximately ages six and one-half to eight), words have meaning and are no longer part of the object they represent, but they are seen as having meaning because they are elements of a larger whole. Words have meaning as part of a story, but do not have meaning in isolation. Words have meaning on a perceptual level as is true of numbers and writing, but do not all have meaning in themselves even though one-to-one correpsondence is present. Whether a word is long or short now depends on the number of letters it has rather than on the size of the object they describe. Articles are considered words.

At the final level, (eight to ten years), every word is a meaningful unit with clear autonomy, it can be defined, and its role as an element of a sentence is realized. In other words, a

TABLE I Comparison of studies on one-to-one correspondence

Steps in developing one-to-one correspondence	Kamii - mathematics	Ferriero & Teberosky - writing	Papandropoulou & Sinclair - metalinguistic
1 Identity symbol is object	perceptual recognition of symbol ( ) symbol = number	print & picture are equivalent elements of one unit print = picture	short word is a small object or a short action - large objects have long words word = thing/act
2 Words are signs or labels	spoken "eight" & printed 8/EIGHT are signs needing social transmission. Child says them without one-to-one correspondence	Print is a label for pictures. Text is a unit to describe pictures. Has no existance separate from pictures.	A word is what you say about something, the name of something. Articles/ prepositions are not words because they're too short
3 Part of a whole - doesn't represent anything in itself	One-to-one correspondence to 8 on a perceptual level. #8 is last in a series but not inclusive of first seven numbers.	Initial consideration of the graphic properties of print. The text is still predictable from the illustration and dependant on it.	A word has meaning as an element of a larger whole but not by itself Words have meaning rather than being the objects they represent.
4 One-to-one correspondence	One-to-one correspondence in counting to 8 and beyond	One-to-one correspondence between graphic units and sound segments. Mapping spoken words to printed form gradually emerges	Words have clear autonomy and are meaningful units/ elements of a sentence.

one-to-one correspondence occurs between a word and its meaning. This comparison seems to support the notion that basic thinking processes are at work here.

Progress through Ferreiro & Teberosky's stages is invariant for Spanish-speaking children (Miller-Jones & Gallagher, 1983), although this may not hold true for all languages. Since Kamii's (1985) mathematics studies were done with English speaking children in the United States, a similarity between the two may indicate that the findings of Ferreiro & Teberosky would hold true for English-speaking children if what is really being described is attributable to a basic cognitive process and not to some other factor such as socio-cultural influence or a specific linguistic pattern.

SUMMARY

During the course of reviewing the literature on word concept and one-to-one correspondence, three questions have arisen that provide the framework for this study.

It was argued that word concept is a necessary element in beginning reading, but one that is acquired gradually at different ages for different children, including those with special needs. The early work on word concept done by Papandropoulou & Sinclair (1974), and followed up more recently by Ferreiro & Teberosky (1982), lay a Piagetian foundation for children's reading/writing. This study utilizes one way that children demonstrate this word

concept, i.e.,by mapping their own spoken words onto their own written words in a key vocabulary approach (Ashton-Warner,1963). The first question to be addressed, then, is how a child's key vocabulary reflects her knowledge of word concept and, concommitantly, one-to-one correspondence.

This question on word concept leads to an examination of one-to-one correspondence more closely to determine its role in beginning reading. Although very different, the studies of Kamii (1985), Ferreiro & Teberosky (1982) and Gelman & Gallistel (1978) all support the cognitive function of one-to-one correspondence. Kamii's description of "pecking" behavior, as it may reflect a cognitive process, gave rise to the second question addressed in this study: Does the "pecking" children do in counting parallel, in some way, the pointing they do when reading?

This study then examines one-to-one correspondence from another angle, perceptual correspondence as differentiated from conceptual correspondence. First discussed by Piaget (1952), perceptual correspondence is mentioned by Kamii (1985) in her counting studies and by Gelman & Gallistel (1978) in their reading study. This study attempts to relate the findings in its third question: Does the perceptual one-to-one correspondence children demonstrate in counting parallel, in some way, the perceptual one-to-one correspondence children establish in reading?

After examining one-to-one correspondence, the steps in correspondence from different areas of learning were juxtaposed. Steps in one-to-one correspondence from Kamii's math studies (1985), steps in one-to-one correspondence from Ferreiro &

Teberosky's (1982) writing studies and levels in obtaining metalinguistic awareness from Papandropoulou's studies (1974) are compared in an attempt to bring into focus the underlying cognitive function of one-to-one correspondence.

Observing a child's counting behavior and key vocabulary behavior with the preceding questions in mind and analyzing their responses may provide insight on the role of one-to-one correspondence as a cognitive process and provide teachers with insight on how children, whatever their developmental level, begin to read.

CHAPTER 3

DESIGN OF THE STUDY

The central argument of this study is that the way children use one-to-one correspondence in counting is related to the way they use one-to-one correspondence when reading/writing.

The purpose of this study is to document this relationship as observed in the way young children count and begin to read.

The following discussion of the methodology used in this research is divided into six parts. Information concerning the sample and sampling procedure is provided in the first part. The second section describes the observational nature and methodology of the research design. Section three discusses methods of establishing reliability and validity in observational studies. Data collection procedures for this study are outlined in section four and techniques of data analysis are discussed in section five. To shed a practical light on the study design, a description of a pilot study done in preparation for the larger study is presented in section six.

SECTION 1: SAMPLING

Most studies carried out in school settings are constrained by those willing to participate, from the supervisory to the teacher level. This study wishes to extend the same perogative to

the children, that is, those children who participate are those who show interest in the particular activities of the study.

Random sampling, therefore, is not feasible for this study. An alternative, however, is to describe the sample population in fine detail. No claims to generalizability will be made except in the sense that a microcosm of classroom behavior can be said to reflect the macrocosm (Webster, 1981). To establish some such basis of comparability this study proposes to "delineate the characteristics of group studied or constructs generated so clearly that they can serve as a basis for comparison with other like and unlike groups" (LeCompte & Goetz, 1982 citing Wolcott, 1973).

The sample that the subjects were chosen from, are described as a whole. The subjects were chosen for relevance to the specific interests of the study. This choosing of subjects because they facilitate the expansion of developmental theory, is referred to as purposeful sampling (Bogdan & Biklen, 1982). The grade one classroom in this study had eighteen children. All the children participated in the activities to give an overall profile of the group, but certain children were selected as "key incident" children because their unique learning patterns were of special interest. The kindergarten setting had twenty children. The baseline activities were done with all of them, with one child selected as a "key incident" child. The preschool setting had twelve children and the baseline activities were done with all of them to establish an overall profile for that age group for use later in data comparisons. Because the emphasis of the study is

on qualitative rather than quantitative analysis, this small number gives an adequate representation of each cognitive level and still allows for in-depth analysis (Templeton & Spivey, 1980).

Sample Population

The data for this study was collected in a small city in northern Alberta, approximate population 30,000. This largely white, middle-class city has a rich ethnic mixture in the minority section of the population, including a small percentage of native Cree Indians.

The young children in this study range in age from three to seven years, including normally developing children and those with developmental delays, as the size of the community necessitates the integration of special needs children into normal settings often until age six or seven.

Children were observed in three settings in order to include a range of ages and abilities. Children 3 - 4.5 years were observed in a daycare setting. Because the daycare is located downtown, it attracts children from various backgrounds. Most of those enrolled are the children of community college students, taking courses that range from university transfer to ESL and Basic Education. The good reputation of the daycare attracts some affluent families and its location also makes it available to families living on welfare.

Children for the 4.5 - 5.5 year old range were drawn from the demonstration ECS (kindergarten) located at the community college.

The children come from a wide range of backgrounds, from children of professionals who appreciate its unique characteristics as a model centre to children of students who find its location convenient. The kindergarten has a policy of welcoming special needs children and generally has a special needs aide in addition to the regular ECS aide and volunteer parent help.

The 5.5 - 6.5 or 7 year old range of children were observed in a first grade classroom in the downtown section of the city. The location of the school makes it accessible to families from a variety of socio-economic levels. Most were white, middle-class, with two Metis children. A Down's Syndrome child was integrated for most of the day. The teacher used a whole language approach to reading and an activity approach to math.

SECTION 2: OBSERVATIONAL METHODOLOGY

The exploratory nature of this study suggests a preference for a naturalistic, observational approach rather than an experimental approach. The emphasis is on "description rather than on manipulation and control of variables, on hypothesis generation rather than hypothesis testing" (Webster, 1981, p.2). Studying young children, as Genishi (1982) points out, has fewer methods available than studying adults, because children's abilities to understand instructions, respond verbally or attend to what may be to them uninteresting tasks, are not yet developed. Consequently, they are poor subjects for formal interviews or experiments. However, their lack of self-consciousness compared

with adults, makes them excellent subjects for systematic observation.

"Casualness is not a characteristic of qualitative research. When done well, it involves all the rigor and thoughtfulness of complex quantitative studies" (Genishi, 1982). This qualitative study has outlined some questions to investigate and some categories of analysis based on a pilot study. As data is collected, some of the proposed categories may be modified or new categories introduced to handle new information. The design of this study is deliberately flexible to allow decisions to be made throughout as needed. Tried data collection techniques will be used as procedure guides. These include participant observation, informal interviews and document analysis (Bogden & Biklen, 1982).

Since the ethnographer's primary means for gathering data is participant observation, the following section will discuss this method in more detail.

In participant observation, participation is as important as observation. Participant observers have general questions in mind to investigate rather than the narrowly focused questions of quantitative research. It is important for the participant observer to establish rapport with her subjects and to be honest regarding the purpose of the research to the extent that it does not affect the behavior of the informants.

The participant observer's primary data collection method is the recording of field notes which specify, in a precise way, what occurred. As Bogdan & Biklen (1982) define it, field notes are

the "written account of what the researcher hears, sees, experiences and thinks in the course of collecting and reflecting on the data in a qualitative study" (p.74).

This study will use two types of field notes: Descriptive and Reflective. Descriptive field notes objectively record details in behavioral terms. Concrete rather than abstract terms are used to describe physical settings, dialogue, events/activities, and the researcher's own behavior. Reflective field notes bracket the researcher's interpretations, impressions, ideas, mistakes. The researcher may include comments on developing themes/patterns, how her methods are working, possible ethical dilemmas, her own frame of mind, points of clarification. Sections, referred to as memos, are included to summarize the research to date and help the researcher assess the progress of the study (Bogdan & Biklen, 1982; Genishi, 1982).

The other data collection techniques mentioned at the beginning of this section, informal interviewing and document analysis, will involve talking to the children about the writing/reading they do, recording their responses and keeping samples of the writing they produce, for later analysis of developmental level.

Using observation as a method of data collection raises the question of reliability and validity. Reliability and validity, both internal and external, will be discussed in the next section.

SECTION 3: RELIABILITY AND VALIDITY OF OBSERVATIONAL STUDIES

Reliability

Reliability may be defined as "the accuracy of a measure or measuring instrument" (Genishi, 1982, p.583). One way a qualitative observer establishes reliability is to check her interpretations against those of her informants (Genishi, 1982). LeCompte & Goetz (1982) define this interobserver reliability as "the extent to which the sets of meanings held by multiple observers are sufficiently congruent so that they describe phenomena in the same way and arrive at the same conclusions about them" (p.41). This reseacher intends to compare observations with the classroom teacher and aide who have a more intimate knowledge of a child's overall development and capabilities. At times, when practical, a professional colleague may be asked to take notes of an interaction and her on-site recordings may be compared with the researcher's field notes, done after the fact, as a check on the researcher's ability to remember details and on the reliablility of the observations themselves.

a) Internal Reliability

Four of the strategies proposed by LeCompte & Goetz (1982), to reduce the threat to internal reliability in observational research, low-inference descriptors, participant researchers, peer examination and mechanically recorded data, are described next as they pertain to this study.

Low-incidence descriptors refer to using concrete, precise terms for descriptions, and verbatim and narrative accounts of behavior and activity. High inference comments are more appropriate to the interpretive section of field notes. As accurate a record as possible will be kept of who did what under what circumstances. Field notes will contain multiple examples of the same phenomenon.

The participant researcher can seek confirmation of findings on different levels. Descriptions of events and interactions will be checked with the classroom teacher and aide. The interpretation of participant meanings will be verified with the classroom teacher or with a professional colleague. Explanations for overall structures/processes will be discussed with a professional colleague or thesis advisor for input.

One's study can integrate descriptions and conclusions from other field workers. Since a small study may not involve other field workers, findings from a literature review could act in this capacity. Publication also constitutes an offering of material for peer review.

Mechanically-recorded data could be used in the form of audio or video tapes when appropriate and nonintrusive, although it is well to keep in mind that a "person absorbs a wider variety of data than any mechanical device can record" (Wilcox, 1982), always keeping in mind, however, the effects of personal bias. Use of mechanical supports during the course of this study will depend on whether any events arise that would warrant them.

b) External Reliability

Five areas needing to be addressed to reduce threats to external reliability, according to LeCompe & Goetz (1982), will be considered in this study: researcher status position, informant choices, social situations and conditions, analytic constructs and premises, and methods of data collection and analysis.

Researcher status refers to how the researcher is accepted by the participants, how successful she is at establishing rapport, and why or why not she is a participant.

Informant choices. A careful description of the individuals studied as well as an explanation as to why they were chosen is important in order to understand why they represent the group.

Social situations and conditions. The social context in which the data is gathered (physical/social/interpersonal) will be spelled out to enhance replicability.

Analytic constructs and premises. Constructs, definitions and units of analysis need to be clearly delineated for replication purposes. The assumptions and theories that underlie the choice of terminology and methods of analysis must be identified in order to connect this study to the way other researchers use the same terms and constructs. The literature review in chapter two of this study addresses this concern.
Methods of data collection. The methods used in this study need to be presented clearly enough to be a manual by which another researcher could replicate the study, even if this necessitates lengthy explanation. The precise identification and thorough description of strategies used to collect data is an essential

element of the design. Categories of data need to be clearly specified especially when interobserver reliability may be impossible. This concern is partially addressed in section four of this chapter (Data Collection) and further elaborated in the pilot study. As field notes are gathered, data collection methods will continue to be described as they are tailored to the observation site. The strategies for analyzing data will also be detailed to allow for replication. Although generally described in section five (Data Analysis), a more complete description will appear in chapter five of the study once data is gathered.

Whereas problems of reliability threaten observational work, validity is its strength. The next section will discuss internal and external validity.

Validity

Validity, as defined by Genishi (1982): "Findings are valid if we have measured or recorded what we say we have measured or recorded, if we have observed a segment of reality faithfully and without distortion" (p.584).

a) Internal Validity

Defined by LeCompte & Goetz (1982), internal validity answers the question: "Do researchers actually observe or measure what they think they are observing or measuring?" (p.43). They go on to specify that observational studies have high internal validity because of the data collection and analysis techniques used, especially with participant observation and lengthy data

gathering. Continual data analysis and comparison is a constant check between information and reality.

One source of threat, however, to internal validity, is the effect of the observer on the behavior of the observed. "Possible and probable effects of the observer's presence on the nature of the data gathered must be considered" (LeCompte & Goetz, 1982, p.46). Such effects are probably greatest during the initial observation period and diminish upon habituation (Webster, 1981). Many of the distortions possible with adults, seem to be minimized when working with children, especially when working on cognitive tasks demonstrated through materials generated by the children, although I believe good rapport and trust is necessary for meaningful spontaneous production of writing.

The effects of maturation relating to internal validity should not be a concern here, but rather an advantage, as the study is concerned with developmental changes over time.

Although the in-depth qualitative studies of one classroom or one centre have high internal validity, the results of the analysis of data generalize only to the setting or individuals under study (Genishi, 1982). The following section discusses external validity as it relates to observational studies.

b) External Validity

External validity, as defined by LeCompte & Goetz (1982) answers the question: To what extent are constructs generated, refined, tested by an observational study, applicable across groups? Because threats to external validity are those effects

that obstruct a study's comparability and translatability, external validity depends on identifying and describing characteristics salient for comparison. According to LeCompte and Goetz (1982), there needs to be a match between the categories used in the study and the reality of the group studied (selection effects). The distinct characteristics of the investigated population, socioeconomic status, level of education, and racial composition, need to be clearly identified. As well, definitions used in the study (construct effects) must be clear in order to relate this study to previous ones on similar topics. This concern is attended to in the glossary of terms, as well as in the definition of items within the text proper.

Genishi (1982) mentions an interesting perspective on external validity, that is, a study based on small numbers may be externally valid in that the reader of the study may generalize its findings to her own similar experiences.

With these guidelines for valid and reliable observational research in mind, the next section outlines specific data collection procedures for the study.

SECTION 4: DATA COLLECTION

This section will describe some of the procedures used to elicit responses from children as they relate to the thesis questions. These procedures lend form to the study and help to focus it on the questions generated by the literature review.

However, as the study progresses, these questions may alter, new ones may be added, or some of the focus may shift, depending on the responses of the children being observed.

Thesis Question #1: What does the way a child goes about establishing a key vocabulary reflect about her knowledge of word concept and one-to-one correspondence in reading?

Procedure to Establish a Key Vocabulary

1. Initially, the child is asked for her very favorite word, the word she likes best, the word she would most like written on the card. Then she is asked if that is enough or if she would like another one. If she requests more than four or five, she may be told "Let's wait until the next time" in order to check her retention of the words already given before expanding further.

   The word (or words if more than one word is given per card) are printed on tagboard cards (1.5" x 5") in felt pen. The child is asked if she likes "e" or "E" and her words are printed in upper or lower case accordingly. The card is read back to the child to make sure it is what she wants.

2. At the next meeting, (a one-week lapse in this study), the child rereads the cards from the first session. If there are any she does not recognize, she is asked if

she wants to keep them or throw them away. If she wants to keep a card, she is told what it says.. The adult then asks what she would like written that day on a new card. If the child cannot think of anything, the adult may prompt by saying something to the effect that the word can be something she likes to eat, or something on television, something she hates, something scary, something she loves, a person's name . . . If the child evidences a strong interest in something, that can be talked about as a basis for writing some words. It is important to follow the child's lead, writing whatever she requests.

3. The subsequent sessions are spent rereading the deck of accumulated cards and adding on new ones until a dozen or so are compiled and easily read. Any not recognized on a second try are discarded.

4. The child and the adult then sit down at a table. The child spreads out her word cards and the adult sits at a typewriter with precut booklet pages (approximately 3.5" x 5"). The child is asked which word or words she wants on the first page and so on. If she tends to put only one word on a page, she is asked if there are two cards that would go together or if there is anything she would like to say about the word. Whenever the child adds connectives, articles, descriptors or any extra words, she is given the choice of adding them to the page or not. For example, If the child looks at her card that

reads CATS and says "I like cats," the adult would ask "Should I type CATS or I LIKE CATS?

When the page is typed, the adult reads it to the child to make sure it says what the child wants the page to say.

5. The child picks up her cards as she dictates them to avoid repetition. When the pages are finished, the child chooses the cover for her book from precut construction paper. The book is stapled twice on the left side. The child may be given the choice of drawing the pictures herself or having the adult do the drawings.
6. The child reads the book to the adult when it is finished. If the child reads without pointing to the words, she is asked to read some of the pages a second time, pointing as she reads, in order that her one-to-one correspondence may be observed.
7. Blank word cards, pens and blank books may be made available to encourage any spontaneous writing on the part of the students. Samples of spontaneous writing may be collected as an additional way to observe the child's reading/writing level.

Thesis Question #2: Does the "pecking" behavior of young children in counting parallel, in some way, their pointing in reading?

Procedure to Address "Pecking":

1. Observe children doing their regular in-class math assignments for evidence of "pecking."
2. Observe children playing math games for "pecking" behavior. If math games are not an ordinary part of the school day, arrange for a time to play a board game using dice (two) with a group.
3. Observe children doing their regular in-class reading assignment for evidence of pointing, preferably in both long and short passages as well as silent and oral sessions.
4. Observe the way children read their key vocabulary cards and subsequent books for evidence of pointing.

Thesis Question #3: Does a child's one-to-one correspondence in counting precede correspondence in reading or do they occur simultaneously as the child moves from the perceptual level to the conceptual one?

Procedure to Examine Perceptual/Conceptual Correspondence

1. Observe the child during the regular in-class reading session for pointing behavior as it relates to the length of the text.
2. Observe the child during the regular in-class math session for one-to-one correspondence when counting objects in sets less than ten and more than ten.

3. If one-to-one correspondence in counting is not clear during the normal course of events, ask the child to count on an abacus, two rows of ten beads each. Compare the one-to-one correspondence displayed on the abacus with the way the child counts randomly spaced objects such as pennies on a flat surface.
4. Observe how the child points to words on her word cards as it relates to one-to-one correspondence. If the print in her key vocabulary book remains short, try typing on a separate sheet many or all of the word cards joined with AND to see if one-to-one correspondence continues beyond a short perceptual string of words.

Additional Data-Gathering Tools

To give an additional perspective to the data gathering on word concept, three tasks from a Written Language Awareness Battery (Evan, Taylor & Blum, 1979), were included:

Aural Word Boundaries

Visual Word Boundaries

Mow-Motorcycle Task

Copies of each may be found in Appendix A.These three tasks, done with the ECS children and first graders in May, were presented on an informal basis, as games. Observations of their responses were recorded in order to compare the manner in which they played the games with the manner in which they established a key vocabulary. Results of these and other comparisons in the study will be presented in table form.

SECTION 5: DATA ANALYSIS

In participant observation, data analysis occurs simultaneously with data collection and gives direction to the study. A more formal analysis is done once the data is in (Bogdan & Biklen, 1982; Genishi, 1982). Qualitative analysis avoids rigidly establishing categories prior to data collection so that the researcher "will be open to patterns that emerge as data is collected" (Genishi, 1982, p.567). One can let "the data speak" and on this basis develop categories.

Ethnographic methods "explore in minute and concrete detail the highly complex series of phenomena which operate in and around the classroom . . . and construct a detailed picture of the full range of dynamics at work" (Wilcox, 1982, p.478). Educational problems are addressed by the researcher after this intense process which then brings greater insight to the forming of suggestions for teaching practice.

One technique used in qualitative data analysis is that of key incidents. Key incidents, as described by Wilcox, 1981, p.462) are "concrete instances of the working of abstract principles" recorded in extensive, descriptive detail. They illustrate universals in the concrete and link the study to other theoretical constructs. Extensive quotations and lengthy descriptions of settings and interactions serve to validate the researcher's interpretation of data. Because the nature of the educational process is complex, it lends itself to fine-grained

analysis of detailed empirical description with an attempt to "pursue an understanding of micro-macro linkage" (Wilcox, 1981, p.477). This study proposes to include key incidents to illuminate the relationship between children's counting and writing.

Observations of three age groups are recorded:

3 - 4.5 years	preschool (daycare)
4.5 - 5.5 years	kindergarten
5.5 - 6.5 or 7 years	grade one

This data was collected from October, 1985 through May, 1986.

Detailed field notes were kept and suggestions from Genishi(1982) and Bogdan & Biklen (1982) tried, such as duplicating the field notes, cutting them up and filing them in folders according to topics, with allowances for concurrent categories when a single event/description applies to more than one category. The field notes were analyzed according to the categories described in the following data collection section with flexibility of categorization depending upon the unique responses of children.

Memo Writing or summarizing of data on a regular basis was done to help define patterns and understandings of issues/theories. Ideas/observations were checked with others in the field (classroom teacher, professional colleague) on an informal basis. One check on objectivity recommended by Genishi (1982), was to have a professional colleague read sections of the

field notes to see if different interpretations or different patterns were possible. Additional information on data analysis was generated as the study progressed.

The next section of this paper will describe a pilot study done in preparation for this larger study, using some of the techniques that have been described in this chapter.

SECTION 6: PILOT STUDY

Introduction

A one-month pilot study was completed in preparation for the proposed thesis study. In this pilot, a dry-run of data collection and data analysis methods was attempted, both to illustrate the methodological procedures more specifically, as well as to improve on techniques for the larger study.

The subtopics for this section will describe the setting, the length of time spent there, the class's daily schedule and how my activities fit into it, a general description of the key vocabulary approach used, and provide a sample case. The remaining cases are provided in Appendix B.

Setting

This pilot study was done in a classroom for mentally handicapped students (ages 13 - 16 years) in a junior high school in a suburb of Vancouver, B.C. All but one of the eight students (three girls , five boys) had Down's Syndrome. I chose this class for a pilot as some of the research on exceptional children

(Gallagher & Reid, 1981; Henderson, 1980; Reid, 1978) suggests that some of their learning patterns follow normal developmental ones, but on a slowed-down timetable. If this is so, I had hoped I might find a little-red-schoolhouse range of learning levels in the group, much wider than in a normal classrooom, with which to try out the thesis activities and observe responses.

The emphasis of this pilot study, however, was on trying out the procedures proposed for the thesis study in order to improve them. Given the time limit of this study, the limited number of children and its limited scope, similarities between the learning patterns of these Down Syndrome children and normally developing reading patterns is not meant to sound conclusive, but rather suggestive of further investigation.

Length of Observation

The classroom was visited eight times:

May 15	June 3
May 22	June 5
May 29	June 10
May 30	June 12

This researcher usually arrived by 8:30 a.m. and left about 11:30, giving an approximate total of 24 hours of observation/activity in the classroom.

Daily Schedule

Following is a description of a typical morning, to give the reader a better idea of how the pilot study activities fitted into the classroom routine.

Some students attend integrated homeroom, others stay in the special needs classroom and do activities of their choice. Aside from individual desks, there are three large tables, a listening centre, a rugged reading area with an armchair, and a shelf of popular games. Work folders are kept in an accessible-to-all file cabinet.

The students copy down their day's schedule from the board with a minimum of help. As individuals finish, they are free to choose an activity before class meeting begins. This is a time to discuss openly any concerns under the headings: Good Things, Problems, and Future Plans. Discussions range from complaints regarding offensive personal behavior, to the group's next field trip, to how late someone stayed up the night before and what they had for supper, to how babies are made. The students are free to come to class meeting if they like or to do an alternate quiet activity.

After meeting, students work in small groups, doing assignments appropriate to their levels of ability.

To lend structure to this study, the following categories of investigation, relating to the thesis questions, will be used in examining each case study, bearing in mind that modifications occur as data unique to each student is presented, and that not all categories apply in all cases.

Categories for Investigating Thesis Questions

Thesis Question #1: What does the way a child goes about establishing a key vocabulary reflect about her knowledge of word concept and one-to-one correspondence in reading?

Categories for investigating one-to-one correspondence and word concept in reading:

1. Key Vocabulary.

A key vocabulary for each child will be established with a minimum of twelve words, generated by the child and based on her interests, according to the guidelines specified in the next section of this paper.

2. Reading Cards.

As a child reads and rereads her key vocabulary on word cards, notes will be kept on the manner in which she maps her oral words to the printed words on the cards as she points when reading.

3. Dictating Book.

As the child dictates her key vocabulary words from her cards to the adult typing them in book format, note will be taken of the manner in which the child points to her words on the cards as she says them and the manner in wich she expands (or does not expand) on her core set of words.

4. Reading Book.

As the child reads her completed book to the researcher, note will be taken of the way in which she points to the words as she says them.

Thesis Question #2: Does the "pecking" behavior of young children in counting parallel, in some way, their pointing behavior in reading?

Categories for comparing "pecking" in counting and pointing reading.

5. "Pecking"

The child will be observed during math assignments and/or games for evidence of "pecking" such as pointing to dots on dice, pointing to marks on a ruler, pointing to pencil marks on paper, touching beads or blocks, touching fingers, et al while counting.

6. Pointing.

The child will be observed during reading assignments for pointing to words either as she reads them herself or as someone else reads them aloud. Note will be taken of how accurately she matches spoken words to the print.

Thesis Question #3: Does a child's one-to-one correspondence in counting precede correspondence in reading or do they occur simultaneously as the child moves from the perceptual level to the conceptual one?

Categories for comparing one-to-one correspondence in math with one-to-one correspondence in reading:

7. Counting during classwork.

Children's counting will be observed during math assignments or play. Note will be taken of the way in which they match numbers and objects in sets of varying quantities from 1-20.

8. Counting - Abacus

A twenty-bead abacus will be used to check one-to-one correpsondence in counting with orderly sets. Loose sets of twenty objects will be used to observe the child's one-to-one correspondence in counting with randomly spaced items.

9. Reading short and long strings.

Children's pointing will be observed while they are reading short strings of words (two or three words) up to longer strings of words (fifteen words) in order to compare their one-to-one correspondence in reading with that in categories 7 & 8.

A more thorough description of the key vocabulary approach, basic to this investigation of one-to-one correspondence follows, with reference to how it was used in this particular setting.

Procedures for Key Vocabulary Approach

The researcher's activities were fitted in around the expected academic work. Usually time to work with a few students was available before class began, before class meeting and as they

finished their work before lunch. Sometimes a student would agree do the activities in lieu of attending class meeting.

A point was made of asking each student if she wanted to work with the researcher at a particular time. The students were unfailingly kind and considerate of a stranger making requests on their free time, considering that the activities were more interesting for some than for others.

Numerous games were played with different students, which proved to be helpful in gaining insight on their math skills.

The first visit was spent observing and occasionally helping a student with her work. On the second visit, each student was asked to state her favorite, most powerful word as a way of addressing the first thesis question (What does the way a child goes about establishing a key vocabulary reflect about her knowledge of one-to-one correspondence and word concept?). Each word was written on a card with fine felt pen, in upper or lower case letters as the student preferred. She was then asked if that were enough words for the day or if she would like another one, If she wanted more than six cards at once, the researcher would end the session by saying that it was another child's turn. If someone seemed stuck for a word, general suggestions were made: "It could be something you like to eat" "It could be something you like on t.v." "It could be something scary." "It could be something you love."

This was done at each session with each child, after she read through her previously accumulated deck of cards. Any word not remembered would be read for the student. The next time it was

forgotten, the student was asked: "Should we keep this one or get rid of it?" Any card not recognized on the third try would automatically be discarded. Discarding could be done sooner, except that some children get upset to see one of their cards ripped up and want more chances to try to remember it, although some children do quickly say "Throw it away."

Between visits, the cards were kept in individual envelopes, available where the child could look at them if interested.

When a child had accumulated a dozen cards or so, that were readily recognized, it was time for a book.

The student and the researcher sat down at a table with a typewriter. She spread out her cards in front of her and chose which one she wanted to go on the first page. The words were typed as she dictated what went on each page. She removed the cards from the table once they had been used. She was encouraged to put two word cards on each page by such questions as "Are there two of those cards that you could put on one page?" If the answer was "No," then one word was typed per page. If, for instance a card said ICE CREAM, but she said I LIKE ICE CREAM, she would be asked if she wanted just ICE CREAM or I LIKE ICE CREAM typed. If the student joined two words with AND, she was asked if she wanted the word, AND, typed. Those who continued with one word per page, would be asked "Is there something you could say about ice cream or baseball . . .?" and we would discuss whether to type just one word or additional words. In all these proposed expansions, the child's decision was respected.

When all the words had been typed on the book pages, the child chose the covers from a pile of precut construction paper of various colors. The book was stapled twice on one edge, and a title added, (for example, Mary's Book). The child was asked if she wanted to draw the pictures or if she wanted the researcher to do the drawings. For the first book, the child often chose to have the adult do the drawings (hasty pencil sketches colored with felt pen, done at home that night). Once the child saw the drawings and realized she could do as well or better, she generally chose to do her own drawings in subsequent books.

The completed book (with THE END printed on the back cover) was read by the child with notes taken on the manner in which it was read. Can the child make the transition from words printed in felt pen on cards to their new typed form on paper? Does the child recognize additional words like THE, AND, and A added to her original words? Does the child read and point with one-to-one correspondence?

If more time were available, the child would be given the option of starting another deck of cards for another book. The books may be given to the child to keep or they may be kept in the classroom in small boxes or envelopes labeled with the child's name, available for other children, as well as the owner, to read and are then taken home at the end of the year. Blank books and cards can also be made available in case anyone wants to experiment on her own.

How this key vocabulary method relates to the three thesis questions on the knowledge of word concept and one-to-one

correspondence and its relation to counting will be illustrated in the following section.

To preserve anonymity, A B C D E F H were used to represent the students. The letters were personalized with names : Anna, Bob, Charles, Donna, Ellen, Frank, Gordon and Harold and assigned to each student at random, keeping sex appropriate.

One case study (Anna) will be presented here as an example of the procedures used. The rest of the case studies can be found in Appendix B.

Sample Case Study: Anna (16 years)

1. Key Vocabulary

Anna was the first student to accumulate enough cards for a book. Whenever asked if she wanted another card or if she had enough, she always chose to go on and on, until the researcher called a halt.

2. Reading Cards

Anna reread her stack of cards easily, after one week's time. She showed her card with ANDY written on it to Andy. He did not appear interested until he asked for ANNA when it was his turn. This is one example of the cards meaning more than just a word. They seem to carry an emotional load - a way of telling other people that you especially like them - that children find very satisfying. As Ferreiro and Teberosky have shown in one of their studies (1982), names have very special importance for children.

Anna would reread her cards to herself, whereas the others were not seen to do this. She read "Knight Rider" for her card that said MICHAEL KNIGHT and when corrected, read and reread it correctly on her own, pointing to it, trying to get it right. When Anna's book was finished, this confusion persisted, leading one to suspect that she perceived the overall configuration rather than individual letters.

3. Dictating Book

When it was mentioned to Anna that her book would be typed, she brought over the calculator. I pointed out that it had numbers, not letters. She replied that she would use it to count the word cards. Possibly more would have been learned by waiting to see what she did with the calculator before jumping in with explanations. One wonders if the reason she gave for the calculator was to save face, since confusion of letters and numbers is typical at beginning stages and she didn't really use it to count the cards after all.

When Anna wrote her book, she sometimes put related items together, for instance: BIRTHDAY and TAPE RECORDER SET since her birthday was the following month and the tape recorder set was one present she wanted to receive. However, she did not say what one might expect, I WANT A TAPE RECORDER SET FOR MY BIRTHDAY. Her two words joined by AND indicate a more elementary language level than sentence production would have indicated.

KNIGHT RIDER and MICHAEL JACKSON seem related because they are both stars and both on television. However, she was also

content to put two seemingly unrelated words together as well, ANDY and MINIPOPS, MICHAEL KNIGHT and WALLET.

She again did not recognize MICHAEL KNIGHT, so we left that one and went on to others. She finally recognized it, probably by the process of elimination. When she read her completed book, she still had difficulty with MICHAEL KNIGHT, indicating that a card not easily recognized should be discarded early on and replaced with a more important word to the child.

When Anna dictated BOOKS for one page, she was asked if she wanted just BOOKS or ANNA READS BOOKS. She chose the latter. The same process was repeated for PURSE, with the sentence initiative coming from the researcher. She did not, however, pick up on the patterning to initiate a sentence on her own with the other words.

For CAR EXPLODED, she was asked if she wanted that or THE CAR EXPLODED. She chose the latter. THE was added to see what she would do with a definite article once it was in her book. The teacher explained that THE CAR EXPLODED referred to the time Anna saw her brother hurt while fixing a car that exploded on him. She evidently talked endlessly about it at the time, and now, months later, it reappeared in her book.

4. Reading Book

Anna seemed very pleased with her completed book. She tended to skip over the THE, A, and AND when reading, but recognized them when they were pointed out. When there were more than two words on a page, she pointed to the words as she read.

Anna read her book again after a two-week period. KNIGHT RIDER and MICHAEL KNIGHT were still confused. In one illustration, SUPER KIDS was written on a shirt (the teacher's nickname for the kids in his class). Anna pointed to SUPER and said "Superkids," then pointed to KIDS and looked up questioningly.

On the page that said ANNA LIKES A PURSE, she pointed to, and read, "Anna likes purse." When she was asked to reread it, the article A was again simply ignored.

5. "Pecking"

When a math game was played with Anna, she used the lines on her ruler for simple calculations, while I used my fingers. Sometimes I deliberately gave the wrong answer to see if she would correct me, but she didn't. But then she might not correct a strange adult. It reminded me of one stage when preschoolers do not correct adults simply because they think adults know what they are doing even if the child disagrees.

On a worksheet of simple addition (3 + 2), Anna used the marks on her ruler to add the sums. When the examples switched to subtraction, she still said "plus," but went the other way on her ruler, getting the correct answer. She seemed to have the ruler technique down pat, but lacked the accompanying understanding of number. The teacher wondered about this too, but was discouraging the use of blocks as counters to do exercises.

When helping Anna do a worksheet (on counting backwards from ten), I held up my fingers, subtracting one at a time. Anna

counted the remaining fingers visually, whereas the other child in the group needed to touch fingers as she counted. Anna knew four down to zero by heart, and didn't use fingers to get the answers for 4-1, 3-1, 2-1, 1-1. She used fingers to keep track when counting by 5's and 10's.

When playing Snakes and Ladders, Anna knew the basic rules, but had difficulty keeping the number of moves in mind as well as the direction of the moves, based on which way the numbers increased. She didn't "peck" the die, although "pecking" might have surfaced with two die.

Summary

Anna appeared to have the beginnings of a stable word concept. She recognized favorite words in different forms and after a time lapse. Her one-to-one correspondence with words seemed to break down when words were unfamiliar (SUPER KIDS, which is usually said fast as if it were one word) and when articles were introduced. When she dictated her book, she omitted RECORDS from MICHAEL JACKSON, another indication that one-to-one correspondence is still shaky. Her asking about KIDS reflected her attempts to establish one-to-one correspondence.

Her confusion of MICHAEL KNIGHT and KNIGHT RIDER seemed to indicate that she had not yet "cracked the code" (phonics). Her written language seemed to reflect the development of her oral language, where articles were often omitted in her speech. Her manner of dictating her book may indicate that she sees words as isolated units rather than as parts of meaningful sentences. It

may be that she views a book as a collection of words rather than a vehicle carrying meaning.

Although Anna pointed when strings of words were longer than two, she did not "peck" when counting up to ten. She did use fingers when counting was more advanced.

Her interest and the alacrity with which her book was compiled are indicative of a beginning reader who is starting to realize how words are joined in sentences to produce meaning.

Anna's Word Cards

ANDY
MINIPOPS
BIRTHDAY
TAPE RECORDER SET
MICHAEL JACKSON RECORDS
PURSE
WALLET
MICHAEL KNIGHT
BOOKS
KNIGHT RIDER
CAR EXPLODED

Anna's Book

page #	
1	ANDY MINIPOPS
2	BIRTHDAY TAPE RECORDER SET
3	KNIGHT RIDER AND MICHAEL JACKSON
4	ANNA READS BOOKS
5	MICHAEL KNIGHT WALLET
6	ANNA LIKES PURSE
7	THE CAR EXPLODED

Summary of Pilot Study

Due to the short time period of the study, a complete observation of how reading and math abilities matched in terms of the thesis questions was not possible. Developmental aspects that one would anticipate in a seven-month study were not a factor in this one-month study.

The key vocabulary approach proved to be a helpful tool in determining the child's concept of a word and one-to-one correspondence, the concern of thesis question #1: What does the way a child goes about establishing a key vocabulary reflect about

her knowledge of word concept and one-to-one correspondence? What the students chose to put on their cards, how they read them, how they went about dictating and reading their books revealed a great deal about their understanding of word concept and one-to-one correspondence. With one exception, all of the students in this study demonstrated that they had established a concept of word.

The concept of word was not firm, however, for two of the students. They seemed to be at a transition stage where sometimes they mapped their oral words to written words and sometimes not. Their one-to-one correspondence in math seemed to be more clearly established than it was in reading (Thesis Question #3):

> If parallels exist between counting and reading, does one-to-one correspondence in counting precede that in reading or do they occur simultaneously as the child moves from the perceptual level to the conceptual one?

No one evidenced one-to-one correspondence in reading without having one-to-one correspondence in mathematics.

Those with more advanced math skills relied less and less on pointing to words when they read. Pecking behavior (counting on fingers), however, was displayed by all (Thesis Question #2):

> Does the "pecking" behavior of young children in counting parallel, in some way, their pointing behavior in reading?

The two most advanced students in math abandoned the marks on the ruler procedure, for doing addition and subtraction worksheet exercises and resorted to making pencil marks on a scrap of paper and subtracting the required number from them, indicating an understanding of the subtraction/addition process rather than relying on a rote procedure. These two were also the most competent readers, spontaneously using sentences in their own writing and secure in one-to-one correspondence in both domains.

Some of the students, those with less advanced math skills, seemed to use words largely as labels. Others, in the more advanced math group, used their words more to communicate a message. Two other students in the higher math group seemed to be in transition, using words as labels, with beginning attempts at communicative messages.

Everyone chose capital letters for their cards and they were typed with capitals in their books, with the exception of the most advanced reader, whose lengthy sentences and own writing called for lower case letters.

The students seemed to fall at various points along a normal developmental continuum for one-to-one correspondence in counting and reading over a wide range (approximately two years to eight years). They were placed on a developmental level chart (Table II) using observations of their overall work as a basis. In particular, their expressive language (used to dictate their books) and their level of one-to-one correspondence were used as indicators of cognitive levels. Placing the lists of word cards and typed books side by side would give a similar developmental

pattern. An analysis of the sentences in the key vocabulary books can be found in Appendix C.

TABLE II Pilot Study - Developmental Levels

X = yes
/ = sometimes
blank square = never

DEVELOPMENTAL CATEGORIES	H	E	G	A	D	A	F	B	C
1-1 corresp. to #10	X	?	X	X	X	X	X	X	X
1-1 corresp. in reading (1-5 words)		/	X	/	X	X	X	X	X
1-1 corresp. beyond #10		?	?	X	X	X	X	X	X
doesn't point up to 5 words						X	X	X	X
1-1 corresp. in paragraphs						X	X	X	X
spontaneous simple sents.			/				X	X	X
doesn't point in paragraphs						/	/	/	X
spontaneous complex sents.									X
doesn't use fingers in counting									

Doing this ministudy was very useful in helping to anticipate some areas that might be overlooked in the larger proposed study. Most critical is the need for monthly summaries of field notes to give direction to the study and to discover any gaps in information that might inadvertently be overlooked.

It will be interesting to note whether similar patterns emerge in the larger study with a range of "normal" children and, if so, what implications that might have for instruction.

Using this pilot study as a guide, the next chapter presents data gathered over a nine month period on "normal children," ages 3.5 to 6.5 years, according to the procedural design set out in this chapter and following designated categories of collection.

CHAPTER 4

FINDINGS OF THE STUDY

Originally, on the basis of the pilot study, nine categories were proposed for analyzing the data. As the observations and activities were done with the three groups, it became evident that five categories would be sufficient for data analysis: Key Word Cards, Reading the Cards, Dictating the Book, Reading the Book and Counting with One-to-One Correspondence. Additional activities and observations that arose during the course of the study could be dealt with as appendices. One of these remaining five categories combines two of the original nine categories. The three categories omitted were Pecking, Pointing, and Reading Long Strings of Words because of their low incidence.

The Key Word Card activity continued throughout the year with the grade one children, until almost all of them had compiled a book. The word card activity was not continued with the preschoolers or the ECS children because a baseline had been established and there was a definite lack of interest on the part of the children. The only exception to this was Sally (an ECS child) whose word cards and book are detailed in Chapter Five on "key incident" children.

The data analysis in this chapter addresses the main problem of this study: Is there a relationship between the way a child counts and the way she begins to read? Three questions were proposed to address this problem statement:

1. What does the way a child goes about establishing a key vocabulary reflect about her knowledge of word concept and one-to-one correspondence in reading?

2. Does the "pecking" behavior of young children in counting parallel, in some way, their pointing in reading?

3. Does the child's one-to-one correspondence in counting precede correspondence in reading or do they occur simultaneously as a child moves from the perceptual level to the conceptual one?

A summary of each group's responses to the questions follows. Detailed data by categories for each child are in the Appendix Section. Tables have been used to summarize the data for analysis and to show relationships between correspondence in counting and in reading.

The first question asked: What does the way a child goes about establishing a key vocabulary reflect about her knowledge of word concept and one-to-one correspondence in reading?

SUMMARY OF PRESCHOOL DATA IN RESPONSE TO QUESTION ONE:

Although three and four-year-olds are not usually ready to read, the key word cards were done with them in order to establish a basis of comparison with the older groups.

Two categories were the most salient to describe the preschooler's task performance: Key Word Cards and Reading the Cards. The categories

on Dictating a Book and Reading the Book did not apply at the preschool level as no child progressed far enough to compile a book. Data by categories for each preschool child are in Appendix D.

Table III lists the key word responses of the preschoolers. Of the ten children listed, half responded with their name and/or symbols (letters, numbers), when asked for a word. This may indicate that the concept of word was not yet well developed. Of those who gave words in response to the key word task, none continued to remember the words from week to week so that one-to-one correspondence between oral words and written words was not established.

TABLE III Preschool Key Word Responses

CHILD		* AGE	WORDS GIVEN
Garth	S1	53 mos.	4, BATMAN, KARATE
Fred	S2	46 mos.	FRED
Maurice	S3	47 mos.	4, 5, M, N, L, D
David	S4	54 mos.	DAVID, KARATE PUNCH
Rick	S5	48 mos.	(no words given)
Lydia	S6	54 mos.	3, 2
Aaron	S7	49 mos.	HOUSE, HOT DOG, BAD GUY, KARATE 4 WORM, LION
Sandy	S8	50 mos.	SNOWMAN, WORM, SANTA CLAUS AND SUGAR FOR RUDOLPH
Keith	S9	54 mos.	KEITH 4, KARATE KID, PHONE, UP
Karen	S10	50 mos.	H, T

*Age is given in months as of October, 1985.

The ages of the preschoolers ranged from 42 months to 54 months, a ten-month span. This was reflected in the wide range of responses to the key word activity, from symbols (letters/ numbers) only, to a mixture of words and symbols, to six to eight words, including a phrase.

Initially, word cards were of great interest to preschoolers, as the following vignette will demonstrate, but the interest didn't continue as the purpose for the cards, reading, was not present. One child, J., really sparked the initial interest in word cards, but unfortunately, did

not continue to come to the daycare. At first I didn't recognize the word he wanted, so he acted it out. He stood on one leg with arms outspread and did a fancy kick and handslice that came straight from the movie The Karate Kid. The word he wanted was KARATE. He showed it to the other children and excitement spread. They all wanted a card saying KARATE and went around holding their cards and acting out karate chops as if the cards gave them some magical karate power. J. came back and asked for a second card, saying the same thing. He gave the impression that he thought two cards would make him twice as karate-powerful as the others. As with all other cards the children dictated, these cards were not remembered from week to week.

SUMMARY OF ECS DATA IN RESPONSE TO QUESTION ONE:

Key word cards were started with all the ECS children, to establish a frame of reference, with the anticipation that none would be ready yet to read. Various stages of "readiness" were encountered with one surprise, Sally, who was reading before Christmas. A more lengthy description of Sally's response to the key word cards will be presented in Chapter Five which deals with "key incident" children.

Two categories apply to the ECS children: Key Word Cards and Reading Cards. As Sally was the only child to complete a book, the other two categories, Dictating a Book and Reading the Book, apply only to her and will be dealt with in Chapter Five. Data by categories are in Appendix E.

Most of the children were interested at first in the word card activity in October. This interest gradually dwindled as the children

began to realize they didn't remember words. Some were still interested (for a few weeks) in giving words, however, even though they did not remember them from week to week. Others were not interested at all or downright opposed. The word card activity was initiated again in April - May, but continued only with Sally, as the others again lost interest and/or didn't remember the words.

Table IV summarizes the responses of the ECS children to the Key Word task.

TABLE IV ECS Key Word Responses

CHILD		* AGE	# OF WORDS GIVEN	# OF WORDS REMEMBERED	# OF WEEKS REMEMBERED
Alex	S11	60 mos.	2	0	0
Kris	S12	62 mos.	11	0	0
Carl	S13	61 mos.	5	5	2
Carol	S14	50 mos.	2	0	0
Jackie	S15	51 mos.	5	2	2
Joan	S16	62 mos.	5	0	0
Jay	S17	58 mos.	4	4	8
Jack	S18	62 mos.	6	0	0
Jason	S19	65 mos.	3	1	1
Cora	S20	64 mos.	8	5	12
Laura	S21	63 mos.	17	1	1
Lori	S22	60 mos.	5	3	1
Sally	S23	63 mos.	25	25	36

* Age is given in months as of October, 1985.

This table shows that ECS children were more fluent than preschoolers in dictating words for the Key Word Task. The range in ages of the ECS children (nine months), similar to that of the preschool group, helps to account for the range of responses to the Key Word Task. In contrast to half the preschoolers, only one out of the thirteen ECS children gave numbers and letters for words, indicating perhaps that most

of the ECS children in this study were forming a concept of word. This is supported by the Written Language Awareness Battery described later in this chapter. With the exception of people's names, five of the thirteen children were not able to remember any words from week to week and another five were able to remember only a few words for a short time. Two children, Jay and Cora, remembered some words for two-three months, but were not interested in continuing with the activity. Only one child, Sally, was able to demonstrate one-to-one correspondence with words as she was the only reader in the group.

SUMMARY OF GRADE ONE DATA IN RESPONSE TO QUESTION ONE:

Four categories were used with the grade one children: Key Word Cards, Reading the Cards, Dictating the Book and Reading the Book. A summary of the data by categories is in Appendix F.

Table V shows the relative progress of grade one children through the word card activity by stating the month each child consistently remembered her word cards and the month in which she dictated and read her key word book. The last column of months is also the time that each child demonstrated one-to-one correspondence in reading as she read her key word book. It is very possible that some of the children achieved one-to-one correspondence with words before the month listed, but the table is meant to show the relative progress of the children through the process.

It should be mentioned that the key word card approach is largely a decontextualized one and that some children might have responded differently to a format with a heavier emphasis on context.

TABLE V Relative Progress of Grade One Children With Word Cards and Key Word Books

CHILD		*AGE	MONTH CARDS REMEMBERED	MONTH KEY WORD BOOK WRITTEN
Ruth	S24	79 mos.	November	March
George	S25	78 mos.	April	May
Richard	S26	69 mos.	November	February
Sean	S27	79 mos.	November	January
Cynthia	S28	70 mos.	November	February
Roland	S29	74 mos.	November	February
Cam	S30	74 mos.	April	June
Kelly	S31	76 mos.	April	June
Terri	S32	85 mos.	November	February
Arlene	S33	76 mos.	November	January
Burt	S34	87 mos.	January	February
Sue	S35	76 mos.	November	January
Tanya	S36	78 mos.	November	February
Karla	S37	74 mos.	November	May
Diane	S38	75 mos.	February	June
Sammy	S39	68 mos.	----------	----------
Sol	S40	83 mos.	----------	----------

* Age is given in months as of October, 1985.

As shown in Table V, the grade one children did not all begin to read at the same time during the year. Ten of the seventeen children were reading from the beginning of the study in November. Most of the ten had written their key word books by January or February and demonstrated a firm sense of one-to-one correspondence in their reading. Of the remaining seven children, five began to recognize words as the year progressed, although it was not until April that three of them were finally reading. Most of their books were completed in May or June, and they demonstrated correspondence as they read them. The remaining two first graders were not reading by June and did not compile key word books or demonstrate correspondence in reading.

Across the groups, there seemed to be a sequence of responses when the key word cards were presented to the children from week to week to be read. The youngest children in the study did not recognize their words. On the next level, the children would remember the words they had given, but not recognize them. This was most apparent when some of the five-year-olds would remember two or three words given the previous week, but match them to the wrong cards. Next, children remembered cards accurately for approximately three or four weeks, but did not recognize them after two to four months (approximately). Finally, the words were actually read and recognized for a minimum of the nine months of the study.

RESPONSE OF GRADE ONE AND ECS TO WRITTEN LANGUAGE AWARENESS BATTERY

The number of words given by first graders was not relevant, as all grade one children were able to dictate copious words, possibly indicating a sense of word concept more developed than that of the younger groups. This was supported by the results of three sections of the Written Language Awareness Battery (Evan, Taylor, and Blum, 1979) given to the ECS and Grade One children: Aural Word Boundaries, Visual Word Boundaries and the Mow-Motorcycle Task. The responses of the children to these tasks seemed congruent with their responses to the key word task. All the grade one children could do the tasks, usually with ease, with the exception of Sammy and Sol, who also had difficulties with the key word task and with the reading tasks required in grade one. Sally, the one ECS reader, did all the tasks correctly with one distinction. She was the only ECS child to read the sentence as she circled the words and as a result ended up circling some syllables within words. Interestingly, these were the compound words (cowboys, downtown) made up of two individual words which she circled. Alex, who had the most difficulty with counting, was the only ECS child in this study to circle individual letters as words.

Table VI summarizes the Grade One children's response to the WLA Battery. An x indicates that the task was accurately completed. Errors are noted. Most of the first graders had difficulty with number nine, either leaving out one of the words or mixing up some of the words given, as indicated in the table.

TABLE VI Response of Grade One Children to WLA Battery

CHILD	MOW-MOTORCYCLE	AURAL WORD BOUNDARIES	VISUAL WORD BOUNDARIES
Ruth	x	#9 left out never	x
George	x	#9 left out that	absent
Richard	x	#9 reversed word order	cow boys
Sean	x	#9 reversed word order	x
Cynthia	x	x	cow boys
Roland	x	#9 left out that	cow boys
Cam	x	#9 left out that	cow boys
Kelly	x	x	cow boys
Terri	x	x	x
Arlene	x	x	x
Burt	x	x	x
Sue	x	#9 reversed word order	cow boys
Tanya	----------	moved ----------	
Karla	x	#9 left out never	cow boys
Diane	x	x	x
Sammy	x	omitted #8 & #9	circled sentence
Sol	0	I/am happy #9 inserted were	cow boys

As shown in the next table, Table VII, those ECS children with firm correspondence to 25 also did well on the WLA Battery: Cora, Sally,

Jackie, Lori. Alex, with a very weak correspondence was not able to do any of the tasks successfully. Carol's correspondence to 25 was fairly recent and her response to the tasks was mixed. Although Laura counted by rote to 15, she lacked an understanding of number as quantity and also had difficulty with the tasks.

Although Jay has firm correspondence to 25, he reverted to base ten when counting beyond the number 30, something the children with more firm correspondence did not do. His was a mixed reaction to the tasks. He circled each individual word, but moved vertically across the page. He did not want to continue the Aural Word Boundary Task. Joan and Jack, both with correspondence less than 25, had mixed reactions to the tasks. They both missed one of the choices on Mow-Motorcycle and either refused or were not able to do the Aural Word Boundary Task. Although Joan successfully completed Visual Word Boundaries, Jack, with the lower correspondence, did not circle his words in sequence and circled a phrase as one word.

An x indicates that the task was correctly done. Notations of any errors are made. 0 indicates that the child was not able to do the task.

TABLE VII Response of ECS Children to WLA Battery

CHILD	MOW-MOTORCYCLE	AURAL WORD	VISUAL WORD	COUNTING
Cora	x	9 words	x	to 25
Sally	x	9 words	circled some syllables	to 25
Alex	chose left card	0 words	circled only letters	to 4
Carol	chose left card	3 words	x	to 25
Jay	x	6 words	x	to 25
Joan	dictionary	2 words	x	to 15
Jack	dictionary	refused	in a wagon	to 10
Laura	0	4 words	0	to 15
Lori	mow	absent	x	to 25
Jackie	x	9 words	absent	to 25

Samples of the WLA (Written Language Awareness) Battery can be found in Appendix A.

ANALYSIS OF GRADE ONE KEY VOCABULARY BOOKS

a) Sentence Structure

As shown in Table VIII, most first graders used simple sentences with a few compound and complex sentences. One overall pattern that emerges when one examines the modifiers in the table is that those who completed their books most easily (earliest), namely, Sean, Richard,

Arlene, Terri are those who used the highest total number of modifiers. Those who were among the ones who took the longest to complete a book, Karla, George, Diane, were in the group who used the least number of modifiers. Since all had one-to-one correspondence in counting from the beginning of the year, it is, unfortunately, not possible to compare their current levels of word usage with their acquisition of correspondence in counting.

TABLE VIII Analysis of Grade One Key Word Books

	SENTENCE STRUCTURE			MODIFIERS					
CHILD	Simple	Cpd.	Cplx	Adj	Adv	Phrs	Art	Conj	Tot
Ruth	14	0	0	4	2	0	0	2	8
George	13	0	0	7	0	0	0	0	7
Richard	14	0	2	7	2	10	3	3	25
Sean	7	2	1	4	3	7	7	2	23
Cynthia	14	3	0	4	1	2	0	10	17
Roland	5	0	6	6	0	9	1	0	16
Cam	17	1	0	9	0	0	3	3	15
Kelly	16	2	0	2	2	0	9	1	14
Terri	13	0	1	7	2	7	2	1	19
Arlene	10	0	0	7	1	3	4	4	19
Burt	13	0	1	0	3	5	0	1	9
Sue	10	0	0	6	0	2	3	2	13
Tanya	18	1	1	1	0	3	2	3	9
Karla	15	0	0	0	0	1	0	0	1
Diane	23	0	0	4	0	3	2	1	10
Sammy	----------								
Sol	----------								

It is interesting to compare the second books dictated by some of the children (found in Appendix G) as the form of these was not bound by word cards. Sean and Arlene used both compound and complex sentences as well as numerous phrases to carry a story line, whereas, Ruth, Cynthia,

Diane and Karla stuck with simple, largely unrelated sentences. Sean was the only one of this group to be observed using noticeably advanced math skills, i.e., counting spontaneously by two's and five's and doing addition and subtraction examples in his head.

b) Semantics

The books of Karla and George have the simplest statements: I LIKE and a noun. These two were among the last to complete a book. Many others used that simple, egocentric format, but added a few sentences that were descriptive or talked about other people (Cynthia, Tanya, Kelly, Diane, Cam, Burt). The rest went a step further and used sentences that expressed a ministory or included rationales for statements. When Sean and Arlene did their second books, they exhibited a further advanced step by having all the sentences relate to one story theme with a beginning, middle and end.

This first section has dealt with one-to-one correspondence in reference to words. The next section looks at correspondence in counting and the relationships between the two.

QUESTION TWO

The second question proposed: Does the "pecking" behavior of young children in counting parallel, in some way, their pointing in reading? As mentioned earlier, since very few occurences of these behaviors were recorded, they were omitted from the analysis.

QUESTION THREE

The third question of interest is: Does the child's one-to-one correspondence in counting precede correspondence in reading or do they occur simultaneously as a child moves from the perceptual level to the conceptual one?

Children who count with perceptual correspondence use numbers as labels without maintaining one-to-one correspondence for more than a handful of numbers and are not aware of numbers as representing actual quantities. Children who count with conceptual correspondence, on the other hand, are very careful to maintain one-to-one correspondence and to obtain the exact amount of items when they count. All the readers in this study had conceptual correspondence.

SUMMARY OF PRESCHOOL DATA IN RESPONSE TO QUESTION THREE.

Table IX compares counting samples taken from the preschoolers in November (T1) and January (T2) indicating the levels of one-to-one correspondence in counting. Five of the ten children substantially increased their level of one-to-one correspondence, two of the children increased their level by only one digit and the three remaining had left the daycare setting before the second sample was taken. Data by categories can be found in Appendix D.

TABLE IX One-to-One Correspondence of Preschoolers

CHILD	T1	T2
Garth	5	13
Fred	3	4
Maurice	10	14
David	5	10
Rick	3	4
Lydia	3	11
Aaron	5	17
Sandy	10	n/a
Keith	21	n/a
Karen	4	n/a

Since none of the preschoolers were reading, it appears that one-to-one correspondence in counting precedes correspondence in reading. The level of correspondence and how it relates to each child's response to the word card task of Question One is outlined in Table X.

Some preschoolers counted with one-to-one correspondence using numbers at random rather than in sequence, saying number strings such as 11, 3, 7, 12....14, 13, 14, 13....14, 4, 8, 12, 1, 2, 3, 1, 2, 3....The preschoolers who counted with random numbers, but maintained correspondence (Garth and Aaron) were also the ones who maintained high correspondence with numbers in sequence. Those who used random numbers in the October sample, but did not maintain correspondence in counting (Fred, Karen, Rick) were also the ones with the lowest correspondence in sequential numbers.

Table X compares preschool counting samples and word cards. Those children who retained a small amount of one-to-one correspondence in counting (Fred, Karen, Rick) also gave a minimal response to the Key Word Task. Those with more extensive correspondence in counting (Aaron, Sandy, Keith) had a more prolific response to the Key Word Task.

TABLE X Comparison of Preschool Counting and Key Words

CHILD	CORRESP. IN NOV.	CORRESP. IN JAN.	KEY WORD
Garth	5	13	4, BATMAN, KARATE
Fred	3	4	FRED
Maurice	10	14	4, 5, M, N, L, D
David	5	10	DAVID, KARATE PUNCH
Rick	3	4	-------
Lydia	3	11	3, 2
Aaron	5	17	HOUSE, HOT DOG, BAD GUY KARATE 4, WORM, LION
Sandy	10	N/A	SNOWMAN, WORM SANTA CLAUS AND SUGAR FOR RUDOLPH
Keith	21	N/A	KEITH 4, KARATE KID, PHONE, UP
Karen	4	N/A	H, T

SUMMARY OF ECS DATA IN RESPONSE TO QUESTION THREE.

During the initial visits to the classroom in October, the children were asked to count the researcher's fingers as it is a familiar and nonthreatening task that served as an ice-breaker. It also supplied a baseline for counting. In October (T1), the children were asked to count on an abacus while their one-to-one correspondence was noted. This abacus had 20 large beads, ten on each of two rows.

In January (T2), each child was asked to count a collection of pennies (25) in a box cover. One-to-one correspondence and their approach to keeping track of items distributed in random order were noted as opposed to earlier counts on items (fingers/beads) in a fixed order. In May (T3), , the penny count was done again with each child and any differences from January were noted. Data by categories are in Appendix E.

Unfortunately, additional samples of counting on fingers and on the abacus were not taken, precluding the possibility of comparative data in this respect.

TABLE XI One-to-One Correspondence of ECS

CHILD	T1	T2	T3
Alex	4	4	4
Kris	5	5	n/a
Carl	4	12	n/a
Carol	10	12	25
Jackie	20	25	25
Joan	11	12	15
Jay	20	25	25
Jack	10	11	11
Jason	10	25	25
Cora	10	25	25
Laura	15	15	15
Lori	20	25	25
Sally	20	25	25

Table XI shows a wide range of ability to count with one-to-one correspondence among ECS children. Some children counted with correspondence to at least 20 in October. Unfortunately, the ability to count beyond 20 was not established at that time. Other children in October had correspondence extending to five or ten. Some of these children extended their correspondence dramatically between October and January (Jason, Cora), while others seemed to remain at a standstill (Andrew, Kris, Jack, Joan).

The use of random numbers for counting, with and without correspondence, was also noticed among the ECS group. The children using random numbers had one-to-one correspondence up to five and ten initially. None of the children who initially had correspondence up to 20 used numbers at random to count, although Jay did use the base ten sequence in order.

Alex's use of random numbers showed a developmental progression, during the study, from random numbers in the teens, to a base ten system in the twenties, to conventional number names in the twenties. Those who used random numbers with correspondence (Carol, Carl and Joan) extended their correspondence with sequential numbers up to between 15 and 20. Those who used random numbers without correspondence (Alex, Kris) did not expand their sequential counting beyond number five.

There seemed to be a general pattern between a child's ability to remember a word, other than a proper name, over time and her demonstration of one-to-one correspondence in counting as shown in Table XII, comparing the level of counting correspondence of the ECS children with their key word responses when both were initiated together in the fall.

TABLE XII Comparison of ECS Counting and Key Word Responses

CHILD	CORRESP. IN OCT.	# OF WORDS GIVEN	# OF WORDS REMEMBERED	CORRESP. IN MAY
Alex	4	2	0	4
Kris	5	5	0	n/a
Carl	4	5	5	n/a
Carol	10	2	0	25
Jackie	20	5	2	25
Joan	11	5	0	15
Jay	20	4	4	25
Jack	10	6	0	11
Jason	10	3	1	25
Cora	10	8	5	25
Laura	15	17	1	15
Lori	20	5	3	25
Sally	20	25	25	25

Alex, Kris, Joan, Carol and Jack were not able to remember any of their word cards and their correspondence did not extend much beyond the number ten. Carol stands out from this group since, by May, her correspondence had extended from ten to twenty-five. Those children who initially had correspondence to at least 20 (Jackie, Jay, Lori, Sally) were also able to remember some of their cards for at least a short period of time.

SUMMARY OF GRADE ONE DATA IN RESPONSE TO QUESTION THREE

As counting on the abacus to 20 was too simple for this group, it was omitted and replaced with counting pennies. Sometimes counting correspondence was demonstrated with classroom materials during regularly scheduled math times. All counting activities were put under the Counting with One-to-One Correspondence category. Data by categories are in Appendix F.

Almost all of the first graders had one-to-one correspondence when counting in sequence to at least 25. Even the children who initially were not ready to read in the fall and those who didn't begin to remember words consistently until April, still had one-to-one correspondence to 25 in October. The only child to have counting patterns similar to younger children was Sol, who also was not able to retain words, even by May. He frequently recounted an object or left out a number when counting items spread out in no particular order. At number 30, he continued with 30-11, 30-12...a pattern similar to that used by some ECS children. He counted in sequence with correspondence to 14 with ordered objects.

Because of this "ceiling effect" for counting in grade one, the data for grade one will not be analyzed in reference to Question Three, with the exception of Sol and Sammy, atypical grade one children detailed in Chapter Five.

CROSS GROUP COMPARISONS

The Preschool and ECS children were observed counting various objects that were both placed in a certain order (fingers, abacus beads) and placed randomly on a surface (pennies in a box lid). From these observations are listed some counting behaviors exhibited by children as they moved toward establishing one-to-one correspondence:

Behaviors Observed Prior to Correspondence in Counting

> Saying a number without correspondence to an object.
> More than one number per object
> More than one object per number
> Repeating the same number in a sequence
> Skipping a number in a sequence
> Recounting the same object / Skipping others
> Saying numbers at random but with correspondence
> Starting over with number one in the middle of a sequence
> Adding a skipped number later on in the sequence
> Using base ten (11-teen, 12-teen...20-11,20-12..30-11..)

The children who resorted to random numbers in counting could be said to be demonstrating perceptual correspondence as they seemed to understand numbers as labels rather than as representing a quantity that includes the previous counted objects (conceptual correspondence).

Perceptual one-to-one correspondence, the understanding of the number name as a label rather than as a quantity inclusive of the

preceding amounts, was demonstrated by those children who matched spoken number to object, but continued to recount some of the same items and skip others. Children with perceptual correspondence were not among those children who were reading or beginning to read.

In relation to word cards, the children who read and retained their words all had one-to-one counting correspondence to at least 25. Although there were some who had counting correspondence, but were not yet reading, there were no readers without counting correspondence.

Table XIII contains the average one-to-one correspondence in counting for the three groups over time, based on a ceiling of 25 items. It should be noted that 25 is a minimum for the first graders and that most could count with correspondence beyond number 25. The extent of each child's counting correspondence was not examined in this study. The ECS children, as well, were limited to counting samples of 25. Although some ECS children could count with correspondence beyond number 25, the extent of their counting was not examined in this study.

TABLE XIII Comparison of Average Counting Correspondences

	PRESCHOOL	ECS	GRADE ONE
average corresp in Nov.	7	12	25
average corresp in Jan.	10	17	25
average corresp in May	N/A	20	25

To parallel the list of counting behaviors observed in young children prior to one-to-one counting correspondence, is a suggested listing of potential steps children seem to go through as they progress toward one-to-one correspondence in reading. These responses were given when children were asked to state a word of their own choosing for the Key Word Card activity. This listing is tentative at best as there are many areas of pre-reading behavior not covered in this study.

Behaviors Observed Prior to Correspondence in Reading

> drawing pictures and labeling with own or adult writing
> using symbols (letters/numbers) for words
> writing own name and those of family/friends
> giving a long string of words that told a story
> giving one word per key word card
> matching two oral words to one written one or saying one oral word for two written ones

Since some of the nonreaders in ECS were able to do the Written Language Awareness Battery (Evans, Taylor & Blum, 1979), these behaviors could also be included in this tentative listing:

> circling individual words in a written sentence (Visual Word Boundary Task)
> matching oral words to written ones using length as a clue (Mow-Motorcycle Task)
> matching blocks to spoken words in a memorized sentence (Aural Word Boundary Task)

The listings of behaviors prior to correspondence in counting and reading were not found to be in any consistent order. Clear parallels between the two listings are difficult to determine with the possible exception of matching one oral word to two objects (or written words) or matching two oral words to one object (or written word).

Table XIV compares the syntactical classes of words given for key word cards by all three groups. Preschoolers did not give any verbs when asked for words. ECS children gave only two in all, whereas, by grade one, verbs were commonly given. Preschoolers were more likely to give symbols (numbers/letters) for words than ECS children. When giving words, both preschoolers and ECS children were more likely to give nouns.

TABLE XIV Cross Group Comparison of Syntactical Features

CLASS OF WORD	PRESCHOOL		ECS		GRADE 1	
own name	2	(5%)	1	(1%)	0	(0%)
symbols	13	(33%)	10	(13%)	0	(0%)
nouns	20	(50%)	43	(54%)	200	(45%)
verbs	0	(0%)	2	(2%)	145	(33%)
modifiers	3	(7%)	20	(25%)	85	(19%)
connectives	2	(5%)	4	(5%)	15	(3%)

Table XV compares the three groups in terms of how many syllables were used per word. It is odd to note that the grade one children in this study used, proportionally, more one-syllable words than either of the younger groups and fewer multisyllable words. One possible explanation might be that the first grader's sense of words may be influenced by the formal reading instruction of grade one, although the classroom in this study used a whole language, rather than a basal

reader, approach. In this study, words of four syllables were the only ones that clearly separated readers from nonreaders. The high percentage of one syllable words used by first graders reflects their use of connectives and articles in sentences, uses not present in the younger groups.

TABLE XV Cross Group Comparison of Syllabic Features

NUMBER OF SYLLABLES	PRESCHOOL		ECS		GRADE 1	
one	16	(67%)	26	(48%)	350	(80%)
two	5	(21%)	14	(26%)	60	(14%)
three	3	(12%)	14	(26%)	23	(5%)
four	0	(0%)	0	(0%)	6	(1%)

Table XVI is a summary table to give the reader an overview of the information obtained across groups. The data categories (summarized for each child in the Appendices) are used as column headings in this table. Those categories that addressed reading correspondence are listed under Question I and those that addressed counting correspondence, under Question III. The pattern of x's in this table illustrates how the variety of responses to the tasks, typical of younger children, becomes uniform in grade one children who have established one-to-one correspondence in both areas. The atypical x patterns for S39 and S40 are those of the first grade nonreaders.

In summary, the following observations can be made:

1) The way a beginning reader establishes a key word vocabulary does seem to reflect her developing concept of word and one-to-one correspondence in reading.

2) A relationship does seem to exist between a child's one-to-one correspondence in counting and her corres- pondence in reading. Even at the preschool level, those children with higher levels of one-to-one correspondence demonstrated more competent responses to the key word activities.

3) A child's one-to-one correspondence in counting precedes, and may even be a prerequisite for, corres- pondence in reading. This counting correspondence is on a conceptual, rather than perceptual, level.

4) The way a child uses random numbers in counting seems to be one indication of her progress in moving from perceptual correspondence in counting to conceptual correspondence. All readers in this study had conceptual correspondence to a minimum level of 25.

The following chapter will examine in detail the responses of some "key incident" children to the thesis tasks in an effort to further illuminate some of the findings of this study.

TABLE XVI Summary of Cross Group Data

Category	QUESTION I												QUESTION III					
	1 Key Word				2 Read Cards			3 Dictate Book		4 Read Book			5 Counting					
	symbol	name	noun	verb	no	1 wk	3 mos	yes	no	1-1	no 1-1		-5	5	10	15	20	25
Preschool																		
S1	x		x		x			x							x			
S2		x			x			x					x					
S3	x				x			x							x			
S4		x	x		x			x							x			
S5					x			x					x					
S6	x				x			x							x			
S7	x		x			x		x								x		
S8			x		x			x							x			
S9	x	x	x		x			x									x	
S10	x				x			x					x					
ECS																		
S11		x			x			x					x					
S12		x			x			x						x				
S13		x				x		x							x			
S14	x				x			x										x
S15		x				x		x										x
S16		x			x			x								x		
S17		x				x		x										x
S18		x			x			x							x			
S19	x	x				x		x										x
S20		x				x		x										x
S21		x				x		x								x		
S22		x				x		x										x
S23		x					x	x		x								x

TABLE XVI Summary of Cross Group Data (continued)

Category	QUESTION I 1 Key Word				2 Read Cards			3 Dictate Book		4 Read Book		QUESTION III 5 Counting					
	symbol	name	noun	verb	no	1 wk	3 mos	yes	no	1-1	no 1-1	-5	5	10	15	20	25
Grade One																	
S24			x	x			x	x		x							x
S25			x	x			x	x		x							x
S26							x	x		x							x
S27			x	x			x	x		x							x
S28			x	x			x	x		x							x
S29			x	x			x	x		x							x
S30			x	x			x	x		x							x
S31			x	x			x	x		x							x
S32			x	x			x	x		x							x
S33			x	x			x	x		x							x
S34			x	x			x	x		x							x
S35			x	x			x	x		x							x
S36			x	x			x	x		x							x
S37			x	x			x	x		x							x
S38			x	x			x	x		x							x
S39	x	x	x	x		x			x					x			x
S40			x		x				x						x		

All the grade one children in this study who completed a key word book demonstrated one-to-one correspondence with words when reading their books. Some children in the pilot study, as well as some grade one children not in this study, have shown a lack of one-to-one correspondence with words, especially function words such as the and a.

CHAPTER FIVE

KEY INCIDENT CHILDREN

Key incidents, according to Wilcox (1981, p. 462) are "concrete instances of the working of abstract principles" recorded in extensive, descriptive detail. In this study, the behaviors of certain children could be characterized as key incidents since it provided concrete examples that help explain the abstract principles outlined in the earlier chapters of this study. Consequently, these children have been referred to as "key incident children." More detailed notes were taken on them, as their responses to the activities were outside the overall profile of their respective age-groups. Their responses seem to clarify some of the cognitive steps children take in the beginning reading process, as well as link the observations on each age group to one another, since their responses were atypical for their age-groups, but typical of other age groups.

One ECS child, Sally, was chosen as a "key incident" child, as she was the only one in the ECS who was reading and therefore able and interested enough to generate numerous key word responses. Although Sally was one year younger than the age for grade one, her overall responses to the activities were more typical of grade one responses. The interesting thing about Sally, however, was the manner in which she responded to the word card activity. Although cognitively able to handle grade one

tasks well, her playful responses were in sharp contrast to the seriousness of the grade one children in this study.

Sammy, Sol and Richard were grade one children, selected for this key incident chapter for different reasons. Although of grade one age, albeit just, Sammy's responses to the key word activities were similar to what a four or five-year-old would say. His enthusiasm and steady progress, however, indicated that his beginning reading skills were following a normal developmental pattern.

Sol was older than his classmates, but still not reading. His difficulties in correspondence with both words and counting indicated a possible cognitive deficit or delay. No specific disability had been identified. The third first grader, Richard, is briefly cited as his spontaneous story served to highlight one of the limitations of the structure of this study in terms of encouraging imaginative responses.

ECS KEY INCIDENT CHILD

SALLY (July, 1980)

Compared to her peer group, Sally had a very different response to the key word card activity. She was very interested in word cards right from the beginning in October and adopted a playful attitude toward them. She was having snack when she was first asked for a word and she responded with APPLE JUICE and then continued on in a playful vein asking for HAIR JUICE and MOO JUICE

and WALL JUICE.... She remembered most of her cards from week to week, even when she had accummulated well over a dozen. Her errors were characteristic of a beginning reader cracking the phonics code when, for example, she said "Tammy" for TUMMY and "head" for HAIR. She made fewer mistakes as the weeks went by. By January, she knew all her cards consistently. She delighted in playing with sounds, asking for things like GEE GEE and BEE BEE to be written.

In November, Sally wrote MOM on her own and then MOLM. I asked her what the latter said and she replied "Molm," sounding it out. By December, Sally was reading her word cards in a nonsense way, saying MUICE instead of JUICE.

Sally was observed doing an alphabet puzzle in December. She said the letters in order as she did the puzzle. At K, she began again from A to find out what came after K. She repeated this process again at N, R and W. This concentrated, painstaking approach characterized all of Sally's activities.

One day HOT CHOCOLATE was held upside down by mistake. She continued to stare at it, trying to figure out why she couldn't read it until another child told her it was upside-down. Since phonics is clearly a strength with Sally, perhaps she was trying to figure out the word phonetically and not taking the word in as a whole, which would have made it easier to realize that it was upside-down.

When Sally dictated her book, she revealed the younger child she really is. She didn't expand her words into sentences, but wanted only one card per page. When prompted as the first graders

were, the most she would do was to put two rhyming words together.

She typed some of her cards on her own sheet of paper once her book was finished. There were spaces between some of the words as she typed, but most of her words were typed in a long string without spaces between them. Although able to demonstrate one-to-one correspondence by pointing as she read her key word book or a trade book, Sally still exhibited behavior typical of a younger child by not consistently leaving definite spaces in between the words she typed.

Sally read her book with no errors and didn't point while reading. When asked to point, she did so with accurate one-to-one correspondence.

SALLY'S BOOK (Fall, 1985)

1. GEE GEE
2. RITZ MITTS
3. BOX JUICE STORE
4. MOO JUICE
5. HOT CHOCOLATE
6. GRAPE JUICE
7. BOOK JUICE
8. WALL HAIR
9. APPLES AND APPLE JUICE
10. MILK PILK
11. BEE BEE
12. HAIR JUICE AND TUMMY JUICE

In April, Sally was playing with writing letters at the writing centre. She drew a fat outline of the letter B. Then added a backward E and an A. She then got playful and drew a figure . It looked like a chick, but Sally turned it upside-down and said it was a goose. She then changed the E into

a window and the B to a ghost by adding eyes. She talked about a friendly ghost show she had seen on T.V. Then she drew a whirlpool-type figure and said it was the ghost going down a hole.

This behavior seemed to indicate a mature interest in words and writing since the other ECS children at this time were choosing sand/water play, blocks, playhouse.... The playful approach to the writing, however, was in keeping with Sally's chronological age. It seemed to fall somewhere in between the drawing of pictures that Sammy did and the generation of a story line that Richard did, given the same opportunity, i.e., paper, pencil, quiet time and an interested adult.

In May, Sally was looking at a trade book, Just Me and My Daddy by Mercer Mayer. When asked to read it (which she readily did), she read most of it word perfect. She read PICNIC for PICKED (suggested by the illustrations) and CAMPSIT for CAMPSITE. She read fluently and with expression, without pointing. When asked to point for some of the pages, her one-to-one correspondence was accurate.

When asked how she had learned to read, Sally replied that she had learned around Christmas and that her Mom gave her some words and she tried and tried until she got them. Then her Dad asked her to read a book to him and she did. (N.B. Sally was already reading her own book, made from word cards, before Christmas).

Sally was the only ECS child to have a consistent interest in word cards throughout the year. In April, all the ECS children

were again asked if they would like word cards. None of the boys were interested. A few girls were mildly interested, but did not remember their cards from week to week, with the exception of Sally.

Following is a list of Sally's word cards from February to May. As they were becoming more and more outrageous, they were not put in book form. She sounded out these cards consistently from week to week and did so with great enthusiasm.

February:

VOODOO VD GOODABA GOO BOO
PLAYING OUT IN THE SNOW
BAD DAY
VALENTINE'S DAY
100 100100 YEARS
APRIL 100 YEARS
ZA BLUFF BACK
VAB BAD

April:

SHO
FOO FEE
SAN NOO FEE
SAA DO FEE
SOO DAA
SAA FOO FEE
SAN DO BE
SAN TOO FEE TA
TA TEE TOO TEE TA TA

May:

SA GOOFY
SA DA DOOFY
SA DOOFY BOOFY YOOFY TO FOOFY
SA GOOFY BOOFY BLAFF

Sally had accurate one-to-one correspondence in all of the counting exercises. In October, when counting the researcher's

fingers, most of the children began to count over from one when the second hand was added. Sally, however, counted on from 6-10. When she counted pennies in February, she was conscious of quantity, taking one out at a time from the box while counting. Distracted by classmates, she decided to take all the pennies out of the box and count them as she put them back in. She reached number 12 and was distracted again by a another child. She began again to recount them with a definite effort to know the correct amount. Her one-to-one correspondence was accurate to at least 25. When counting pencils in May, she didn't want to point to each as she counted, but do it "in her brain." When one or two pencils were added to the pile, she counted on rather than counting over from one. When three more were added, however, she recounted from the beginning. Perhaps, given her penchant for accuracy, the quantity was more than she could keep track of "in her brain."

Overall, Sally's cognitive ability in reading and counting was more typical of a grade one profile, although the playfulness of her approach to the tasks was typical of her age.

Since Sally was one of the few children in transition during the study, from nonreading to reading, her "techniques" might be instructive for teachers. Sally played extensively with words and sounds, rhyming words, using nonsense words. Her playing with sounds in nonsense words may have laid the groundwork that strengthened her concept of word and allowed her to break the phonics code that let he4r read trade books easily.

Sally's careful counting with conceptual correspondence to at least 25, support the notion of correspondence in basic counting

as a prerequisite to reading. Since Sally entered ECS with this correspondence, it is, unfortunately, not known when it first developed.

GRADE ONE KEY INCIDENT CHILDREN

SAMMY (February, 1980)

Sammy was a first grader who was not ready yet to read. He was noticeably less mature than his classmates and had just turned the age for grade one entrance.

Although Sammy did not recognize words initially, he was always very interested in doing word cards and would spent quite a long time carefully illustrating each one. He was the only child to do this in grade one. The ECS children in this study did not usually illustrate their cards, although some of the preschoolers did.

Sammy's first word was BEAR which was discarded when he didn't recognize it. He didn't recognize his second card I AM PLAYING IN THE SNOW, even when we had read it and the following card said the same thing. He looked at a card that he had drawn two figures on and said "me and my mom," but didn't comment that the card had no words. He read cards with or without words in the same manner. For I LOVE MOM, he read "Mom and Dad."

In November, Sammy copied FIRST from the board and said it read "first snow." When asked where it said FIRST, he pointed to the F. When asked where it read SNOW, he pointed to the S.

In January, Sammy wanted to write his full name, first and last, and did so two cards. He didn't recognize I LIKE SCHOOL, which was discarded. He called FAT CAT, "elves" and then asked for ELVES for his next word. He said "Santa" for SANTA RUDOLPH and "bears" for BEAR CUB. He did not seem to be troubled by the presence of a second word.

In February, Sammy drew a house and colored it with markers. He wanted to write SANTA next, doing it himself as I said out the letters slowly one at a time. It reminded me of what my daughter would often do at four years of age. Sammy wrote all of the alphabet on one of his cards. With a slip of the tongue he said, "Want me to write you..draw a school, a doll?"

Sammy spent a long time doing the following writing and drawing (approx. 30-40 min.). He drew three cards with pictures and I suggested that we add words. On the first card he wanted ME AND MY MOM ARE PLAYING IN THE SNOW. I said it wouldn't fit, but would he like just ME AND MOM? He said he could write it. He wrote all three words, without help, neatly in the small space:

MOM

ME AND

On the second card, he drew two faces and wanted the words I LOVE MOMMY. As they were written, he spelled LOVE out loud, ahead of time, and spelled out MOM as MOMMY was written. He wanted to write the third card himself - I AM PLAYING IN THE SNOW. He wrote MA for AM. I spelled out PLAY and he added ING himself. For the fourth card he decided to write I AM JUMPING IN THE SNOW, but

ended up copying his third card instead. All this he did with great enthusiasm and animation.

In March, Sammy continued his delight in doing word cards. With markers, he colored any word cards that he hadn't finished the week before. He next drew a unicorn fish. When asked if he wanted words with it, he said yes, but didn't follow up on it. I asked if he wanted me to write it or if he wanted to. He said he would do the writing, but continued drawing and coloring and chatting. No words were put on cards for two weeks.

One of Sammy's cards stops short with I AM PLAYING IN T. He read it as I AM PLAYING IN THE SNOW, then looked again at it and said "I am playing in the." One gets the impression that he still sees letters as representing the whole word, similar to one of Ferreiro & Teberosky's (1982) beginning writing stages. He read MOM ME AND as MOM AND DAD, then asked if it actually said MOM AND DAD. This was the first time he showed any doubt about what he read. When the card was read correctly, he repeated it.

By mid-March, Sammy began to notice distinctive features of words. For I LOVE MOMMY, he first said "Mommy, Daddy," then looked again and self-corrected to "I love Mommy." For the card with a drawing of two figures, he said "Me and my baby sister." Since there was no writing on the card, I asked him where it said that. He responded "I just said that." I asked him if he wanted me to write it. He said yes.

Although Sammy had recognized I AM PLAYING IN THE SNOW quite a few times up to now, he no longer remembered it or I AM PLAYING IN T. He asked for HOUSE to be written three times on one card as

he had three drawings of houses. He asked for FIRE TRUCK to be written on a card with his drawing of a fire truck.

When Sammy had originally written the card for MOM AND ME, it ended up looking like MOM

ME AND and he had always read it as ME AND MOM. Now, in mid-March, he read MOM and then asked what the rest said. He tried to read it to make sense of it and then gave up. It seemed that up to now he had "read" his cards from memory aided by drawings, whereas now he was attending to the words themselves and actually trying to read them, and this combination did not make sense.

One card had OLD WOMAN written on it. Originally he had asked for OLD WOMAN IN THE SHOE, but there wasn't enough room on the card to write it so he said "Well, just write OLD WOMAN then."

In May, Sammy no longer recognized most of his words with the exception of his own name, I LIKE SCHOOL and I LOVE MOMMY. For ME AND MY BABY SISTER, he said "Me and my Dad," thought for awhile and then said, "Me and my Dad and my sister."

When asked for a favorite word, he continued to respond with "I want to draw a picture." He wrote MY BABY on his own and asked to have SISTER spelled out for him. He drew a picture of steps, was a bit hesitant about adding the word, then agreed if I wrote it. He drew a picture of a hook, but when I offered to write the word HOOK next to it, he insisted on doing it. I spelled HOOK and he added an S himself and said HOOKS. His last drawing is of a monster/sister. For this he drew a dress, a tongue, tonsils, added a bellybutton and then another tongue. When asked if that

was a funny drawing or a scary one, he immediately replied, "scary." He asked for the red marker to color the tongues because "real tongues are red." I asked if he knew someone with a scary tongue, he replied, "monster" and made a monster face, contorting his own face. After adding a bit more to his drawing, he said it was his sister.

Sammy's interest in word cards, particularly his drawings, was very similar to Garth's, in the preschool, who drew pictures of Superman on his cards. Sammy's birthdate (February, 1980) and Garth's (May, 1981) are only 15 months apart. Considering that the span of ages in grade one is over a 12-month range, 15 months does not seem that great an age difference and yet two grade levels separated these two children - two grade levels (preschool and grade one) with enormously different expectations for two youngsters who were more cognitively similar than they were different.

Sammy's rote counting put him in advance of Garth. Sammy counted to 24 by rote while Garth counted to 13. However, in understanding of the quantity that numbers represent, Sammy's difficulty adding three bottlecaps and two bottlecaps indicated a more elementary level of number awareness. Although Sammy was of an age to be eligible for grade one, he appeared to be developmentally at a much younger level judging from his responses to the activities.

Since Sammy also seemed to be in transition from nonreading to reading, developing normally, his responses to the word card activity may be typical of beginning readers. Characteristic was

his interest in drawing accompanied by writing, his earlier perception of letters as words, his fascination with writing his name and the complete alphabet, his lack of concern for matching one oral word to two written words, his need to spend lengthy sessions drawing and writing of his own choice with only interested comments from an adult for support (in contrast to direct teaching), his gradual awareness of the order of letters and words needed for word meaning, his focusing on the meaning of word phrases as when he read "me and my dad and my sister" for the card that read ME AND MY BABY SISTER.

Since Sammy continued to make progress in reading throughout the year at a very high level of interest, he gave the distinct impression that it is just a matter of time until he matures enough to move from perceptual to conceptual correspondence with counting as well as with words. His keen interest in writing many of his own word cards is an indication of the role that doing one's own writing plays for some children in helping them establish a concept of word, as well as a key vocabulary of remembered words.

SOL (November, 1978)

Sol was the only child in grade one whose responses to the activities did not appreciably change over time.

In December, Sol recalled one or two cards from memory, but could not differentiate them. He would call DUMBO, "Donald Duck" and DONALD DUCK, "Dumbo" interchangeably, and not seem to notice

the contradiction. He counted squares by matching one word per square, although the numbers were often at random and some squares would be counted more than once. He skipped number 15, got mixed up in the 20's, skipping some numbers and repeating 27 and 28. When he reached 30, he continued with 30-11, 30-12, similar to some of the ECS children.

Although I didn't realize it at the time, Sol's developmentally younger approach to counting could have been an indication that he was not yet ready for a word card vocabulary.

In May, Sol counted accurately, by rote, to number 14, skipped 15 and 16 and continued on to 24. His counting of other objects demonstrates a counting ability that may see numbers as labels, rather than as representing quantity. When Sol counted three bottlecaps to add to two bottlecaps, he got the wrong sum as he recounted one of the caps. Children with firm one-to-one correspondence move items as they count and are concerned about getting an accurate count.

Although Sol was not able to do the Mow-Motorcycle Task accurately, he did exceptionally well on the Aural Word Boundary Task. He competently did number nine after the sentence was said once, whereas many of the better readers asked to have number nine read two or three times before they felt they could do it.

Although Sol is the oldest child in grade one, developmentally he appears to be at a much younger level. His responses to the counting exercises and the key word exercise suggest a beginning ECS level. His lack of change in response to the activities over the course of the year may be the biggest

concern, as the overall pattern for all three groups was that noticeable change occurred over the course of the year in each child's response to the exercises especially when counting. This lack of noticeable change for Sol may indicate a special learning problem. This observation was confirmed by Sol's classroom teacher who said that he may be put in a special learning resource room next year. Knowing Sol's developmental level in counting and response to words could be of help to a remedial teacher.

Given more time for this study, one would be tempted to keep a very careful record of Sol's counting progress, providing him with numerous opportunities to count, to see if his counting progressed in a manner similar to that of the younger children in this study.

RICHARD (January, 1980)

Richard, another first grader, was a highly verbal child and his freewheeling story style seemed to demonstrate that the Key Word Card activity of this study had its limitations and was probably most effective with those at the beginning reader stages. His own story, told spontaneously, helps to illustrate the interest and enjoyment that children find in telling and reading their own words. Perhaps preschoolers and ECS children find release for feelings through play alone, but the more sophisticated linguistic capabilities of first graders call for a language as well as a play outlet.

When Richard's book was completed, (one of the first), he came to draw the pictures. Since his book wasn't ready yet, he proceeded to tell me a long story, talking and drawing at the same time. The story he told involved himself, his Dad and his Mom (who he says are separated). He lives with his Mom.

Richard's story:

He and his Dad are with these rockets. Rockets, clouds hang over Richard, but he's never in danger because he says he can run away. In his third drawing, there is a threat of danger:

> I'm in this safe capsule. My Dad's in it too. We'll have to live there for a little while. My Mom's in the plane still. She jumps out in her own safe capsule. This thing is about to explode - "help." My Dad's saying the same thing - "help, help, help." He needs someone to help him. This mechanical bomb saves us. All of us are really safe. There's a whirlwind - a big button - it's already pushed - really a light (sound effects of siren while he's drawing the button) It's sending a message into outer space.

This session with Richard illustrated how limiting word cards can be, since his own spontaneous story is rich in action and detail, one page connecting to the other. Word cards did not show the full potential of his imagination and ability to write. Although they can be a good beginning step in the reading process, word cards may have limited the imaginative responses of other children in this study.

SUMMARY

The key incident children described in this chapter serve to span the age-group categories of the study, helping to tie the progressive steps into a continuum.

Sally's ability to read and her counting with firm correspondence to 25, right from the beginning of the year, placed her within the grade one profile, although her manner of learning was age-appropriate for ECS.

Sammy's interest in word cards and his attention span while doing them was closer to a grade one profile, whereas the manner in which he did his cards had more in common with a preschool- ECS profile. His perceptual rather than conceptual understanding of number was more typical of a younger profile as well.

Sol's ability to concentrate on an assigned task was age-appropriate, but his one-to-one correspondence in counting had more in common with the ECS children as did his response to the key word cards, i.e., his willingness to give words, his inability to remember them (with the exception of MOM).

Although chronologically of grade one age, Richard (as well as Sean) demonstrated a level of sophistication with language beyond the typical grade one profile generated in this study.

The final chapter reviews the study and its findings and suggests hypotheses and implications drawn from this review.

CHAPTER 6

DISCUSSION AND IMPLICATIONS

INTRODUCTION

This chapter will begin with a summary of the research problem and methodology of this study. Next, the findings will be discussed relating the responses of Question One to the responses of Question Three. A discussion of the hypotheses generated will follow.

A section on the questions raised by the study relating to beginning reading instruction will be included. The chapter will be concluded with a discussion of the limitations of this study and suggestions for further research.

SUMMARY OF THE RESEARCH PROBLEM

This study investigated one-to-one correspondence as a basic cognitive function of young children, by examining its application to children's counting and to their recognizing words in beginning reading.

One component of beginning reading, word concept, was examined through the use of word cards spontaneously dictated by the children (key word vocabulary) rather than from a metalinguistic approach. The cognitive basis of one-to-one

correspondence was discussed with particular reference to Kamii's (1985) work in math and Ferreiro & Teberosky's (1982) studies of word concept expressed by children in their writing.

Children's ability to match spoken number words to objects when counting was compared to their ability to match spoken words with their written counterpart in an attempt to discover an underlying learning pattern based on one-to-one correspondence.

The research problem was stated in Chapter One as

> Does mapping spoken number-words to physical objects parallel the mapping of spoken words to written ones?

This was refined during the study to more accurately read:

> Is there a relationship between the way a child counts and the way she begins to read?

In practical terms, the problem can be stated:

> Can one tell by the way a child counts, how ready she is to read?

As was anticipated by the ethnographic nature of this study, the data as it was collected, shaped the study.

Originally, it was proposed that examples of the "pecking" described by Kamii (1985) would be related to the amount of pointing children do when they read. However, the low incidence of the behavior in this area necessitated deemphasizing this aspect in favor of other factors that arose during the course of the study. For instance, perceptual correspondence (labeling objects with numbers) and conceptual correspondence (counting with

an understanding of quantity) were described in relation to how a child counts and approaches beginning reading, rather than in the originally proposed light of reading strings of words.

SUMMARY OF METHOD/DESIGN

The sample for this study was taken from three groups of young children, 3.5 - 4.5 yrs. (daycare), 4.5 - 5.5 yrs. (ECS) and 5.5 - 6.5 yrs (grade one).

An observational, rather than experimental design, was used as it seemed more appropriate for an investigative study of young children that sought to generate hypotheses rather than to test them. Extensive field notes were taken that were distilled into the format of this paper. Researcher observations were compared to the classroom teacher's observations on the same children as the data was collected. The reliability of the study was aided by this interchange, although it was limited by having only one researcher collecting and interpreting data. Descriptions of the tasks and methods employed are fairly detailed to facilitate replication.

The notion of "key incidents" (Wilcox, 1982) was expanded during the study to include "key incident children" described in Chapter Five. These were children who did not fit into the overall profile of their age groups, but who, nevertheless, lend insight to the study.

DISCUSSION OF THE FINDINGS

Summary of Questions Asked

To help answer the main concern of this study - Is there a relationship between the way a child counts and the way she begins to read? - the data were organized around two questions:

1) How does the way a child goes about establishing a key word vocabulary reflect her knowledge of word concept and one-to-one correspondence in reading?

2) Does a child's one-to-one correspondence in counting precede correspondence in reading or do they occur simultaneously as the child moves from the perceptual level to the conceptual one?

Tables III and IV summarize some of the findings of the study that address Question I. The preschool children in this study often confused letters and numbers with words, whereas the ECS children had a clearer concept of word. Neither group was typically able to demonstrate one-to-one correspondence in reading. Most grade one children were able to demonstrate one-to-one word correspondence in reading at some time during the course of the study by carrying the key word task to completion in book form as shown in Table V.

Tables VI and VII compare the results of the sections of the Written Language Awareness Battery (Evans, Taylor & Blum, 1979)

given to the ECS and grade one groups to their correspondence in counting. The similarities in responses of the children to the WLA tasks and the thesis activities seem to support the statement of the WLA authors that those tasks that tap the interaction of oral and written codes are more strongly related to learning to read than tasks that solely address written language.

Table VIII shows the results of analyzing the grade one key word books. The relationship between complexity of syntactical structure and one-to-one correspondence in counting was not as clear in the more homogeneous grade one, as it was in the pilot study on children with Down's Syndrome, which involved fewer children, but a broader range with respect to cognitive development.

Addressing the second question, Tables IX through XII show a relationship between a child's level of one-to-one correspondence in counting and her level of response to the key word task. It appears that children move from a perceptual basis in counting to a conceptual one before beginning reading takes place.

An examination of the key word cards of all three groups and the key word books of the first graders suggest possible developmental patterns in syntactical (Table XIV) and syllabic features (Table XV). A developmentally younger child rarely gave a verb when asked for a word, whereas verbs became common among first graders. This is supported by Templeton & Spivey (1980) in their study on the metalinguistic awareness of young children. Nouns were more readily defined as words by younger children,

whereas an awareness of verbs as words required a higher developmental level.

The small percentage of function words used (Table XIV) also relates to the findings of Templeton & Spivey (1980), who found that "even for concrete operational children . . . WITH and THE are not words" (p.275).

Finally, Table XVI gives an overview of the data categories as they addressed the thesis questions.

Behaviors Leading to One-to-One Correspondence

Similar counting characteristics were observed in the three groups among those children who were not yet reading. These behaviors (listed near the end of Chapter Four) seem to be some of the preliminary steps used by children in establishing one-to-one counting correspondence with sequential numbers.

The children who exhibited these behaviors in their counting appeared to understand numbers as labels rather than as representing quantities and may be said to be at a perceptual level of one-to-one correspondence. Children who did not exhibit these characteristics in their counting may be said to have conceptual one-to-one correspondence in that they understood the inclusive property of number. Perceptual and conceptual correspondence will be referred to later in the discussion on hypotheses generated by the study. A tentative listing of possible pre-reading behaviors was compiled to parallel the pre-counting one. One question raised by this comparison, especially regarding perceptual counting, is whether the small sight vocabulary that

some prereaders have (often their own name and that of family/friends) parallels the perceptual level of one-to-one correspondence in counting.

Random Numbers

Some preschoolers and ECS children used numbers at random 11,3,7,12 ... to count objects, sometimes with one-to-one correspondence and sometimes without. Those who maintained correspondence were able to count more extensively with numbers in sequence than those who didn't maintain correspondence. None of the children who counted in sequence up to number 20, however, used random numbers. This suggests a possible developmental pattern to be presented later as Hypothesis I.

Comparison of Counting Correspondence and Word Card Response

Table X shows that preschoolers with the lowest levels of one-to-one counting correspondence had the lowest levels of word card responses, whereas, preschoolers with the highest levels of counting correspondence also demonstrated the highest levels of response to the word card task.

Table XII shows the same general pattern for ECS children. Those with the lowest level of one-to-one counting correspondence were the least responsive to the word card task and those who responded best to the word card task had counting correspondence to 20 or more.

Chapter Five dealt in detail with a few children who did not fit their age-group profile, but rather fit into an older or

younger profile, supporting the notion of a developmental counting - reading continuum. One early reader in ECS demonstrated cognitive strengths of a grade one child, but maintained an age-appropriate learning style. One grade one non-reader appeared to be progressing normally, but with a one-year lag, while another grade one nonreader appeared to have a two or three year lag and normal progression was in question.

HYPOTHESES GENERATED

Observing children's counting and their approaches to beginning reading through the key word card activities generated some hypotheses that may have implications for the way young children are taught. Given the small sample used in this study and its observational nature, these hypotheses are meant to suggest further areas of research rather than conclusions.

Hypothesis I

A child's counting may develop in wave patterns both with random and sequential numbers. If so, a child's counting pattern would then allow her to be placed on a developmental continuum that may parallel a similar continuum for reading.

Observing how children in the preschool and ECS use random numbers to count items suggests a developmental pattern: children may first count with random numbers without correspondence, then progress to random counting with correspondence, then to

correspondence, counting with numbers in correct sequence in waves of up to 5, up to 10, teens, beyond teens. They may repeat the process as they progress, stabilizing smaller amounts as they extend to larger amounts. Since counting with correspondence using random numbers does not include an awareness of overall quantity, it may be categorized as a matching activity, an elementary form of one-to-one correspondence.

This suggested "wave pattern," including both sequential and random numbers appears to have something in common with Kamii"s (1985) four steps or "slices" in the conservation of number according to Piaget, with respect to number magnitude:

1) 1-7 or 8
2) 8-14 or 15
3) 15-30 or 40
4) above 30 or 40

These "slices" exist between ages 6-7 years (approximately) when children may reason with one-to-one correspondence between small amounts, but not necessarily between larger amounts. This "progressive structuring of number" (Kamii, 1985, p. 22) means that a child may have a conceptual understanding of the number six, but not necessarily number 16 or 30 or more.

Since this thesis assumes one-to-one correspondence as a basic cognitive function, this process in beginning counting may have a parallel in beginning reading. Perhaps children say words at random, knowing favorite stories, without correspondence, then begin to match a small number of oral words to their written counterpart (as when they recognize a few word cards) to

recognizing a good number of words in sequence with one-to-one correspondence. If these "counting waves" preceded "word waves," then a child whose counting was progressing in waves might indicate a child whose cognitive base was ready for words. A child who was not progressing in counting waves might indicate a child who had not yet developed the cognitive structure to handle words. If further research were to establish such "waves," it would raise the possibility of its use as a helpful indicator for teachers. Perhaps such a child might need more time to mature and develop a cognitive pattern for counting before tackling beginning reading. Although speculative at this point, the possibility arises that a child who was making very little or no progress in counting might have special learning problems that would benefit from special help early, in the preschool years.

Hypothesis II

A certain level of one-to-one correspondence in counting may be a prerequisite for beginning reading.

Certain grade one children stood out from the group even though their responses to the thesis tasks fell within the overall group profile. Certain idiosyncrasies in their responses interrupted the smooth flow of expectations established by their peers.

Kelly was one of these children. At first, it appeared that he might be one child who would disprove the connection between counting with one-to-one correspondence (with an awareness of quantity) and having one-to-one correspondence when reading words.

In the fall, Kelly's correspondence in counting was firm to at least 25, but he couldn't remember word cards. From week to week he couldn't remember the simplest words of his own choosing - DOG, CAT, KIM (his sister). It wasn't until late March that he finally started to remember words - and then he did so with great enjoyment, needling his friends with humorous insult.

Cam was another child with firm counting correspondence, but little consistent memory for words. He loved giving elaborate two-card sentences, some of which he memorized for awhile, none of which he actually read consistently until April. Another was Burt, whose counting ability was undisputed, but who showed little interest in word cards until February, when he saw the first book come off the press, and then rapidly composed his own.

These three demonstrate the variety of factors, other than the most commonly cited one, immaturity, that can impinge on a child's readiness to read. Interest and motivation appeared to be strong factors in Burt's response to the key word activity. Cam's gradual awareness of word concept had to develop before he could realistically participate in the key word book activity.
Difficult to describe, Kelly's response indicated how highly individualistic a child's approach to reading may be. It would have been interesting to have been able to observe the counting of Kelly, Cam and Burt a year earlier in ECS. One might conjecture that their counting may have progressed steadily in waves, but lagged a bit behind their peers in timing, given the lag in their grade one reading. But, of course, this is only conjecture. If the relationship between one-to-one correspondence in counting and

in reading posed by this study were confirmed, then, with all these children, their ability to count with firm correspondence would have been an assurance that, given time, the ability to read would follow.

On the other hand, Alex (ECS) and Sol (Grade One) showed very little change in their responses to the activities over the nine months of the study. Alex's one-to-one correspondence in counting, with sequential numbers, never went beyond number four. Sol did not count with an awareness of quantity even by May. This lack of progress in conceptual counting may suggest the possibility of some type of learning problem that may affect both the areas of math and reading. Since the sample in this study was small, it is possible to only speculate, on the basis of the data gathered, that children like Alex and Sol might need to reach a counting level of correspondence to at least number 25 (conceptual - with an awareness of quantity) before one could expect them to begin to read. Once that level of counting were achieved, it may still be several months before reading would begin, since some children in the study had correspondence in counting to 25 several months before they began to read. All readers in this study, however, had a basic one-to-one counting correspondence to at least 25.

Hypothesis III

A child's level of one-to-one correspondence in counting may predict her pattern of readiness to read.

Comparing the responses of preschoolers and ECS children to the key word card task and the counting tasks leads to Hypothesis III which could only be supported by a longitudinal study that could follow the children through grade one to compare reality with predictions.

Among the preschoolers, Keith, Sandy and Aaron stood out from their peers as demonstrating facility with words and with one-to-one correspondence in counting. One might speculate that they may be among the first of their peers to begin to read.

The firm one-to-one counting correspondence of Garth, Maurice and David suggests the possibility that they may take longer to begin reading, but not encounter any serious difficulty. On the other hand, given the small age difference, one might suspect that the weak counting correspondence of Fred, Rick and Karen (tying in with their weak responses to the word card task) may indicate some possible difficulties with beginning reading.

Between November and January, Lydia, the youngest child in the group, increased her counting correspondence from number three to number eleven. On the other hand, Fred and Rick increased their correspondences by one number in the same time period, from number three to number four. In May, Fred and Rick were the only children of the original sample still in the daycare setting. Their one-to-one correspondence still had not expanded beyond number four, possibly a cause for concern. Rick had progressed some, however, as his random numbers were now in the 40's rather than in the teens and he was showing some understanding of our

base ten system by saying 40-11, 40-12 . . . No similar changes were noted in Fred's counting.

Similarly, from an examination of the data on the ECS children, it is interesting to speculate that those with extensive correspondence in October (Sally, Lori, Jay, Jackie) might be the first in the group to begin reading. Those who made dramatic changes might be next (Jason, Cora) and those with little change (Andrew, Kris, Jack) might have difficulty with beginning reading.

At first glance, Carol stands out from this group as not fitting the pattern as, by May, her correspondence in counting had increased from #10 to #25. However, since she was the youngest of the group (only two months older than some of the preschool children) , it is possible to suggest that her ability to read word cards may increase in a similar manner as she matures.

A longitudinal follow-up would be most helpful to determine if those children in ECS follow the suggested future patterns once they reach grade one next year, and to observe the correspondence patterns of the preschoolers in the next two years. For example, it would be interesting to follow Sol in school to see if he follows, very slowly, a normal developmental pattern or if learning difficulties will block his learning to count and read effectively. Since Sammy's counting appears to be developmentally appropriate, one wonders if he will learn to read with ease, as expected, when he repeats grade one next year.

SUGGESTIONS FOR FURTHER RESEARCH

It is interesting to note some other observations made during the course of this study that suggest additional areas of investigation. The following paragraphs briefly outline some of these.

An attempt was made to collect samples of spontaneously written language from each age group, but the time constraints of the study resulted in too few samples for meaningful analysis. Nevertheless, children's writing is an area for further research that could provide unique insight on the development of one-to-one correspondence in children and the stages of beginning reading, a theme expanded in the work of Ferreiro & Teberosky (1982) and Taylor, Blum & Logsdon (1986).

Most of the atypical children in this study were boys - especially regarding developmental lags. Almost all the girls went smoothly and uneventfully through the activities, whereas those with difficulties or idiosyncratic patterns were boys. A much larger sample would be needed to confirm this slower developmental pattern for boys, but it does raise the question of what the most effective grade one environment would be to accommodate these possible lags.

Some of the younger children (preschoolers Rick and Fred) said numbers in sequence, but lost the one-to-one correspondence before losing the sequence. However, Alex, an older child, maintained one-to-one correspondence, but lost the proper sequence of number names first. If it were determined that the counting

pattern of Rick and Fred were developmentally typical, then an atypical counting pattern such as Alex's might signal the presence of a learning difficulty of some kind.

Comparing the syntactical features of the key word cards given by each group, (Table XIV), suggests another possible indicator of when a child might be ready to read. For instance, one third of the words given by first graders were verbs, while the younger groups gave very few verbs or none. This raises the question of whether or not this behavior is developmentally typical. If it were, possibly the key word vocabulary of a child with reading difficulties might be syntactically analyzed to help determine intervention techniques. If, for instance, a child did not spontaneously give many verbs, it might indicate that she was at a younger developmental level In addition, one might observe that the more a child gave symbols (letters or numbers) when asked for words, the more a developmentally young pattern for that child would be indicated. On the other hand, if a child were to give words, not symbols, and gave verbs and modifiers in quantity, it might suggest that she had difficulties other than a developmental lag. However, the basis for these speculations has yet to be established.

When one child finished counting her pennies in May, she did something interesting. She took one out and said, "I know how many are left - 24." The researcher then took another penny out and she answered, "23." Next, two pennies were taken out and she guessed the remainder correctly. When three additional pennies were removed, however, she paused and then began to visually count

the remaining coins. It would have been interesting to follow Piaget's example of using what children spontaneously ask as a basis for another research question. In this study, Jackie's "game" was incorporated into the penny count exercise and used with the other ECS children and with the grade one children, but, given the time constraints, was not expanded enough to allow patterns to emerge.

One wonders if the progress of Alex (ECS child) is developmentally very slow or if there is a learning difficulty that interferes with the normal pattern of his learning to count and read. If patterns of counting could be used as indicators of possible learning difficulties, it raises the question of what early intervention techniques would then be most helpful in enriching an environment to promote one-to-one correspondence in counting? For example, since matching is an early form of correspondence, would additional experience with it help the cognitive development of children similar with learning difficulties?

It would be helpful to know about the "fallow" periods of a child's development. Given the giant leaps some children took in reading and counting during the course of the year, one wonders what happens during the two summer months? Even in much longer study, data would not usually be collected on ECS children during the summer. By October (as with some of the grade one children in this study) counting to 25 or beginning to read and the intervening steps would possibly be missed.

Counting is something children find fascinating and do spontaneously from an early age. Another area of research suggested by this study is the investigation of the counting patterns of 2.5 - 3.5 year olds. Knowing these patterns would give an overall picture of the development of counting correspondence to better determine if children like Alex and Fred are following a normal counting pattern, only at an earlier stage than this study observed. To carry this one step further, might there be a relationship between the counting patterns of a two-year-old and her patterns of one-to-one correspondence later on in preschool and grade one? Studies that followed children from ages two to six could help clarify some of these questions.

QUESTIONS RAISED FOR CONSIDERATION IN TEACHING PRACTICE

This study has been structured to examine one-to-one correspondence in counting and reading. The possibility of a relationship between the two raises some interesting questions for consideration by teachers.

Counting patterns are much easier to observe than reading ones. Given a broader research base, would it be possible to add one-to-one correspondence in counting to the teacher's repetoire of ways to help determine the readiness of grade one or special needs children for formal reading instruction?

The counting of items is already an important part of preschool programs. If the importance of counting in building a

cognitive base for reading were established, how might this affect the programs now offered for three to six-year-olds?

Another question this possible relationship raises is how a first grade environment might be structured to promote the development of one-to-one correspondence in reading. Would the suggestion of Taylor, Blum and Logsdon (1986), that a rich literate environment encouraging meaningful writing (key word books as first readers), and focusing the child's attention on oral-written interactions contribute to such an environment?

These questions, arising from this qualitative study, are hypothetical at this point, however, as instructional practice generally requires grounding in quantitative data.

LIMITATIONS

To reiterate, this study was limited by its small sample, as a larger sample would have generated an unmanageable amount of qualitative data.

Visiting a classroom, even on a regular basis, limited the amount this researcher was able to observe compared to what a teacher is able to observe on a daily basis. From noticing the giant strides certain children took during the year, one gets the impression that children have cognitive growth spurts to match their physical ones. When these occurred over holiday periods or during the researcher's absence, information gaps were left. Ethnographic study on young children would be much more thorough,

done on a daily basis, although the size of the generated data base might be difficult to either manage or interpret.

This study has inferred that the decontextualized use of key word cards is one effective way to examine one-to-one correspondence in reading. However, there may be other factors at work in the process that were not examined in this study.

No data was gathered on the home environment of the children in this study so that any home influences, directly or indirectly, on reading and counting are unknown.

In conclusion, this study suggests that a relationship does exist between one-to-one correspondence in counting and one-to-one correspondence in reading. Questions were raised regarding the nature and function of this relationship and some possible influences of this relationship on teaching practice were suggested, subject to further research.

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APPENDIX A

WRITTEN LANGUAGE AWARENESS BATTERY

(Evan, Taylor & Blum, 1979)

The following three tasks (or parts thereof) were used in this study:

MOW - MOTORCYCLE TASK

Directions: Show the subject one set of cards. Tell him/her, "One of these words is and the other is . Which one is ?

Stimuli Sets (counterbalanced by length and position). The first four sets were used in this study.

mow	hippopotamus
motorcycle	hello
elbow	dictionary
elephant	dog
toy	basket
telephone	bee
chips	umbrella
children	ugly

VISUAL WORD BOUNDARY TEST

Directions: Subject is directed to count the words and put a circle around each word.

Stimulus Sentence

Seven cowboys in a wagon saw numerous birds downtown.

AURAL WORD BOUNDARIES

Segmentation Tasks. The second item in each set was used in this study.

Directions: I'm going to say something to you and I want you to say it right after me. Then say it again and put a cube on the desk for every word you say.

He fell.
Dad cooks.

Where is Mother?
I am happy.

Maybe she can go.
Someone found the book.

All the people went home
We hang our coats up.

A lady lived in that house.
I like to hug my Mom.

The little boy looked out the window.
My sister likes to play with trucks.

My pony ran very fast down the hill.
Wise old owls looked down from the tree.

One day the sun woke up crabby and mean.
They were so happy that they never grew tired.

APPENDIX B

PILOT STUDY CASE STUDIES

CASE STUDY #2: BOB (15 years)

1. Key Vocabulary

Bob usually gave me only words he could spell, spelling them for me. His first word was CHECKERS because he was playing that game at the time. He always looked around the room for ideas for words as some normal first graders do. I should have asked him to close his eyes and think of a word to see what his response would be. Apples were the only thing he could think of that he liked to eat. I wrote APPLES on one card; then, knowing he could read, I asked if he would like I LIKE APPLES on another card. He agreed. Bob seemed to need prompting to think of words. I asked him what he liked to play besides checkers. His response was "ball." I wrote BALL as well as a card with BALL in a sentence on his approval.

I wondered if his literal approach to word cards was a lack of imagination or a lack of trust in me. This would become clearer if I were in the setting longer so that trust could develop. Since Bob stutters, I wondered if he felt under pressure to do things right, which might include keeping his word cards safe and literal.

In the following sessions, he continued to look around the room for words and spell them for me (names of games on boxes, for example).

2. Reading Cards

Bob read his cards easily each session. When asked to point as he read, he did so with one-to-one correspondence.

3. Dictating Book

Bob put most of his word cards together logically. When dictating his book, he was able to expand on his word cards with little prompting. He added on the last page as an afterthought. When we had finished typing his book, Bob spent time at the typewriter himself. He put his word cards on the chair between his legs and typed most of his words onto one sheet of paper. Words in a sentence were typed on the same line.

4. Reading Book

Bob read his completed book without any mistakes. He did not point to any words. He seemed the most interested of any of the children in listening to the other students read their books to me.

5. "Pecking"

Bob counted by 5's and 10's to 100 without reference to a number line or fingers (props used by most of the others).

6. Pointing

In teacher-led exercises, Bob read a short paragraph aloud, without pointing. When following along with an unfamiliar paragraph the teacher was reading, however, he did resort to pointing.

7. Counting During Classwork

Although Bob is in the more advanced math group (carrying and borrowing) he figured out the answers by making pencil marks on scrap paper rather than using the ruler as a calculator which other less advanced children were doing in a rote manner.

SUMMARY OF CASE STUDY #2: BOB

Bob's one-to-one correspondence is clear. He reads appropriate words and doesn't seem to need the support of pointing except in long, unfamiliar paragraphs. His one-to-one correspondence in math is secure as he is able to add large numbers, making marks for each addend and then adding them correctly to get the right answer. In general, Bob's math skills and reading skills seem comparable and on a par with what one would find in a typical grade two or three classroom.

Bob played checkers frequently, according to the rules, although he did not always notice or take advantage of jumping opportunities. I observed him playing checkers with Charles, the highest functioning student, who didn't seem to have the patience to learn or abide by the rules. Charles jumped on players indiscriminatley and removed them. Without a word, Bob retaliated by switching to Charles's rules. When Charles protested, Bob switched back to regular rules. When Charles again played unfairly, Bob switched to his method. At this point, Charles tipped over the board, ending the game.

Bob stuck to the rules in checkers when playing with me and always won, even though I was trying my best. When he had trapped my last king, at the end of one game, he moved away instead of jumping it, so that the game could continue. It reminded me of playing with younger children when the fun of playing the game is

more important that the competition. The way Bob played checkers also seemed to indicate a grade two or three level of cognition.

Bob's Word Cards	Bob's Book
	page
CHECKERS	1 IT'S TIME TO GO HOME
EAT	2 I LIKE TO EAT APPLES.
TIME	3 I WENT TO PLAY BALL.
APPLE	4 I LIKE TO EAT APPLES AND POP.
I LIKE TO PLAY BALL	5 I LIKE TO PLAY CHECKERS AND EAT CHIPS.
I WENT TO PLAY SOFTBALL	6 I WENT TO PLAY SOFTBALL
I LIKE TO EAT APPLES	
BOX	7 BOX AND BOOK
BOOK	8 SUPERKIDS EAT APPLES.
HOME	9 I PLAY CHECKERS WITH JO ANN
SUPERKIDS	
POP	

CASE STUDY #3: CHARLES (15 years)

1. Key Vocabulary

Although Charles started with one-word cards, as did the others, he seemed quite bored. When he came in talking about an accident he had seen on the way to school, I asked him to dictate some word cards to me to describe it. He dictated them all readily, in sentence form, in logical sequence.

2. Reading Cards

Charles didn't point to words when he read his cards even when there were up to fifteen words on one card. When asked to point, he displayed one-to-one correspondence.

3. Dictating Book

Charles asked if he could type his own book. I agreed. He proudly typed some of his word cards, one card to a page. However, he typed each word on a separate line. The shorter word cards fitted onto one page fine. Charles seemed to realize that a fifteen-word card wouldn't fit on one page, so he went to get a large sheet of paper. He seemed unconcerned when I mentioned that the large sheet wouldn't fit into his small book. I demonstrated typing a sentence all on one line, but he resumed his own method of one word per line. Later, with his agreement, I typed the rest of his book at home on booklet-sized sheets.

Although his book was already typed, Charles asked for an additional page to write on, which he taped to his desk. He wrote:

Frank, get out of my life, please.	(In retaliation for a similar card of Frank's)
Anna, come into my life, please.	(His girl friend)

4. Reading Book

Charles read his completed book fluently, without pointing. Although he read his word cards word for word, he read his book for meaning in the manner of a proficient reader who may alter words, but retains the overall meaning. He pointed out that one of my drawings was not congruent with the meaning of the text.

5. "Pecking"

Charles used his fingers automatically when playing board games. When the group played the number guessing game, he had very few guesses, seeming to be trying to figure out the principle of the game.

6. Pointing

On my first day, I observed the teacher reading a long paragraph aloud to a group of four students. All but one were pointing to the words as they followed the reading. I asked the teacher, after, if the one who wasn't pointing was his most advanced math student. He confirmed. This was Charles.

7. Counting During Classwork

In the advanced math group, the others used their rulers to calculate subtraction, but Charles consistently used pencil marks on scrap paper. For 22 -19, he wrote
demonstrating that he understood the problem, but not the concept of borrowing. The ruler users understood still less, using the ruler in a rote manner to get the correct answers without understanding why.

SUMMARY OF CASE STUDY #3: CHARLES

Charles was the most advanced student in the class, verbally fluent, doing both math and language exercises with ease and alacrity. Although he was never seen to point at any time while reading, he still used his fingers for simple subtraction in board games and made marks on scrap paper for math exercises rather than doing them in his head or using counting on rather than counting all.

Overall, his abilities in language seemed more sophisticated than his mathematical abilities and both surpassed the

capabilities of any of his classmates. The teacher commented that there was some question as to the extent of his mental handicap. He did not share the physical Down's Syndrome features of the other students.

Charles's Word Cards	Charles's Book (same as cards)
1 fire station	
2 Rob Carr (a friend)	
3 Anna _____ (last name)	
4 Bob _____ (last name)	
5 It was on 192 Avenue	
6 There was a fire truck and a police car.	
7 It was raining out when the accident happened.	
8 The car hit the light and the guy was hurt.	
9 We had to put our seat belts on the bus because the police were there	
10 Then the whole road was cleaned up.	

CASE STUDY #4: DONNA (15 years)

1. Key Vocabulary

Donna was the first to include affective words, i.e., names of friends and BE FRIENDS. Overall, she was not as interested in word cards as some of the others. She seemed content to give mostly isolated words for her cards. When she gave ELEPHANTS, I said "Anything you want to say about elephants?" Her response was "No, just elephants," although for shoes and food she expanded with a more specific word rather than a sentence.

2. Reading Cards

Donna recognized her word cards easily.

3. Dictating Book

Efforts to get Donna to expand her word cards while typing her book had little success; she generally added an adjective.

4. Reading Book

Donna read her completed book without pointing, but seemed a bit bored with it. She read "I love you, Brad" for I LOVE BRAD. I didn't ask for a reread, but felt sure she had been reading for meaning and could omit the YOU easily. She did reread her book to herself when waiting for her turn at math check.

5. "Pecking"

When playing a dice board game, Donna resorted to the ruler for small number subtraction (3-2). When counting by 5's and 10's to 100, she would look at the number line to confirm, even though

she knew the sequences by heart. When the number line was covered, she used her fingers to keep track.

6. Pointing

During a worksheet exercise, Donna read a short paragraph of about three lines, not pointing, but subvocalizing. She did point, however, when the teacher read aloud a long, unfamiliar paragraph.

7. Counting During Classwork

Donna used the lines on her ruler to do borrowing exercises in subtraction worksheets and she got the right answers. She had the procedure down pat, but I'm not sure she really understood the concept of borrowing.

SUMMARY OF CASE STUDY #4: DONNA

I worked less with Donna than with some of the others as she was in the more advanced, independent group. She seemed secure in one-to-one correspondence in both math and reading.

Donna was very interested in tap dancing, did a demonstration for the class and was scheduled to do a teaching session with her peers at lunchtime. I suspect that if I were to do a book on tap dancing with her, a clearer picture of her cognitive abilities would emerge.

Donna's Word Cards

PLAYSCHOOL
BRAD
PURPLE FLOWER
KNITTING

BUTTERFLIES
ELEPHANTS
BE FRIENDS
A WHALE
LADY
CHRISTMAS
SMILE
QUEEN
SHOES - HIGH HEELS
FOOD - CHICKEN
GIRLS AND BOYS

Donna's Book

page	
1	I LOVE BRAD
2	QUEEN IS WICKED
3	LADY SMILE
4	KNITTING AND PLAYSCHOOL
5	PURPLE FLOWER
6	CHRISTMAS IS NICE
7	FOOD - CHICKEN
8	GIRLS AND BOYS
9	ELEPHANTS
10	A BLUE WHALE
11	YELLOW BUTTERFLIES
12	BE FRIENDS
13	HIGH HEEL SHOES

CASE STUDY #5: ELLEN (14 years)

2. Reading Cards

Each time I read word cards with Ellen, there were some she did not recognize, different ones on different days. For instance, she recognized RECORD PLAYER after one week's time, but didn't recognize it the next time, after a lapse of one day. Perhaps this could be because she had more new cards to distinguish it from.

Ellen pointed to her words as she read them. Once, when reading RECORD PLAYER, she pointed to RECORD and said "record player" and then pointed to PLAYER and said "player" a second time. This seemed to indicate that she was still in the process of establishing one-to-one correspondence between her spoken word and its written form.

3. Dictating Book

When we typed her book, Ellen did not recognize PENCIL and ERASER. I gave her the choice of keeping or discarding them. She chose to tear them up.

4. Reading Book

When Ellen read her completed book to me, she didn't recognize all the words. On one page she looked at the illustration of two girls in sleeping bags and said "puppet show." I pointed to the first word on the page, JOLENE, a word she always easily recognized because it was a special friend. She immediately recognized it and read the rest of the page correctly, pointing accurately. My overall impression was that she was guessing a lot and that her one-to-one correspondence may still be on a perceptual level.

5. "Pecking"

Although most of the students knew that 3-3 = 0, or anything less itself was 0, Ellen needed to do hers using marks on a ruler. She didn't accept answers from others, but needed to do it herself each time.

When counting backwards from ten on a worksheet exercise, I held up my fingers to assist. Ellen touched my fingers each time one was subtracted, starting from #1 and recounting each time. She stopped at 2-1 and did that sum in her head.

While playing Snakes and Ladders, Ellen was very impatient about sticking to the rules and following the squares in order. She continued throughout the game to move ahead more spaces than warranted and tried to move her piece directly to the end rather than moving as the board does, in a back and forth pattern. She manuevered her spaces so that she never landed on a snake that

would require her to move backward. She didn't "peck" at the one die, seeming to know the amounts automatically. It might have proved different with two dice, but I didn't think to check that at the time.

SUMMARY OF CASE STUDY #5: ELLEN

Ellen seemed to be in a transition stage, sometimes exhibiting one-to-one correspondence in language, sometimes not ,as when pointing to RECORD and saying "record player," but other times pointing to the words accurately.

Ellen worked on an alphabet board, during language time, matching cut out wooden letters to their inset shape. She recognized capitals, but had trouble with lower case; b and d were a mystery to her, in spite of their being in her real name which she wrote in small letters, not capitals.

Ellen did simple one-digit addition and subtraction for which she always used concrete objects or marks on her ruler. She would sometimes get confused and start her counting over again. Ellen used "pecking"/pointing in both math and language consisently. She always pointed to her words when she read and touched individual fingers when she counted. She counted with one-to-one correspondence up to 10. Unfortunately, I didn't check her with numbers beyond 10.

Ellen's Word Cards	Ellen's Book	
	Page	
RECORD PLAYER	1	BIRTHDAY PARTY
PUPPET SHOW	2	JOLENE SLEEP AT MY HOUSE
BIRTHDAY PARTY	3	WATCH T.V. HAPPY DAYS
NEW CASE	4	JULY 2 (her birthday)
WATCH T.V.	5	PUPPET SHOW
JULY	6	SUNGLASSES AND CASE
SUNGLASSES	7	I MAKE MY LUNCH
JOLENE	8	I HAVE SUPPER
I HAD SUPPER	9	RECORD PLAYER
I MADE LUNCH		

CASE STUDY #6: FRANK (15 years)

1. Key Vocabulary

When I first asked Frank for a word for his card, he said "ten." I gave him the choice of TEN or 10. He chose the numeral. This confusion is typical of normal beginning readers, although it did not persist with Frank.

Frank seemed to have the most imaginative word cards. The teacher confirmed his powers of imagination, saying that in the

past Frank had imagined himself to be The Incredible Hulk, actually bashing holes in the school and uprooting new trees. He was the first to use I LOVE YOU words (I LOVE ANNA. I LIKE GORDON). Others listened in, as it seemed to draw them like a magnet. When Charles was annoying Frank, Frank took delight in getting his annoyance out through word cards: CHARLES IS SNAKES/CHARLES, GET OUT OF HERE, PLEASE.

2. Reading Cards

Frank recognized his word cards easily with the exception of SNAKES. He had given SNAKES in response to my asking for a scary word. I have noticed with normal beginning readers as well, a tendency not to remember words that have been "forced" by the adult. Perhaps it is better to keep the choices open and let the scary words surface if they need to. Later, however, he recognized SNAKES without difficulty.

3. Dictating Book

Frank thought typing his book was going to be hard and while we were doing it, repeatedly commented on how easy it was. He combined cards without difficulty.

4. Reading Book

Frank seemed very pleased with his completed book. He read it over and over without pointing, although he pointed with one-to-one correspondence when asked.

5. "Pecking"

Frank used marks on his ruler to do subtraction (borrowing) worksheet exercises, in a rote manner. When playing a dice board game, Frank started out by using his ruler for subtracting, but switched to using his fingers when he saw me doing it. He "lit up" with understanding and was telling some of the others why they should use their fingers to fingure out the number of moves.

6. Pointing

When reading an unfamiliar worksheet paragraph (three lines, Frank used a pencil to point to words. When reading a familiar short paragraph to peers, he didn't point.

SUMMARY OF CASE STUDY #6: FRANK

At my suggestion, Frank easily combined word cards on one page, occasionally expanding the words. Most of the time they conveyed an understandable message. His one-to-one correspondence in reading and math seemed established. He used pointing only when the reading material was unfamiliar and lengthy.

Frank's Word Cards	Frank's Book
	page
	1 ANNA (last name)
DAFFY DUCK	2 CHARLES, GET OUT OF HERE, PLEASE
APE	3 I LOVE YOU, ANNA
SNAKES	4 MR.--------- AND DAFFY DUCK.
IGUANA	5 BOB, OUT THE CAMP
BUGS BUNNY	6 I LIKE GORDON AND DIANE.
DIANE -------- (aide)	7 I WENT TO GO ANNEX AND BUGS BUNNY
CHARLES------- (surname)	8 APE 10
ANNA------- (surname)	9 CHARLES IS SNAKES
MR. ------- (teacher)	10 DONNA IS IGUANA
BOB, OUT THE CAMP	
I WENT TO GO ANNEX	(next year's school)
ANNA SAID TO ME "I LOVE FRANK'	(dropped when he overhear her say it to someone else)
CHARLES, GET OUT OF HERE, PLEASE	

CASE STUDY #7: GORDON (15 years)

1. Key Vocabulary

Gordon turned out to be the most fascinating of the bunch. In early June, he did heaps of spontaneous writing on both sides of an 8 X 11 sheet. Some writing was in real letters (OLD PETER, OLD HOME) interspersed in a flood of imitation writing (sample included). The speed of his writing was similar to that of a fast adult writer. He read both his recognizable words to me (accurately) as well as his imitation ones.

2. Reading Cards

Gordon remembered most of his cards, especially the ones with SUGAR on them. He missed STUPID once, but knew it from then on. He missed SCREWY twice so we discarded it. He always pointed to words as he said them.

3. Dictating Book

When we typed Gordon's book, he put STUPID with HOT DOG and called it "hamburger." I typed HAMBURGER and omitted STUPID. When I finished, he wanted to type. He said each letter aloud as he typed it, mixing real words with nonsense ones. One row would have mised letter, the next would have classmates' names spelled correctly from memory. He then took my blank word cards and felt

pen and proceeded to write his own cards with his own spelling, typing each one as he went (see attached description).

Gordon seemed to be cognitively at the five/six-year-old level, giving the impression that his active interest in writing (if nurtured and allowed to continue along his guidelines) would develop as normal children's develop, slowly arriving at a level of reading with meaning.

Gordon was the only student who wanted to draw his own pictures in his completed book. All were joyful, recognizable drawings similar to typical five/six-year-old work with the exception of hotdog and hamburger, which were not recognizable to me. Overall, he seemed the one most enthusiastic about his book. He skipped class meeting, which he usually attended, in order to illustrate it.

4. Reading Book

Gordon read his book to the teacher. He was the only student I observed doing this spontaneously.

5. "Pecking"

Gordon was in the math group that worked on adding and subtracting single digit numbers. He did not appear to play as many math games as the others. I was so fascinated with Gordon's writing that I completely forgot to observe his math skills, much to my dismay. This case study, in particular, has made me very aware of the critical need for monthly summaries of field notes in order to fill gaps I may have overlooked, as well as on-going data analysis to pinpoint areas needing more information.

SUMMARY OF CASE STUDY #7: GORDON

When doing regular classroom language worksheets such as putting words in alphabetical sequence, Gordon either rushed ahead doing his own thing, all incorrectly, or bogged down in utter boredom with the task at hand, commenting that it was too hard for him. He seemed to have little concept of the sequence of the alphabet or of the terms first, next, beginning and end for that matter. His plodding manner with what seemed to be cognitively inappropriate tasks was in vivid contrast to his exuberant, speedy, concentrated approach to tasks that interested him.

Gordon showed me a note he had written which included GORDONANDGORDON and MOM along with scribble writing. He seemed very proud of this and read me what he wrote, both recognizable and unrecognizable. Later on, Gordon brought a folder from home with sheets filled with his combination approach to writing. Five small envelopes were also in the folder covered with his writing wihch was more repetition of letters in different patterns, as on the cards.

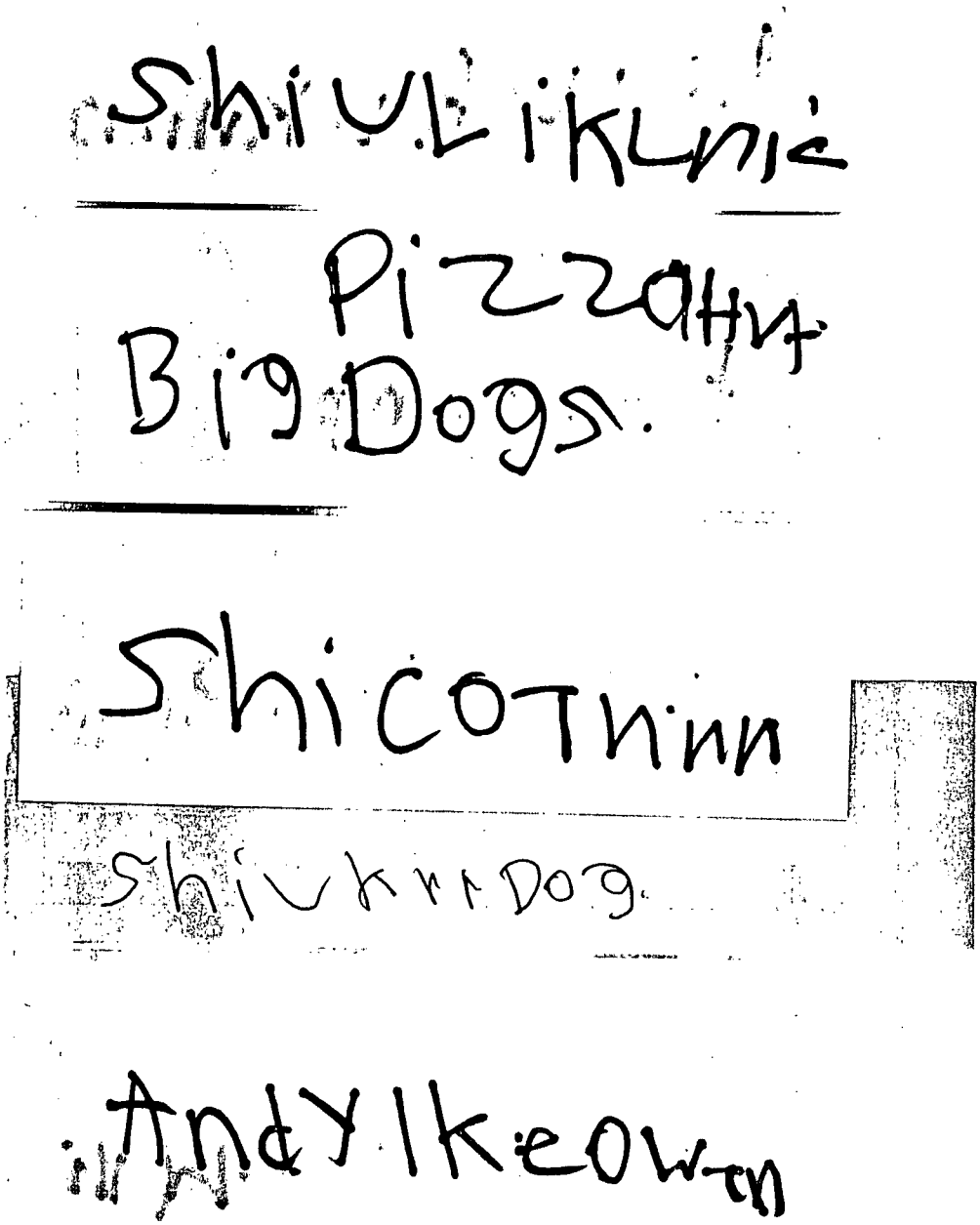
Gordon's technique of using the same limited number of letters, rearranged to mean different things fits right into level two of the five levels of children's writing described by Ferreiro and Teberosky, 1982, mentioned earlier in this paper (p.13). Scribbles have become strings of somewhat recognizable letters in various sequences.

Gordon's manner of compiling key word cards and writing his book seemed closest to beginning grade one behavior in the normal range.

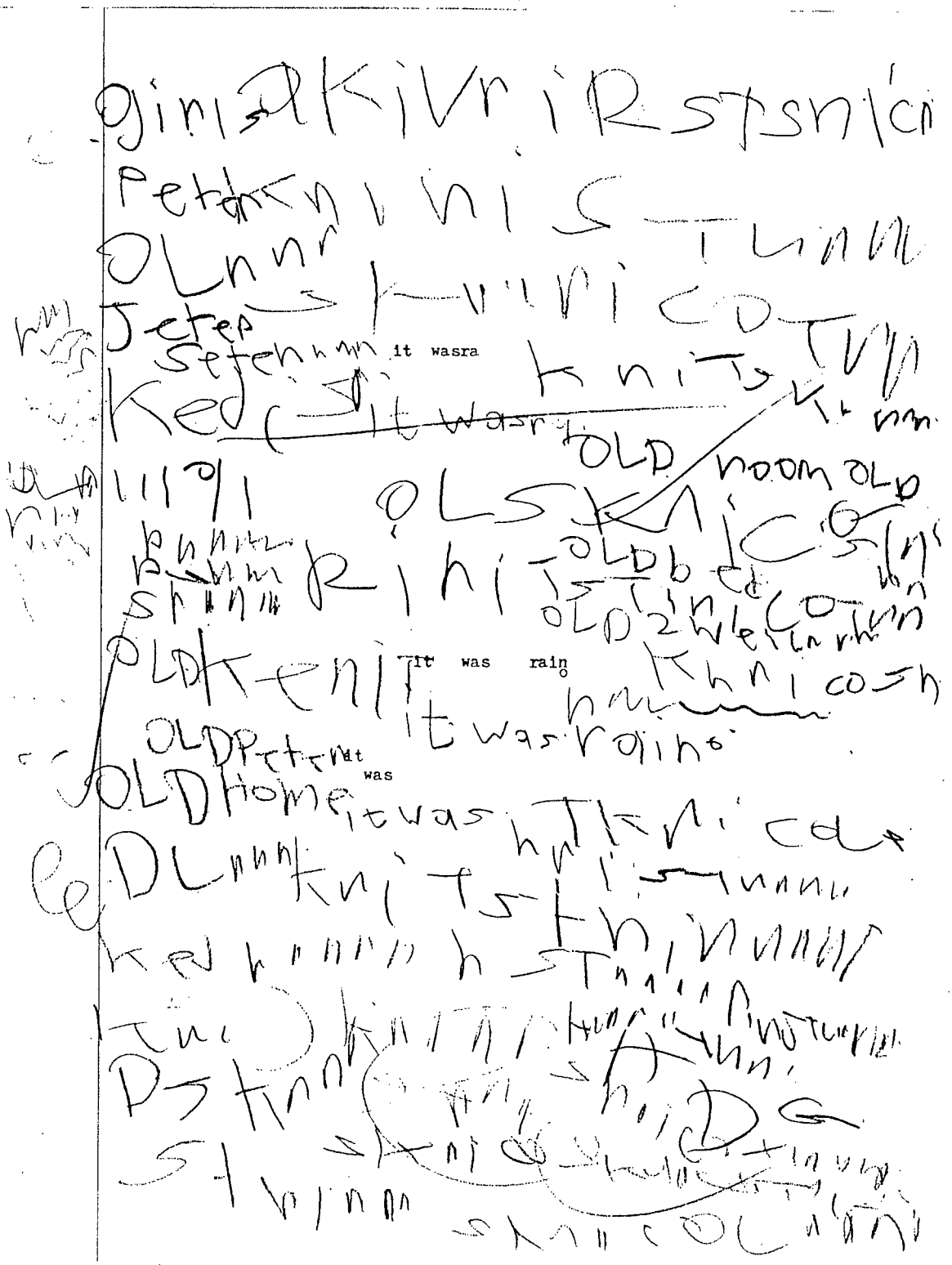
Observation of Gordon at the Typewriter:

card 1:	nitshhistrniskn
card 2:	shiukrrdog (sugardog, word card from memory)
card 3:	? (I missed this one)
card 4:	istukuknion (written very fast - said as he typed)
card 5:	pizza chips big dog (typed in same fashion as others, from memory and readable!)
card 6:	Keep off (written from memory)
card 7:	shicotnnn (typed silently)
card 8:	FranklkeGordon (read by him as Frank like Gordon)
card 9:	RICTSTrrrvs (said it was "Easter")
card 10:	CharleslkeBob (Read as Charles like Bob. No spaces between words when writing or typing)

Gordon had a long attention span at this task, over one-half hour. I may have missed a card or two at the beginning because he was fast and sometimes I found it difficult to copy his cards accurately. All this was done at a time when he had free choice to do anything he wanted.



Gordon's Word Cards



Gordon's Writing

Gordon's Word Cards	Gordon's Book page #	
SCREWY	1	SUGAR DUCK
GHOST	2	SUGAR HORSE
STUPID	3	SUGAR RAT
SUGAR HORSE	4	CHOCOLATE DONUT WITH NUTS
GUINEA PIG	5	HAMPSTER AND GUINEA PIG
SUGAR DUCK	6	SCARY GHOST
HOT DOG	7	HOT DOG AND HAMBURGER
CHOCOLATE DONUT	8	SUPER SUCKER AND SUGAR JELLY BEAN
SUGAR JELLY BEAN	9	CHOCOLATE CAKE FOR A TREAT
SUPER SUCKER		
CHOCOLATE CAT		
SUGAR RAT		

CASE STUDY #8 HAROLD (13 years)

1. Key Vocabulary

Harold had a very limited vocabulary, ten words or so, and showed no interest in word cards or in a book, although he seemed to want attention similar to what the others were getting, including a turn with me at the typewriter. I stapled a blank book together for him to draw in. He looked at it briefly, then ignored it. On the last day, when three of the students all received books, he looked unhappy that he wasn't given one, so I hastily sketched one for him. Again, one brief, uninterested look. The impression I got was that he really didn't know what the book was for.

While the rest of the class wrote their daily schedules, Harold also wrote in his own script - tiny curlicues similar to what norm al two-year-olds might do.

Harold was playing with a verbotin Dinky truck at his table. I asked him if he wanted a word card that said CAR or TRUCK. He chose TRUCK. I then placed the truck on the card and traced around it with the felt pen as I had seen first graders do. This really pleased him and was the only time he seemed interested in my project.

At the teacher's suggestion, we made a few word cards based on a picture vocabulary book that Harold had.

2. Reading Cards

The only cards Harold recognized were the ones with his own name on it and the one with TRUCK and its outline.

3. Dictating Book

Wanting to be like the others, Harold got his word cards and blank book and came to the typewriter. I gave him a sheet of paper as he seemed to want to type himself. He hit each key in succession and spent a lot of time with the paper shift, putting paper in and shifting it back out. Sometimes he typed when not on the paper, sometimes he typed letters on top of other letters, sometimes he hit the same key endlessly. Process, not product, was what was important here. When I demonstrated the space bar, that was hit over and over.

Harold's Word Cards	Harold's Book
HAROLD	(I made Harold a book,
TRUCK	putting one word on each
PIZZA	page and adding an
CHIPS	illustration.)
MAN	

SUMMARY OF HAROLD'S MATH ACTIVITIES

During math-language time, Harold did "pre-voc" activities - largely sorting objects by color or matching objects to cards and inserting them into envelopes. He had an impressively long attention span and his matching skills were excellent. He even matched numbers on a calculator to those on a worksheet, pressed the right process buttons (+, =, clear) in sequence and circled the correct answer on the worksheet, sometimes doing the same example innumerable times until he felt he had got it just right. Once, when he finally got bored with that, he held my hand, with a pencil in it, and guided it to the right keys, scolding me when wrong keys were hit.

I wondered how Harold would do with seriation, as that was not included in his regular program and is one basis for counting. For lack of materials, I took some dry spaghetti and broke it into various lengths. I demonstrated seriating a few pieces as Harold has a limited vocabulary. Starting from scratch again, I handed Harold pieces, one by one, to seriate. He always put the next piece given him, at the beginning of the group, regardless of size. When we mixed up all the pieces and left them with him, he proudly made outlines of houses of various shapes (similar to what very young first graders do with cuisinaire rods) and ate some of the pieces.

I thought seriation might go better with a toy. Lacking stacking toys, I brought in some nesting Russian dolls. Some went into his mouth. He matched bottoms to tops on up to four dolls,

but not five. He sometimes tried to match two tops together. He didn't seem to grasp the idea of nesting and handed individual dolls back to me. I felt he might be using perceptual seriation. His attention span was relatively much shorter than at other activities, seeming to indicate he wasn't yet ready for this activity. I thought of trying seriation with nuts and bolts, but time ran out.

Since counting is based on an ability to seriate (Piaget, 1952), Harold's limited ability to seriate three, possibly four items may indicate he did not have the cognitive base as yet that is needed for counting. Without having one-to-one correspondence in counting, one might assume that, in spite of his limited vocabulary, Harold would not have the correspondence in language needed for reading. If, on the other hand, Harold could seriate a large number of objects (6-10 or so), one might surmise that he had the cognitive base for counting with one-to-one correspondence and one might be then prompted to try to make an intense effort to bypass the language barrier to discover any possible parallels with word concept and beginning reading.

APPENDIX C

PILOT STUDY KEY VOCABULARY BOOKS

Since the reading levels of the Down's Syndrome children in the pilot study span such a wide range on a developmental reading continuum, it is enlightening to place the texts of their key vocabulary books side by side for further comparison. Table XVII charts some basic syntactical characteristics (types of sentences, frequency of use of modifiers, connectives, articles and verbs) to be commented on in the following section, accompanied by a brief comparison of some salient semantic features.

Syntactical Aspects

Use of verbs

The use of verbs dramatically increases with the level of reading sophistication, from pre-literate Harold to fluently-reading Charles, (Table XVII). Beginning key vocabularies seem to typically start with nouns and later expand to verbs.

Sentence Structure

Use of the sentence increases as reading level increases, both in number and in complexity of structure; virtually no sentences at the beginning levels (Gordon/Harold/Anna) up to compound and complex (Bob/Charles). Although Anna has some sentences in her book, they occurred only with direct prompting from the adult and were not her own.

Modifiers

Adjectives seem to appear more readily than adverbs. They seem to be used by beginning level readers as much as by more advanced readers, although more advanced readers seem to use more varied types of modifiers.

Connectors

AND seems to be used in a similar manner at all levels except the very beginning one. Beginning readers like Anna and Ellen tend to state two nouns to a page without using a connector unless prompted by an adult; whereas more advanced readers like Frank and Bob add AND without prompting.

Articles

Articles seem to be introduced later on when one-to-one correspondence is firm. THE and A are often not considered words

by beginning readers and are often simply skipped over when the child reads. THE is often a difficult word for beginning readers to remember. Both definite and indefinite articles are used very little by beginning readers in their key vocabulary dictations (Table XVII). Only the most accomplished reader , Charles, uses them spontaneously to any degree.

Semantic Aspects

Harold's book is representative of a child not yet ready for reading. His book has one word per page, used as a label for the picture. Gordon's book also uses words largely as labels with the addition of modifiers like SUGAR, CHOCOLATE, and SCARY that seem to reflect Gordon's emotional interest in his book. He not only wants to express names of items but what he particularly likes about them, their sweetness or flavor.

Anna, Ellen and Donna still use some words as labels, but also have pages in their book that express thoughts. Ellen mentions interaction with a friend, JOLENE and accomplishments she is proud of (I MAKE MY LUNCH; I HAVE SUPPER). Anna expresses emotional needs (ANNA LIKES A PURSE), meaning she would like a purse like one of the other girls had and THE CAR EXPLODED, reflecting a traumatic incident earlier in her life. Donna expresses her feelings with I LOVE BRAD and CHRISTMAS IS NICE and BE FRIENDS (said emphatically).

Bob and Frank use words in sentences more frequently than they use them as labels. Once prompted, they produce sentences spontaneously; whereas Anna, Ellen and Donna generally only produce sentences when prompted each time and sometimes not even when prompted.

Frank uses his words largely to express personal messages (CHARLES, GET OUT OF HERE, PLEASE; CHARLES IS SNAKES) about someone he was angry with that day and about people he especially likes (I LIKE GORDON AND DIANE; I LOVE YOU, ANNA). Bob's sentences are largely factual and descriptive and seem to revolve around one theme, i.e., "What I like to do."

Charles's book is largely concerned with a story based on one theme, an accident. All sentences were dictated spontaneously with no prompting and word cards contained sentences rather than individual words.

TABLE XVII Frequency of Syntactical Features in Pilot Study Books

STUDENT'S NAME	SENTENCE STRUCTURE			MODIFIERS					
	Simple	Compnd	Complex	Adj	Adv	Phrs	AND	Art	Verbs
Charles	3	1	2	7	6	4	2	9	12
Bob	7	1	0	0	0	7	3	0	15
Frank	7	0	0	2	3	1	3	1	7
Donna	5	0	0	8	0	0	2	1	5
Anna*	0	0	0	0	0	0	1	2	3
Ellen	3	0	0	4	0	1	1	0	3
Gordon	0	0	0	9	0	2	3	1	0
Harold	0	0	0	0	0	0	0	0	0

* Anna's use of the simple sentence was based on direct prompting by an adult.

APPENDIX D

PRESCHOOL DATA

SUMMARY OF PRESCHOOL RESPONSES TO QUESTION ONE (WORD CARDS)

SUMMARY - GARTH (May, 1981)

Garth recognized his own name. On one occasion, he asked Sandy to write his name. She wrote !Q! He insisted it wasn't his name and told her the correct letters in his first name. He was not ready yet, though, to recognize other words.

SUMMARY - FRED (December, 1981)

Fred would only give his name when asked for a word and eventually he gave the number 6.

SUMMARY -MAURICE (November, 1981)

Maurice had the typical confusion of letters and numbers, although this might indicate that he knew that letters have something to do with words. He didn't give any words, but continued to give letters and numbers.

SUMMARY - DAVID (April, 1981)

David recognized his name, but had no interest in words.

SUMMARY - RICK (October, 1981)

Rick showed no interest in word cards.

SUMMARY - LYDIA (April, 1982)

Lydia did not seem to understand what I meant when I asked for a word. She held up her fingers and I wrote the corresponding number for her on a card.

SUMMARY - AARON (September, 1981)

Aaron said words when I asked for favorite words for the words cards. Although unable to read them over time, he guessed at them with quite a good memory.

SUMMARY - SANDY (August, 1981)

Sandy gave me words for cards, including a phrase.

SUMMARY - KEITH (April, 1981)

Keith consistently recognized his name and a small word like UP, but was not yet ready to recognize an extended vocabulary.

SUMMARY KAREN (August, 1981)

Karen realized that the letters have something to do with words, but continued to ask for letters rather than words.

SUMMARY OF PRESCHOOL RESPONSES TO QUESTION 3

SUMMARY - GARTH (May, 1981)

Garth is enthusiastic about counting and there was a noticeable difference in his counting from November to January. In November, his one-to-one correspondence was secure up to number five. Number six and up were not secure. By January, however, his one-to-one correspondence extended to 13 in sequential order and continued on to 20 even though he didn't say the proper number names in sequence.

SUMMARY - FRED (December, 1981)

Fred knew his numbers by rote to number eight, but counted the same object more than once or counted in between objects or gave one number for two objects. His one-to -one correspondence seemed firm up to number three, but shaky beyond that. He gave no indication of understanding number as representing quantity.

SUMMARY -MAURICE (November, 1981)

Maurice's one-to-one correspondence was firm up to ten, possibly to 14. Since he was not guessing numbers at random, one suspects that he may know that certain numbers represent certain quantities.

SUMMARY - DAVID (April, 1981)

In one month's time, David's one-to-one correspondence extended from five to ten. However, his manner of counting beads on the abacus would seem to indicate an understanding of number as names or labels for individual beads rather than an understanding of the inclusive property of number.

SUMMARY - RICK (October, 1981)

Rick's one-to-correspondence seemed secure up to number four. Rick's numbers in sequence seemed to have expanded only minimally

from three to four October to May. His ability with random numbers, however, showed marked contrast from saying random numbers under 19 to ones with larger numbers in the 40's, including a beginning understanding of our base 10 number system (40-10, 40-11, 40-12....).

SUMMARY - LYDIA (April, 1982)

Lydia's one-to-one correspondence seemed secure up to number three before Christmas, then took a big leap up to #11 in January.

SUMMARY - AARON (September, 1981)

Aaron's one-to-one correspondence in counting took a big leap from five in November to 17 in January.

SUMMARY - SANDY (August, 1981)

Sandy's one-to-one correspondence was firm up to ten. She was one of the few children to count on, rather than count over all my fingers when I added my second hand to my first hand. Kamii has described this "counting on" as an indication of a more mature thinking process (Kamii, 1985).

SUMMARY - KEITH (April, 1981)

Keith's one-to-one correspondence extended to number 21 in the fall.

SUMMARY - KAREN (August, 1981)

Karen's one-to-one correspondence seemed to extend firmly to four.

SUMMARY OF PRESCHOOL DATA BY CATEGORIES

GARTH (May, 1981)

1. Key word cards:

GARTH
4
BAT MAN
KARATE

2. Reading cards

Garth remembered his name and the number 4 from week to week, but he didn't remember any others. He read "Leslie" for BATMAN. Leslie happened to be sitting next to him.

3. Counting with one-to-one correspondence

Garth counted scissors in Oct: 1,2,4,5,11,3,7,12 . . . removing them one at a time from a box. This was done with one-to-one correspondence, but using random numbers. In November, he counted my fingers: 1,2,3,4,5 7,8,9,10,6 with abit of a hestitation before saying #6. He repeated the finger sequence above again when counting another child's fingers and again a third time on another child saying #7 twice. A week later, he counted my fingers again, skipping #6 and saying 7,8,9,10-11, 12 on my second hand. He said #10-11 on one finger.

In January, Garth counted with one-to-one correspondence up to 13. He then countinued with one-to-one correspondence, but said the numbers at random - 3,4,14,7,8. Garth liked to count and frequently offered to do so.

FRED (December, 1981)

1. Key word cards

Fred only gave his name FRED when I asked for a word. In December, he said 6.

2. Reading cards

Fred remembered his name but still did not give any other words to be written.

3. Counting with one-to-one correspondence

Fred counted his fingers with one-to-one correspondence up to the #3 then continued in sequence up to #8, using one hand only and sometimes saying three numbers on one finger or in between fingers.

In January, Fred counted a box of pennies by saying 1,2,3,4,5 and jabbing his fingers at the pennies indescriminately, without any one-to-one correspondence. In May, given the same box of pennies, Fred counted in sequence up to #6, but lost the one-to-one correspondence around #4. He skipped some pennies and recounted some, using numbers at random, saying #8 most frequently. Sometimes he said one number while pointing to two pennies. He didn't count all the pennies but seemed to run out of numbers to say, whereas other children will continue with random numbers until they feel they have counted all the pennies in the box.

Fred counted from one to ten on the abacus but said one number for two beads. He began counting silently. When I said I couldn't hear him, he began with the next bead (in the center of the first row), calling it #1. He counted to 10, then said 3 and started with 1 again. At 7,8,9, he pushed over 2 beads. At 3,4,5, he pushed over 2 beads.

MAURICE (November, 1981)

1. Key word cards

2. Reading cards

Maurice recognized the above cards, but did not give me any words for his cards.

3. Counting with one-to-one correspondence

In November, Maurice counted my fingers with one-to-one correspondence to 10. In January, he counted crayons in a row with corr espondence up to 14.

Maurice counted on the abacus with one-to-one correspondence to 10 on the first row of beads. He counted the second row of beads from 1 to 10 as well.

DAVID (April, 1981)

1. Key word cards

DAVID
KARATE PUNCH

2. Reading cards

David continued to recognize his name, but not KARATE PUNCH after one week's time.

3. Counting fingers

David counted with one-to-one correspondence to five on my fingers, said 6 on my second hand, and then quit. On a plexiglass construction, he counted up to 8, but lost correspondence after #5. This was in November. In January, David counted crayons in a row with one-to-one correspondence up to 15.

David counted with one-to-one correspondence to 10 on the first row of beads and repeated the same for the second row. He wanted to count them again. This time he counted 1,2, was momentarily distracted, the started over again with 1 on the third bead, ending with 8 in the first row. He started the second row with 1 again.

RICK (October, 1981)

1. Key word cards

Rick had no interest in telling me a word.

3. Counting with one-to-one correspondence

Rick counted my fingers: 1,2,3,4,5, ?,6,7,8,9. I didn't hear the missing number, but Rick seemed content with the total of 9.

He counted a chain of plastic paper clips, losing correspondence after #3, although he counted in sequence to 9. He skipped some clips while saying numbers. After #9, he said numbers at random, ending with #19. Rick counted on the abacus with one-to-one correspondence to 9. I couldn't hear his count of the second row clearly, but it appeared to be a repeat of the first row.

In May, I asked Rick to count pennies in a box. He said numbers in sequence up to #6, but lost correspondence after #4. He recounted some pennies and skipped others. He said some numbers without touching any pennies. Most of his random numbers had 40 in them, some being 41,42, others being 40-10, 40-11, 40-12. He attempted to count all the pennies in the box. Rick counted on the abacus with one-to-one correspondence to 9. I couldn't hear his count of the second row clearly, but it appeared to be a repeat of the first row.

LYDIA (April, 1982)

1. Key word cards

3 (Lydia didn't tell me this number but held her fingers up when I asked her for a word.)
2

2. Reading cards

Read 3 as #1. When I asked her for another word, she held up the forefinger of each hand. I asked her what that was. She said "2."

3. Counting with one-to-one correspondence

Lydia counted my fingers with one-to-one correspondence up to #4. On the second hand, she counted to 3 and stopped. I watched her counting playdo cookies. She bounced her finger on each cookie, ending with 4, even though there were 5 cookies.

Lydia counted with one-to-one correspondence up to #3 on the abacus. She continued saying numbers at random, but without correspondence as she pushed beads: "14,4,8..." On the second row, she said 1,2,3,1,2,3, with correspondence and added 4,5 at the end.

In January, Lydia counted pennies with one-to-one correspondence to 11, then said random numbers and started over with 1 two more times. She moved each penny slightly as she counted and seemed to touch all of them with few repeats. When starting over, she seemed to lose correspondence as she went faster.

AARON (September, 1981)

1. Key word cards

HOUSE
HOT DOG
BAD GUY
KARATE 4
WORM
LION

2. Reading cards

Aaron recognized HOUSE and KARATE over a one week period, then no longer recognized them. He said "hot dog" for BAD GUY and called LION,"house." He had a good memory for the words he had given me in the past, but it became evident after he had accumulated a few that he was guessing based on memory, rather than reading. Eventually, he lost interest in the activity.

3. Counting with one-to-one correspondence

Aaron counted my fingers with one-to-one correspondence up to 5 on the first hand and to 9 on the second hand, somewhere skipping one in the process. He seemed content with the total. He counted foam packing pieces on his art project. He kept correspondence up to #3, then proceeded to "count" the rest (22 actually) by touching each one and saying numbers at random, especially repeating 14 and 13 quite a few times until all the pieces had been pointed to.

In January, Aaron counted pennies with one-to-one correspondence to 17. Then lost it and finished with random numbers, especially 58 and 59.

SANDY (August, 1981)

1. Key word cards

SNOWMAN
WORM
SANTA CLAUS AND SUGAR FOR RUDOLPH

2. Reading cards

Sandy enjoyed writing her own cards with her own writing. For Guy, she wrote !Q!. She didn't recognize her word cards from week to week.

3. Counting with one-to-one correspondence

Sandy counted with one-to-one correspondence to 10 on my fingers. When the second hand was added, she continued on with 6 rather than beginning again with #1.

Sandy counted with correspondence to 10 on the first row of beads. On the second row, she moved the beads haphazardly, either because she was bored or to save face, since it became evident that she didn't know her numbers beyond 10. She said numbers at random and moved more than one bead at a time until she reached 31.

KEITH (April, 1981)

1. Key word cards

KEITH 4
KARATE KID
PHONE
UP

2. Reading cards

Keith continued to recognize his own name and 4, but not the rest of his words. He mixed up the words, indicating he had a good memory for words he had given me, but was not actually reading them.

3. Counting with one-to-one correspondence

Keith counted my fingers with correspondence to 10. Seemed to find it too easy and boring.

Keith counted with one-to-one correspondence to 21. He left out one number in the teens.

KAREN (August, 1981)

1. Key word cards

H
T

I originally wrote TEA until I realized she might want T. I changed it and she said "Yeah! and she then asked for H.

2. Reading the cards

Karen recognized the letters, but did not ask for words.

3. Counting with one-to-one correspondence

Karen counted my fingers with one-to-one correspondence up to 4. She didn't say 5 until I did. On the second hand, she repeated the same procedure. Karen repeated 1,2,3 over and over, sometimes with one-to-one correspondence, sometimes moving only two beads for the three numbers.

APPENDIX E

ECS DATA

SUMMARY OF ECS RESPONSES TO QUESTION ONE (WORD CARDS)

SUMMARY - ALEX (October, 1980)

Alex did not recognize his word cards.

SUMMARY - KRIS (August, 1980)

Kris had a keen interest in words, but no retention. He would run his fingers twice over TIGER TRUCK and say "apples". When he wrote his name he told me as he went along that K is for Kris and R is for Kris and I is for Kris etc. This reminded me of the stage described by Ferreiro & Teberosky (1985) when children think that their complete name is signified by each letter.

SUMMARY - CAROL (February, 1981)

Carol persisted over a period of three months to give numbers and letters for words in spite of watching numerous others have words printed on their cards. In May, Carol gave words for her cards (FIGHT) although she did not continue to recognize them.

SUMMARY - CARL (September, 1980)

Carl remembered his words for a week or two, then lost retention.

SUMMARY - JACKIE (January, 1981)

Jackie recognized her words briefly for a week or two, then lost retention. She was not particularly interested in the word card activity.

SUMMARY - JAY (December, 1980)

Jay retained word recognition over a month's period, but made it very clear that he was not interested in learning anymore words.

SUMMARY - JOAN (August, 1980)

Joan did not recognize her word cards from week to week. She made an interesting comment one day while writing her own name on one of the cards. She began to write at the right-hand side and asked if she could start there. I said that most people start at

the other end. She said she wanted to start at the right-hand side of the card. She quoted her Mom as saying that the teacher would send her home if she didn't start to write it on the left side. I responded that it didn't matter in kindergarten but that it might in grade one. Her reply: "Yup,that's when I'll do it" and proceeded to write her name, N A O J, starting from the right hand side.

SUMMARY - JACK (August, 1980)

Jack had very little interest in word cards right from the beginning and didn't recognize any from week to week.

SUMMARY - JASON (May, 1980)

Jason did not remember words cards and was not interested in doing the activity.

SUMMARY - CORA (June, 1980)

Cora remembered a few key words, but was quite definite about not wanting to learn any others right then. She was one of the few children who actually watched while I wrote their words and seemed interested in seeing them written. Cora had a discussion with Sally as to whether or not CHOCOLATE was her name. She explained why it wasn't, going letter by letter to prove it. She then asked me to confirm, saying, "That isn't my name, is it?"

SUMMARY - LAURA (July, 1980)

Laura had very little retention of word card recognition. Although she was keen on getting words written for her at the moment, and quite imaginative, her interest didn't last.

SUMMARY - LORI (October, 1980)

Lori remembered her word cards from memory but was not able to match her oral words consistently with their written form.

SUMMARY - SALLY (July, 1980)

Sally easily remembered her word cards from week to week and accumulated enough for her first book before Christmas. Since Sally's response to the activities was very different from the overall group profile, her responses will be detailed in chapter five on "key incident" children.

SUMMARY OF ECS RESPONSES TO QUESTION 3

SUMMARY - ALEX (October, 1980)

Although Alex's one-to-one correspondence continued on with numbers at random, his correspondence using numbers in sequence extended to number four. Little change was observed in Alex's counting from October to May. This lack of apparent progress was unusual compared to the other children in this study. in this study.

SUMMARY - KRIS (August, 1980)

Kris's one-to-one correspondence seemed firm to number five. He was no longer in the ECS in May, so an updated sample of his counting was not available.

SUMMARY - CAROL (February, 1981)

Carol's one-to-one correspondence was consistently firm up to #11 in the fall. In May, it extended to 26.

SUMMARY - CARL (September, 1980)

Before Christmas, his one-to-one correspondence extended to number five. . After Christmas, however, his correspondence extended firmly to #12.

SUMMARY - JACKIE (January, 1981)

Jackie's one-to-one correspondence was firmly established to at least 25 in January. In May, Jackie continued her agility with numbers (initiating the subtraction penny game described in the introduction) and showed more interest in word cards than she had previously.

SUMMARY - JAY (December, 1980)

Jay had one-to-one correspondence firmly to 20 in the fall. In May, his correspondence expanded to at least 25.

SUMMARY - JOAN (August, 1980)

In the fall, Joan's one-to-one correspondence extended to ten. By May, Joan's one-to-one correspondence had extended consistently to 15.

SUMMARY - JACK (August, 1980)

Jack had one-to-one correspondence up to ten, but not consistently. In May, his one-to-one correspondence seemed firm up to #11.

SUMMARY - JASON (May, 1980)

Jason's correspondence extended to number 25 (very slowly and accurately) on pennies. By May, his counting became quicker and more confident.

SUMMARY - CORA (June, 1980)

Cora's correspondence was firm to ten and fairly consistent to 25. In May, Cora's one-to-one correspondence was firm to at least 25.

SUMMARY - LAURA (July, 1980)

Laura's one-to-one correspondence seemed to be consistent up to 15 and quite good, although variable between 15 and 25. Her counting in May indicated that she may still understand numbers as labels rather than as representing quantities as she skipped some pennies and recounted others, whereas most of the children with one-to-one correspondence to 25 were very careful moving the pennies as they counted in order to get the correct total.

On one occasion, Laura was singing the ABC's while pointing with one-to-one correspondence to fruits and objects on a tree in a picture book. When she reached the end of the alphabet, she went on pointing to one picture per beat of her song, maintaining a one-to-one correspondence based on musical beats and objects rather than on words and objects.

SUMMARY - LORI (October, 1980)

Lori's one-to-one correspondence was firm up to 25 both in the fall and in May.

SUMMARY - SALLY (July, 1980)

Sally's correspondence extended firmly to 25 in the fall and in May.

SUMMARY OF ECS DATA BY CATEGORIES

ALEX - (October, 1980)

1. Key word cards

APPLE
SKIDOO

2. Reading cards

Alex did not recognize any of his cards from week to week.

3. Counting with one-to-one correspondence

Alex counted the fingers on one of my hands: 1,2,3,4,6. Alex used a little rubber Batman figure to count the beadson the abacus: 1,2,3,4,6 then random numbers. On the second row: 7,8,9,10...9,10,8,9,10,11,15,15,18,19,1, 6,9,10. He wanted to count the abacus a second time and used similar random numbers although he touched the beads with one-to-one correspondence. When counting pennies, Alex kept his one-to-one correspondence with appropriate numbers to 4. After 4, he continued with random numbers: 6,7,9,10,11,16, 11teen,15,20,22,20-15,21,29,20-15,20-16,22,22,21. He lost correspondence while counting the first ten, saying three different numbers while pointing to the same penny. However, when counting in the 20's, he retained correspondence for all of them.

In May, Alex counted the pennies, matching a spoken number with a penny, but was still not aware of the correct sequence of number, as he said, 1,2,4,6 and continued on with random numbers mentioning 21,24,26 most often.

KRIS (August, 1980)

1. Key word cards

TIGER TRUCK
WHEELS ON THE BUS
TURN A SLED
FISHERMAN
ORANGE

Kris asked for TIGER, thought a bit and then said TIGER TRUCK. I wrote it as he watched with interest, pointing out which letters are in his own name. I read the card back to him. He pointed to TIGER and said "tiger truck." Then he pointed to TRUCK and asked what it said. I replied "truck" and reread the card. He again pointed to TIGER and said "tiger truck." It seemed fairly clear that he thought one word stood for both. He asked for TIGER TRUCK on another occasion and went through the same pointing process, this time matching oral and written word accurately.

Kris was very interested in words. He asked for WHEELS ON THE BUS as he was singing the song. I read and pointed to the words as usual. He took it and read and pointed to the words at least twice on his own matching oral word and written form accurately. He then asked for something I didn't understand. He explained it as "when you're on a sled and you want to turn it with the thing up front with your hands' (acted this out). He called it TURN A SLED. I wrote and read it and he read it and pointed with one-to-one correspondence to the words.

2. Reading cards

Kris did not remember his word cards from week to week.

3. Counting with one-to-one correspondence

In October, Kris counted my fingers with correspondence up to 5. He didn't want to continue with the second hand. On the abacus, Kris counted with one-to-one correspondence to 9, although he moved two beads for #5. He continued with random numbers. On the second row, he said numbers at random: 18,16,14 were repeated quite a few times and some numbers in the 20's were counted with one-to-one correspondence.

He counted pennies with correspondence to #5. He continued counting the pennies, but started again with #1. I demonstrated 6-10 on the pennies and on my fingers, but received no response from Kris. I realized it would have been more fruitful to encourage him to continue using any numbers he could think of.

CAROL - (February, 1981)

1. Key word cards

2 Originally I wrote TWO and 2 and asked which she wanted. She chose the numeral.

4
3
S
F
W

Carol heard the other children give me words, but she continued with numbers and later, letters.

2. Reading cards

Carol continued to recognize numbers and letters but did not offer any words.

3. Counting with one-to-one correspondence

Carol counted the fingers on my first hand with correspondence to #5 and did the same on the second hand. When I held up both hands together, she started counting at the thumbs, whereas the ECS children started from one end. She recounted one thumb.

7
12 10 9 8 1 2 3 4 5 6

Carol counted on the abacus with correspondence to 12, then continued with random numbers still maintaining a correspondence. Carol did not move the pennies as she counted. Her correspondence lasted to 11, the changed to random numbers. She counted some

pennies more than once. In May, her correspondence extended to 26. She skipped #6, but all else was correct.

CARL (September, 1980)

1. Key word cards

GOBOTS
SEWING
CHOO CHOO TRAINS
DINOSAURS

2. Reading cards

Carl remembered his cards for a week or two, then did not continue to recognize them. He remembered what words he had given but was not able to correctly match them:

Said "sewing" for GOBOTS
Said "choo choo" for CHOO CHOO TRAINS
Said "sewing" for SEWING
Said "gobots" for DINOSAURS

3. Counting with one-to-one correspondence

Carl counted the fingers on my first hand: 1,2,3,6,9 although with one-to-one correspondence. He said he didn't know how to count my second hand (October). On the abacus, Carl counted with correspondence to #4, then used random numbers, maintaining correspondence ..16,18,20...30-11, 30-12... When Carl went to count the pennies in the box, he asked where #1 was. He counted with correspondence up to 12, then looked up, hesitated and continued to count using random numbers 3,6,7,10, then upped the ante, 19, 21, 24... He pointed with one-to-one correspondence to all of the pennies, coming back to one he missed in the center, giving a number name to each penny.

JACKIE - (January, 1981)

1. Key word cards

PURPLE
PINK
PEANUT BUTTER
JOSHUA

2. Reading cards

Jackie recognized her color words for a week or two, then did not continue to remember any. She guessed "peanut butter" for PINK. She didn't recognize PURPLE. She gave a concentrated look back and forth on PEANUT BUTTER and said "Spiderman."

3. Counting with one-to-one correspondence

Jackie counted my fingers with one-to-one correspondence to 10. On the abacus, she counted with correspondence correctly to 20. When counting pennies, she picked them up and put them in one hand as she counted. When she reached 12, she changed pennies to her other hand and continued picking them up and counting them with her left hand. Her correspondence continued to 25, in spite of distractions going on around her.

In May, after correctly counting the pennies, Jackie initiated the penny game described in the introduction.

When asked for a word card in May, Jackie said she'd like WE. I asked her if it was like the WE in WE ARE GOING and she said "No, it's the kind that means yes." So I wrote the French, OUI. She examined it and then also asked for the English form, YES.

JAY (December, 1980)

1. Key word cards

GRAPES
SUPERMAN
SPIDERMAN
WHALE

Jay was not interested in watching me write his words.

2. Reading word cards

Jay continued to recognize most of his cards over a two month period. He called SUPERMAN, "Spiderman," and then asked for SPIDERMAN. I said I thought he had already read one card as "spiderman." He replied, "No, that"s Superman." I asked him how he knew, but he didn't answer. However, Jackie answered for him saying that Superman starts with an S but Spiderman starts with an R. We discontinued doing word cards at Jay's request. He was just not interested in doing any more.

3. Counting with one-to-one correspondence

Jay counted with one-to-one correspondence to 10 on my fingers. He counted with correspondence to 20 on the abacus. On another occasion, counting wheels on a vehicle, he continued after #20 with 20-11, 20-12, 20-13, 20-14....20-18, then 40. Although he didn't move the pennies as he counted them, he maintained correspondence to 24, skipping here and there but keeping good visual track of which ones had already been counted. In this process, he left out one. In May, Jay was still not interested in doing word cards and his one-to-one correspondence had expanded to at least 25.

JOAN (August, 1980)

1. Key word cards

POT
TRIANGLE
EXIT
DEAR PAT

2. Reading cards

Joan did not recognize any of her cards from week to week,although she was very interested in doing them. She called POT, 'exit" and EXIT, "exit." She didn't appear to notice the contradiction. At a subsequent session, she read all her cards as EXIT, except when she got to the last one, which was really EXIT. She read it as DEAR PAT. I held up DEAR PAT and EXIT and asked her if one said EXIT or if they both did. She said only one did. I asked which one. She quickly pointed to one and said "Pat," then pointed to the other and said "Pat."

After 3 weeks, Joan did not recognize any of her words.

3. Counting with one-to-one correspondence

Joan counted my fingers with one-to-one correspondence to 10. On the abacus, she counted with correspondence to 12. She continued with random numbers: 15,18,19,20,22,28,26,27,20-11, keeping correspondence.

Joan counted pennies with correspondence to 11, although when she got to #6, her touching the penny did not coincide with her saying the number so that she skipped over one penny between saying 6 and 7. After 11, she continued with random numbers: 17,13,15...26,28,29,20-11 with correspondence, but often recounted the same pennies and never really reached an end. In May, she counted pennies with correspondence up to 15, skipped 16 & 17 and continued with correct numbers and correspondence to 27. This time she removed each penny from the box as she counted and kept them in her hand.

JACK (August, 1980)

1. Key word cards

FRUIT ROLL UP
CHOCOLATE BARS
CHOCOLATE MILK

2. Reading cards

Jack did not ever recognize his word cards. He was quite definite about not wanting to continue the activity.

3. Counting with one-to-one correspondence

Jack counted my fingers with one-to-one correspondence to 5 and did the same on my second hand. On the abacus, Jack counted with correspondence to 10 on the first row. On the second row, he again started with 1, moved 2 beads and called them 6. He ended with 9 and seemed satisfied.

When I presented Jack with the box of pennies, he took one look and said "Hey, there's too many!" I assured him that he could count only as many as he liked. He replied, "7?" He counted with correspondence up to 11, but didn't rearrange any of the pennies. He then stated that that was all he wanted to count. In May, he counted the pennies with one-to-one correspondence to 11 and then he stopped, saying that he could only count to 10. He didn't move the pennies while counting.

JASON (May, 1980)

1. Key word cards

Z
D
B
X
DRAGON
PLANE

When I asked Jason for a favorite word, he replied, "B." I wrote it and said "the letter B." I then asked him what word he would like. He thought for a minute and answered DRAGON.

2. Reading cards

Jason recognized the letters but continued to call both word cards, DRAGON, apparently from memory rather than actual reading.

3. Counting with one-to-one correspondence

Jason counted my fingers with correspondence up to 10. He refused to count on the abacus. Jason moved the pennies slightly as he counted them with one-to-one correspondence slowly to 25. In May, he counted them with correspondence to 25, without hesitation.

CORA - (June, 1980)

1. Key word cards

YES
NO
MAYBESO
NEST
HAT
VEST
CABBAGE PATCH

2. Reading cards

Cora recognized YES, NO, MAYBESO consistently, but gradually handed me all of the other cards, claiming that they weren't her cards. She decided by December that she definitely did not want any more word cards, even though she could remember some of them.

3. Counting with one-to-one correspondence

Cora counted my fingers with correspondence to 10 and seemed very bored with the task. On the abacus, she counted with one-to-one correspondence to 22, but left out 11 and 12. When counting the pennies, Cora took them one at a time out of the box and counted with correspondence to 25. Although she was at times distracted by the activities of the children around her, she did not lose count. In May, Cora offered to count the pennies, doing so as accurately as she did the first time.

LAURA - (July, 1980)

1. Key word cards

ICE CREAM
FARMER IN THE DELL
BANANA RAINBOW
MILK CHOCOLATE
ICE CREAM PICTURE
BANANA MILK
PEYANO (for Keyano) COLLEGE

Laura was not interested in watching me write her words or in reading them after they were written.

2. Reading cards

Laura recognized ICE CREAM for a short period and did not recognize any of the others.

3. Counting with one-to-one correspondence

Laura counted my fingers with correspondence to 10. On the abacus, she counted with correspondence to 21, but slipped up

somewhere between 15 and 16 by saying two numbers on one bead. When counting the pennies, she moved them and maintained her one-to-one correspondence to 26. Evidently she skipped one number in the 20's. In May, Laura counted the 25 pennies up to 29, recounting some and missing others as she did not move the pennies as she counted. It would appear that her correspondence in counting goes to number 15.

LORI (October, 1980)

1. Key word cards

EDMONTON
ROB
MONTREAL
SNOWMAN
HAIR

2. Reading cards

Lori asked for EDMONTON a second time, not recognizing that she already had it written on a word card. She said her words from memory on whatever card came up without recognizing which was which.

3. Counting with one-to-one correspondence

Lori counted with one-to-one correspondence up to 10 on my fingers. On the abacus, she counted with correspondence to 20. When counting pennies, she moved them as she counted to the side of the box, ending up with 2.5 straight rows of pennies. Her correspondence went to 25 with no errors.

SALLY - (July, 1980)

1. Key word cards

APPLES
APPLE JUICE
MOO JUICE
GEE GEE (hard G)
BEE BEE
RITZ
HAIR JUICE
TUMMY JUICE
HOT CHOCOLATE
EYE JUICE
BOOK JUICE
WALL HAIR
WALLPAPER COLORING
GRAPE JUICE
BOX JUICE
MILK

Sally kept asking for more and more juice words until I called a halt. She said that MOO JUICE was two words.

2. Reading cards

Sally knew most of her words from week to week. EYE JUICE gave her problems and was eventually discarded. She read TUMMY as "Tammy" and HAIR as "head," but remembered them after one reminder.

3. Counting with one-to-one correspondence

Sally counted my fingers with correspondence up to 10. When I held up my second hand, she continued counting with 6 rather than beginning again with 1 and recounted all the fingers. When counting pennies, Sally took one at a time out of the box. At one point, she lost track of the count because of outside distractions. She then decided to take all the pennies out of the box and counted them as she put them back in. She was again distracted by a hyperactive youngster in the vicinity and started over again although she had already reached 12. She ended up with firm one-to-one correspondence to 25 with definite meaning and effort to know the correct amount of pennies.

In this particular ECS group, there seemed to be a general pattern between a child's ability to remember a word over time and her demonstration of one-to-one correspondence. Although children are individuals and there is a lot of variation in responses to the activities in this study, overall it appears that those who have the most difficulty remembering words are also the ones with one-to-one correspondence that is limited to 5 or 10. Those who are more capable of retaining words in memory, at least for a period of two to three weeks, are also those whose one-to-one correspondence extends consistently up to 20 or 25.

APPENDIX F

GRADE ONE DATA

SUMMARY OF GRADE ONE RESPONSES TO QUESTION ONE (WORD CARDS)

SUMMARY - SEAN (March, 1979)

Sean remembered his word cards with ease, asked for additional ones each session and remembered them all from week to week. He expanded his word cards with great variety of sentence structure and chose the format of you and a verb, which seems a mature step from writing the book in the first person.

His use of modifiers seemed very mature for a first grader. He kept pestering for another book, so in May I typed a second book for those interested, from dictation not from word cards. Sean was the only one to tell a story and base it on an actual past experience of his. He read the story word perfect.

SUMMARY - ARLENE (June, 1979)

Arlene was one of the children who finished their books quickly. She was keen on the activity and asked for extra cards each session. A few of her initial cards were discarded, but no others were, once she got going. She easily expanded and combined words for her book. She was one of five children who wanted to have a second book typed. She followed a story line, made up as she went along, but not based on a past factual experience as Sean's was. She read the book word perfect.

SUMMARY - TERRI (September, 1978)

Terri was one of the earlier children to complete a book. She was very interested in the activity and would have continued with a second book if I had had time. She remembered her words from week to week, although she occasionally stumbled over endings of words.

SUMMARY - RUTH (March, 1979)

Few notes were recorded on Ruth as she moved smoothly through the activities, as did many others, remembering her cards from week to week and adding new cards with ease. She, like many of the girls especially, did nothing out of the ordinary. Ruth expanded her word cards into book form easily, but simply. She was one of the children interested in a second book. Her spontaneous dictation still used the simplified form expressed in her first book.

SUMMARY - BURT (July, 1979)

Burt was unique in this group in the manner in which he approached word cards. For the first few months he showed very little interest. He had difficulty remembering some of his words and great difficulty thinking of any even with prodding. Some weeks he didn't want a word, the only child in this group who didn't.

In February, Burt saw the first book made in the group (for Sean) and became insatiable. He continually pestered for a book. He dictated one word card after another until a halt was called. In 3-4 weeks, he had generated enough word cards for a book. Once Burt understood, in concrete terms, what the word card exercise was all about, he did the exercise with astonishing ease.

SUMMARY - CYNTHIA (December, 1979)

Cynthia was another child, like Ruth, who uneventfully went through the key word activity. She remembered her words from week to week, was interested in the activity and easily expanded her cards into a book. Cynthia analyzed CHRISTMAS comparing it to her own name. She pointed out that it was the same at the beginning except for a Y instead of an I (in her real name). Cynthia also dictated a second book.

SUMMARY - KELLY (June, 1979)

Kelly was one of the last children to put together a book. He had great difficulty initially remembering his word cards and discarded quite a few before he began to consistently recognize them all. Even simple words like DOG and CAT were difficult for him. Once Kelly began to remember words (in March) he was quite creative - writing his own words and personalizing his cards in a way that fired the interest of his friends (COLIN IS A BRAT. I LIKE COLIN).

Kelly's teacher commented that she felt he read alot more classroom words than he remembered from my word cards. She showed me some meticulous needle work done by Kelly at a skill level beyond the typical first grader. She felt that in classroom exercises, he seemed to do best when he had the whole picture. She found him very bright and a good speller, although phonics was not a strength of his. She felt in March that he was beginning to match spoken words with written ones, but wasn't sure if the words he recognized from day to day were going into long term memory. We both felt that Kelly might be an example of a learner with right-brained strengths. By May, Kelly remembered enough words to make a book and read his book very well, with correspondence, after a one-week lapse.

SUMMARY - TANYA (April, 1979)

Tanya smoothly went through the word card activity. She almost always knew her word cards. She dictated her book with ease, but tended to keep her book very close to her cards in form.

SUMMARY - ROLAND (August, 1979)

Roland went through the word card exercise quite uneventfully. He made a few errors while dictating and reading his book, but on the whole went through the exercise with ease.

SUMMARY - DIANE (July, 1979)

Although Diane was always interested in word cards, she got off to a slow start in remembering her words. By February, she began to consistently remember her cards and accumulated more than enough for a book.

SUMMARY - RICHARD (January, 1980)

Richard was one of the first to finish a book and was very interested in the process, often asking for additional cards. He didn't hesitate on any words, reading them all at top speed. His teacher claims he could read at three years of age. He bubbled with imagination and enthusiasm so that taking the dictation for his book was a delight. His verbal adeptness led to modifications and expansions of his word cards that did not happen with more reserved children. Richard volunteered to illustrate a book of his own and told the story as he went along. Some of his creation is included in Chapter Five on "key incident children."

SUMMARY - CAM (August, 1979)

Cam was unique in his approach to the key word card activity. Initially, he took so long to think of a word, that I would go and do someone else and come back after he had a chance to think. Once he started, he dictated extremely lengthy story-sentences, was very enthusiastic and didn't want to shorten anything. Most of his cards were not remembered until about April when he began to remember most of them from week to week. These cards were noticeably shorter than the earlier ones. Cam easily dictated his book and preferred to keep a combination of capital and lower case letters. He was beginning to comment on phonetic features, as when he said that it sounded like a d in "Kurtis" and asked for a short form of the name, spelling out KURD.

SUMMARY - KARLA (August, 1979)

Although willing , Karla was never too enthusiastic about the word card activity. She generally knew her cards, but rarely asked for more than one, whereas, most of the other children asked for two or three and some occasionally wanted more than there was

time to give. Karla was reluctant to expand on her cards when we typed her book and did so only when coached. Her book retained a very simple structure. Karla was one of the children who requested a second book. She read the book with no errors.

SUMMARY - GEORGE (April, 1979)

George made slow progress initially with the word cards and only began to remember some in April. He was one of the last to type a book. He continued to take his time and concentrated on words before saying them. He used the I LIKE format throughout his book on his own initiative. This appears to be a step up from saying words without sentences and a step before using more complex sentence constructions.

SUMMARY - SAMMY (February, 1980)

Sammy loved doing word cards, but had difficulty remembering them, even the cards he had illustrated. He did not show any particular interest in making a book, even though he saw the books made with the others. Sammy's word cards are described in detail in Chapter Five.

SUMMARY - SUE (June, 1979)

Sue was one of the earlier children to finish a book. She uneventfully went through the process. Her sentence structure was comparatively simple, four pages having phrases rather than sentences.

SUMMARY - SOL (November, 1978)

Although Sol was interested in words, he was just not able to retain any from week to week with the exception of MOM. In the classroom, he had difficulty distinguishing some of the letters (for example, I from l). Sol signed his name on the list for a second book, so I took his dictation even though he did not complete a first book. He was not able to read the book.

SUMMARY OF GRADE ONE RESPONSES BY CATEGORIES

SEAN (March, 1979)

1. Key word cards

From the beginning, Sean took his cards from me and read at his own pace rather than having me hold and turn the cards, as I did with most children. He always asked for more than one new card. He chose the lower case for his words.

2. Reading the cards

Sean knew all his cards each time.

3. Dictating the book

Sean was the first one ready to dictate a book and did so quickly. After the first page, I asked Sean to expand on his individual word cards. He did so easily in sentences. For CLOTHES, he said the sentence "You wear clothes all day." As I was taking it out of the typewriter, I said "except when you take a bath." He wanted to add that, so I put the paper back into the typewriter and read his sentence over, waiting for him to finish it. He reworded it several times, coming out with awkward constructions. He couldn't remember that I had used the word EXCEPT so he began again and again. He had difficulty finding a conjunction that would make the sentence sound right to him and abandoned the effort.

4. Reading the book

Sean read his completed book a week later, word perfect.

5. Counting with one-to-one correspondence.

When I asked Sean to count squares on graph paper, he was much more interested in counting by 2's. The squares were colored in groups of 7, so he had to change from even 2's to odd 2's. He did so accurately. He counted orally by 5's. He counted pennies with one-to-one correspondence to 25.

SEAN'S WORD CARDS

Cabbage Patch
Care Bear
chocolate ice cream
little dog
motorcycle
bike
clothes
kids
pictures
balloons and socks
shoes and tape

SEAN'S BOOK

1. Care Bear
2. Cabbage Patch kids is nice.
3. Balloons are colorful and socks warm your feet.
4. You wear clothes all day.
5. You drive a motorcycle in the spring.
6. You ride a bike in the spring.
7. You have chocolate ice cream when you come in from the cold.
8. You wear shoes in the spring and you listen to a tape.
9. You play with your friends.
10. You like your own dog.

SEAN'S SECOND BOOK

1. A boy is riding his bike.
2. Then his mother said "You have to bring your bike in." And he never.
   So his Mom locked his bike up for two days.
3. Then the two days were up.
   The second day was raining and he couldn't ride his bike.
4. On Wednesday, it was sunny so he could ride his bike.
5. Then it was time to go to school.
   It was kindergarten so it was in the afternoon.
   After school, he rode his bike until suppertime.
6. After supper, he rode his bike until 8:30.
7. He had to go to bed at 9:00.
   The next morning he went to get Karen and we rode bikes together.
8. Then it was time for school for both of us.

ARLENE (June, 1979)

1. Key word cards

Arlene showed lots of interest and enthusiasm for doing the word card activity. She wanted to write her own cards at times and would return and make sure they were all in her envelope where they were supposed to be. She sometimes would spell out the words she wanted written.

2. Reading the cards

She discarded CRAFTS after I told her what it was. She recognized CATS but not HUNGRY CATS, but we kept that one because she wanted it. Arlene would often ask me to do the cards with her. BUTTONS and DOMAIN (the name of a classroom game) were both discarded.

3. Dictating the book

Arlene was enthusiastic about typing her book and easily expanded on one-word cards. She commented that it was hard to combine two of her words into a sentence on one page (my suggestion), but then proceeded to do it speedily, albeit thoughtfully. She looked at her card FOODS and said "food" then looked again at it and said "foods."

4. Reading the book

Arlene stumbled on one tricky phrase, AND AN A and finally read it as AND A. She didn't recognize RHONDA, but read all the rest correctly.

5. Counting with one-to-one correspondence

Arlene counted pennies with correspondence to 24 and graph paper square to 48.

ARLENE'S WORD CARDS

bears
cats
dogs
cats
the night before Christmas
Christmas tree
hungry cats
foods
favorite
a girl
puppies
math
I love you
working
I love school
I love Mom
It's was snowing yesterday
School is fun.
Rhonda
My favorite letter is A
My baby doll Julie
crafts - discarded
buttons - discarded
Whose Mouse Are You? - discarded

ARLENE'S BOOK

1. I love school.
2. I love Mom.
3. Math is good. Working is good.
4. The night before Christmas and an A.
5. My baby doll Julie.
6. A Christmas tree and a girl.
7. Bears like to eat foods.
8. Cats are hungry.
9. Rhonda and a dog.
10. School is fun.
11. Some cats and puppies like to play.
12. It was snowing yesterday.
13. I love you.

ARLENE'S SECOND BOOK

1. Once upon a time there was a little cat.
   The little cat liked to jump and play.
2. There was a dog next door that liked to eat cats.
   And if that cat went into the next door's yard, the dog would eat her.
3. One day the dog came into the cat's yard but the cat was in the house. He liked the little cat.
4. When the cat came out, the dog started to play with her.
5. They jumped over the fence and went into the dog's yard.
   They called the little girl out to play with them.
6. And they went to the cat's yard and they called the little boy out to play with them too.
7. They played for hours and hours until the Mom and Dad called them in to supper.

   The end. See you on Monday. (typed by Arlene)

TERRI (Sept. 1978)

1. Key word cards

Terri often wanted duplicates of word cards for herself. She asked for the NIGHT BEFORE CHRISTMAS, but instead of spelling it out for me as Arlene had, she said she wanted to find out if I knew them without her help.

2. Reading cards

Terri usually recognized her words, but called CARTOONS, "computer." Her second card also said CARTOONS and she read it correctly. When I showed her the first card again, she read it correctly as CARTOONS. I then wrote her a third card saying COMPUTER. She said I HAD for I HATE until she saw SINGING and then revised the first part of the card to I HATE.

3. Dictating the book

N/A

4. Reading the book

Terri read I FEEL for I'M FEELING, but corrected it when I asked her to reread and point. She pointed about half way through the book and then stopped. Her one-to-one correspondence was fine. The only other slip was when she read "cookies and milk" for CHOCOLATE MILK AND COOKIES, but looked at it a second time and corrected it herself.

5. Counting with one-to-one correspondence

Terri counted buttons with correspondence up to 20. When I had asked for an estimate before she started, she counted them visually before giving an answer. She counted pennies to 24.

TERRI'S WORD CARDS

dogs
cats
cartoons
the night before Christmas
It's a sunny day
cartoons
All I really need.
I'm feeling happy.
I'm feeling sad.
My sister is silly.
computers
I'm feeling angry.
I go to my friend's fort after school.
I hate singing.

TERRI'S BOOK

1. I'm feeling sad.
2. I'm feeling happy.
3. I'm feeling angry.
4. I like dogs and cats.
5. I hate singing
6. My sister is silly. She watches cartoons.
7. The night before Christmas I had chocolate milk and cookies.
8. All I really need is a dog.
9. I go to my friend's for after school.
10. I love computers.
11. It's a sunny day.
12. My sister is silly when I come home after school. She always jumps on me after school.

RUTH (March, 1979)

1. Key word cards

I have almost no notes on Ruth, as she knew her cards from week to week and never did anything out of the ordinary.

2. Reading cards

same as 1

3. Dictating book

Ruth was very good at combining her word cards into one sentence, whereas many children say two separate sentences. She hesitated and thought a while before deciding which two words would go together in a sentence on the same page. She always made a logical association, whereas less mature children tended to choose any two that are handy, even if they are not related. However, Terri had little imagination for expanding and usually didn't or did so very conservatively.

4. Reading the book

word perfect

5. Counting with one-to-one correspondence

Ruth had one-to-one correspondence to at least 24.

RUTH'S WORD CARDS

strawberries
donut
Smurfs
Merry Christmas
I'm happy.
I like Julie.
I like green
I like Stephanie.
To day's Valentine's Day.
St. Patrick's Day.
I like December
I like snow.
I like snowmans.
We work hard.
I can run.

RUTH'S BOOK

1. I like green.
2. I'm happy today.
3. Smurfs can run.
4. Strawberries are good.
5. We work hard.
6. I like snowmans and snow.
7. December is Christmas.
8. I like St. Patrick's Day and Valentine's.
9. Stephanie likes donuts. She is nice.
10. It's March. I like March.
11. I like Julie. She is my sister.

RUTH'S SECOND BOOK

1. I like you, Julie and John.
2. I hate ghosts.
3. We are studying frogs and tadpoles.
4. I like Saturday and Sunday.
5. My Dad is in Vancouver.
6. I love strawberries and donuts.
7. I like gym and music.

BURT (July, 1978)

1. Key word cards

Burt had great difficulty thinking of words. He rarely asked for a second card. Occasionally, he would get no new words, because he couldn't think of any even with some prompting on my part. No other children had this reaction.

2. Reading the cards

Sometimes Burt would say he didn't know the words and then proceed to say them. He usually read the words very slowly, with noticeable effort. He began to remember his cards better in January.

In February, there was a remarkable change in Burt's response to the cards. As soon as he say Sean's book and was assured that he would get a similar one, he asked for one word card after another until I called a halt at four per lesson. He began to recognize all his cards except I DON'T LIKE IT WHEN MY BROTHER BEATS ME UP. When I told him what it said, he decided to keep it and read it over to himself silently. He was a bit stuck on I LIKE TO DRAW PICTURES, read it over silently scanning the whole sentence, then read it correctly. He kept asking for a book and began to dictate whole sentences rather than single words.

3. Dictating the book

Burt remembered all his cards except COMPUTERS. When I told him what it was, he decided to include it in his book. He didn't

recognize I LIKE MY BROTHERS when we first started. Partway through he suddenly said "I know this one" and read it correctly. I asked him how he knew it and he said he sounded it out. He added SISTER to that one because he wanted it to be factual, but kept most of the others as originally written. The only ones he expanded were one word cards. Those already in sentences were not expanded further. He did not want to add on any extra pages, whereas most of the other children did.

4. Reading the book.

Burt was delighted with his book and read it perfectly.

5. Counting with one-to-one correspondence

Burt counted pencils placed randomly with one-to-one correspondence to 34 and puzzle pieces to 64.

BURT'S WORD CARDS

CHRISTMAS
MY MOTHER
SANTA CLAUS
TOYS
STRAWBERRY ICE CREAM
MAKE A SNOWMAN
I LIKE WRITING
I LIKE MY BROTHERS
I DON'T LIKE IT WHEN MY BROTHER BEATS ME UP.
I LIKE TO DRAW PICTURES
I LIKE TO PLAY WITH MY FRIENDS
I LIKE TO GO TO MCDONALDS
I LIKE TO GO OUT FOR RECESS.
I LIKE BOOKS.
I LIKE ICE CREAM
I LIKE SCHOOL
I LIKE MY FATHER.
I LIKE COMPUTERS.

BURT'S BOOK

1. My Mother
2. I like my father.
3. I like school.
4. I like ice cream.
5. I like to draw pictures.
6. I like books.
7. I like to go out for recess.
8. We get presents on Christmas.
9. My Mom buys us toys.
10. I like my brothers and sister.
11. Santa Claus brings us presents.
12. I like to go to McDonald's.
13. I don't like it when my brother beats me up.

14. I like to play with my friends.
15. I like computers.

CYNTHIA (December, 1979)

1. Key word cards

Cynthia did the word card activity easily, often asking to write her own cards.

2. Reading the cards

Cynthia knew her cards each week. At one point said "strawberries" for STRAWBERRY and "I like balloons" for I LIKE BOOKS" but self-corrected.

3. Dictating the book

Cynthia expanded her word cards easily and without any prompting from me right from page one. She said "ducklings" and immediately expanded it to a sentence. She added three pages during the course of dictating the book and expanded some pages when I suggested "Anything else on this page?" I thought her last page was a neat ending to an I LIKE book.

4. Reading the book

word perfect

5. Counting with one-to-one correspondence

Cynthia counts with correspondence to at least 25.

CYNTHIA'S WORD CARDS

balloon
strawberry
Christmas tree
Cabbage Patch kids
McDonald's
I like mouses.
I like books.
ducklings (in her own writing)
I like Mom, Dad
I like dogs.
I like Doxsee.
dog
be my valen (tine) today
I like Karen

CYNTHIA'S BOOK

1. I like ducklings.
2. I like Karen.
3. Be my Valentine's today.
4. I like strawberries.
5. I love Mom and Dad and RaeAnne.
6. I like McDonald's and A & W.
7. I like dogs and cats.
8. I like balloons and Cabbage Patch balloons.
9. I love mouses.
10. School is fun and I like doing work.
11. I like Christmas and I like Christmas trees.
12. I like Cabbage Patch kids and my Cabbage Patch kid.
13. I like books and I like reading books.
14. I like Doxsee.
15. I like Jo Ann and RaeAnne.
16. I hate liver.

CYNTHIA'S SECOND BOOK

1. I like birthday presents and I like birthday parties.
2. I like reading books. I like Jo Ann.
3. The dogs are nice to me and so are cats.
4. My sister is a pain. I don't like glasses.
5. I like my Mom and Dad.
6. I like earrings. My favorite color is pink.
7. I like popsicles.
8. I like stories and I like the story of Chip and Dale's New House.
9. I don't like school.

KELLY (June, 1979)

1. Key word cards

Kelly was not too interested in this activity when I first began. He didn't always watch me write his cards as do most of the others. In December, Kelly did not recognize any of his cards and they were all discarded. When I asked him for a very important word he said MOM and then DAD. He then wanted SISTER. I asked if he wanted me to write the word SISTER or his sister's name. He said "Krista." I wasn't sure how to spell it, so he told me how to spell another sister's name that was easier to spell - Kim. In January, Kelly did not recognize CAT and called DOG, "Dad." A nearby kid said "no" so Kelly revised and said "dog." He read the next card, DAD, correctly.

In February, he said "Kevin" for DOG and didn't recognize his first CAT card. He did, however, recognize the second CAT card, but did not recognize ELEPHANT. He wanted to keep any cards he didn't know and got a bit upset when I suggested discarding any. He wanted to write his own card without my help and wrote I LIKE U. He wrote a second card, SIX, that he copied from the board.

In March, Kelly still didn't recognize CAT. Other kids told him that one as well as ELEPHANT. He still confused DAD and DOG. When I put the two cards side by side he pointed to each, saying them correctly. He again wanted to write his own cards and copied SUN and MOON from the board. For U ARE A BRAT, he was told the ARE by Burt, and the BRAT by me. Burt told him how to spell YOU but he stuck with U.

2. Reading the cards

refer to question #1

Kelly began to remember his cards consistently in March-April.

3. Dictating the book

Kelly was very distractible when dictating his book compared to the others. He was very smiley and wiggly during the whole thing whereas the others took it all quite seriously. He was at ease doing expansion. Once I suggested expanding a page, he continuted without further prompting. He showed a great sense of humor.

I gave him the choice of U or YOU and both times he chose YOU. He also chose to have his book typed in small letters. He revised one page to include MOON and SUN as his book was beginning to get too thick to be stapled.

4. Reading the book

On page 5, he started to say AND, but changed it to BUT when he saw the rest of the sentence. He said DO for DON'T in #5, then corrected when he saw the rest of the sentence. He left out MY in #7 before DAD, even in a second reading when I asked him to point. On p. 10, he said COLIN IS MY BEST FRIEND, then looked at it awhile and changed it to BRAT. He concentrated a while on page 11 before he recognized BEST FRIEND.

5. Counting with one-to-one correspondence

Kelly had correspondence to at least 19 when counting small blocks and to 24 with pennies.

KELLY'S WORD CARDS

(discarded)

GHOST
NICE
CROCODILE
CAMEL
COOKIES
HAIRCUT
ELEPHANT
HALLOWEEN
CHRISTMAS

(kept)
MOM
DAD
KIM
KRISTA
CAT
DOG
I like Colin.
Colin is a brat.
Colin is my best friend.
sun
moon
U are a brat.
I like Russell.
six
Russell is a brat.
I like Bradley.
Bradley is a brat.
I like U.

KELLY'S BOOK

1. I like the sun. I like the moon.
2. Bradley is a brat.
3. I like Bradley.
4. Kim is my sister.
5. I like cats, but I don't have a cat.
6. I like the number six.
7. I like my Mom and my Dad.
8. I like Russell. Russell is a brat.
9. I like Krista. She is my sister.
10. Colin is a brat.
11. Colin is my best friend. I like Colin.
12. I like dogs, but I don't have a dog.
13. I like you.
14. You are a brat.

TANYA (April, 1979)

1. Key word cards

Tanya dictated her word cards with ease.

2. Reading the word cards.

Tanya always knew her word cards from week to week.

3. Dictating the book.

Tanya easily chose two cards to put on one page, but kept them as written rather than compounding them into one sentence. At the end of the book, she wanted to add more than one additional page. She did not choose to expand her cards as we typed. She

asked what WATER said. When I didn't respond, she said "Oh yeah, water."

4. Reading the book

word perfect

5. Counting with one-to-one correspondence

Tanya counted with correspondence to at least 22.

TANYA'S WORD CARDS

bird
hampster
fish
dog
I like Ms. Wagner
I like Sandi
I like Ms Dussault
I like Evelyn.
Today is Valentine's
I like Valentine's Day.
I like Terri-Lynn.
I like Chrystal.
Rudolph
Santa
I like my birthday.
My birthday is on April 20.
I like Ms. Dupont.
I like Jo Ann.
I like playing with water.
I like school

discarded: panda bear

TANYA'S BOOK

1. I like Jo Ann. I like Ms. Dupont.
2. My birthday is on April 20. I like my birthday.
3. I like Rudolph. I like Santa.
4. I like Chrystal. I like Terri-Lynn.
5. Today is Valentine's. I like Valentine's Day.
6. I like Ms. Wagnar. I like Sandi.
7. Fish and my dog are my pets.
8. Bird and hampster are my pets.
9. I like school and I like playing with water.
10. I like the whole world.
11. I like the pictures that everybody makes.

ROLAND (August, 1979)

1. Key word cards

Roland would often ask for his turn at word cards.

2. Reading the cards

Roland generally knew his cards from week to week.

3. Dictating the book

Roland easily expanded his word cards, even as he was setting them out on the table. He started a pattern with BECAUSE and continued it of his own accord, for most of the book. He didn't recognize two of his more recent cards, I LIKE SMURFS and I LIKE CHALKBOARDS so we discarded those. I probably could have spent a longer time with Roland, consolidating his word cards before typing them into book form.

4. Reading the book.

Roland didn't recognize BECAUSE the first time, but once I told him what it was, he continued to recognize it. I LOCK was corrected to I LIKE. THEY'RE was pronounced THEY ARE and IT'S was pronounced IT IS. He said SANTA for SANTA CLAUS and omitted an ON.

5. Counting with one-to-one correspondence

Roland counted with correspondence to a minimum of 24.

ROLAND'S WORD CARDS

draw
cat
Santa Claus
dog
I like work.
I like frogs.
I like Smurfs.
I like frogs.
I like birds.
I like horses.
I like milk.
I like girls.
I hate chocolate milk.
I like chalkboards.

discarded: I like porridge
I like films

ROLAND'S BOOK

1. I like dogs because they're soft.
2. I hate chocolate milk.
3. Santa Claus is nice.
4. I like girls.
5. I like milk because it's good for you.
6. I like horses because I get to ride on them.
7. I like birds because they're nice.
8. I like frogs because they're slimy.
9. I like cats.
10. I like working.
11. I like drawing because I can draw a picture.

DIANE (July, 1979)

1. Key word cards

Diane was always interested in word cards. She began to write many of her own cards at the end of February and was one of the few to use her own spelling on some such as SISSRRER for SISTER.

2. Reading the cards

Through January, Diane would remember her cards off and on. LAMB was sometimes called SHEEP. She said EATING FISH for I LIKE FISHING. Some of her words were discarded when they were consistently not remembered. In February, however, there was a sharp contrast as Diane began to remember all her word cards. She had to concentrate to distinguish DUSSAULT from DUPONT.

3. Dictating the book

Diane first put her cards into three categories, the only child I noticed consciously doing this:

I LIKE cards
I LOVE cards
(others)

She wanted to keep her LIKE and LOVE cards as written. She combined the LOVE ones at my suggestion because the book was becoming too thick to staple. I suggested she tell me something about her single word cards - "Do you want to tell me something about LAMB, or do you want me to type just LAMB?" Diane suggested two or three variations on a sentence before settling on one she definitely liked. She expanded her other single words cards easily, without coaching.

She didn't recognize MICHELLE, although she knew it was my daughter's name. We discarded it at my suggestion. She wanted to do a lot of her own typing. We compromised by having her type the I's and THE END. She also typed one other page, I LOVE COLIN. She was the only child to show this intense an interest in doing some of the typing.

4. Reading the book

Diane read DUPONT for DUSSAULT, then self-corrected. She only pointed to the words on one page, the one with three sentences.

5. Counting with one-to-one correspondence

Diane counted with correspondence firmly to at least 22.

DIANE'S WORD CARDS

lamb
fishing pole
SNOW
POPSICLE
MITTENS
I LOVE MS. DUPONT
I LIKE SCHOOL.
I LIKE KAREN.
I LIKE SNOW.
I LIKE NAOMI.
I LIKE BEARS.
I LIKE AMANDA.
I LIKE RHONDA
I LIKE MS. DUSSAULT AND MS. WAGNAR.

discards: presents
eating fish
I like monkeys

Cards in her own writing:

I like you Ms. Dupont.
I love Michelle
I like black bugs.
Ale is grounded.
I love Colin.
Naomi has the chicken pox.
I love my sister.
I like Mom and Dad.
I love you Jo Ann.

DIANE'S BOOK

1. I like Rhonda.
2. I like Naomi.
3. I like Amanda
4. I like you, Ms. Dupont
5. I like black bugs.
6. I like bears.
7. I like Ms. Dussault and Ms. Wagnar.
8. I like school.
9. I like Karen.
10. I like snow.
11. I like Mom and Dad.
12. Lambs have white wool on them.

13. Snow is white.
14. Our Grandpas go fishing with their fishing poles.
15. I eat popsicles.
16. I wear mittens.
17. Ale is grounded.
18. Naomi has the chicken pox.
19. I love you, Jo Ann. I love my sister. I love Ms. Dupont.
20. I love Colin
21. I like to clean the house.

DIANE'S SECOND BOOK

THINGS I LIKE

1. I like popsicles.
2. I like Naomi.
3. I like Jo Ann.
4. I like the whole class.
5. I like people working hard.
6. I like playing with the kids.
7. I like Rhonda.
8. I like working hard.

RICHARD (January, 1980)

1. Key vocabulary cards

Richard took his own cards from me and read them at his own pace. He wanted to write his Mom's "real name" and wrote it with the last name first. He often initiated contact with me to do the cards. He asked for "stop signs" (periods) on his cards.

2. Reading the cards

Richard almost always knew his cards and asked for more than one at each session. He commented "I can say these because I know how to read." When Richard was given the choice of having one word or a sentence, he usually chose the sentence.

3. Dictating the book

When I told Richard I would type his book on Friday, he said "I need to be there too!" He didn't want to spread his word cards out on the table as the others had done, but chose to say one at a time from the pile in his hand. He expanded the cards easily and creatively. He wanted 'TIL not UNTIL. He did not want to expand TAPE and TAXI, but he did want a sentence for PAPER and SEWER. He wanted to keep DONALD DUCKY as is since he found it humorous that way.

Whenever Richard started to chat about one of his cards, I would suggest we type it in his book and he usually agreed. I originally typed I LIKE ICE. I SLIP ON IT, but he decided to rephrase it using WHEN. He kept looking at the card that said

WE'RE GOING THIS SUMMER WITH MY DAD and reading it over four or five times saying "This is funny." I didn't know whether he was referring to meaning or syntax. Finally he said "My Dad is dumb." I asked if he wanted me to type that and he agreed.

4. Reading the book

Richard easily read his book including all the new words.

5. Counting with one-to-one correspondence

I asked Richard to count pencils in a can, but he said he'd have to take them out so he could se each one. We emptied them. He took a handful and said he would count to 30. He laid the pencils on the table and counted to twelve and said he needed one more to make 30. He added one pencil and counted 13 and said "there." The contradiction between 30 and 13 gave him pause, but not enough to correct it. The first time he pointed to the twelfth pencil, he kept pointing to it to try to get to 13, then abandoned that idea and added an additional pencil to make 13. He counted pennies with correspondence to 24.

RICHARD'S WORD CARDS

icy
gingerbread
computer
Donald Duck
paper and sewers
tape and taxi
My Mom likes breakfast and clocks
Reeve Eva (own writing, eventually discarded)
4 days 'til my birthday.
i hate chickens.
I love feeding chickens.
We're going this summer with my Dad.
I got up at 5:00 today.
I like you (own writing)
I like fish (done after book was finished)

RICHARD'S BOOK

1. 4 days 'til my birthday.
2. I hate chickens.
3. Tape and taxi.
4. I like gingerbread.
5. Paper going to a sewer.
6. Donald Ducky.
7. I like using the computer. I used to have one. It was a TRX 50.
8. I like ice when I slip on it. Ice is my favorite thing.

9. My Mom likes breakfast and clocks.
10. I like you.
11. I got up at 5 o'clock today.
12. We're going this summer with my Dad. My Dad is dumb. He is my favorite when he plays tricks on me.
13. I love feeding chickens.
14. And that is my favorite book.

CAM (August, 1979)

1. Key word cards

Initially, Cam dictated long strings of words for his word cards. He would take longer than most children to think of something and then would come up with a long spiel. He seemed to be unaware of my difficulty in getting all of his words written.

2. Reading cards

Cam could surprisingly read most of his first long card on Santa. I wasn't sure if he was reading with one-to-one correspondence or from memory, but would guess it was the latter as he did not continue to remember his cards later on in the month. Said BABY for CUB and BEAR for BEER.

In April, Cam began to remember his cards consistently in marked contrast to the past months. He is one of the few children who consistently pointed as he read. His sentences are now given in a few words rather than a long string.

3. Dictating the book

Cam dictated his book with ease and added the last page without my prompting. For the first page he said DOG. He hesitated and looked at his cards. I asked if he wanted to add something else. He said DUKE IS MY DOG. Some of his cards were written in capitals and some in lower case. I asked which he wanted in his book. He chose to use both, whichever was on the cards. He read all his cards correctly. On one page he said I LIKE ORANGE AND YELLOW. When I started to type, he said "Wait," and changed it to include CATS. He did the same with blue and black.

4. Reading the book

Cam read his book well, with some self-correction. He pointed to the words on each page as he read; something that most of the others didn't do. He said FIRETRUCK for FIREMEN and FRIEND for BUDDY and then self-corrected. He studied BRADLEY a bit and then remembered it. He read CARE BEAR on one page, but didn't recognize CARE on the next page. He read KURTIS for KURD and KURTIS for KURTIS, but didn't seem to notice the contradiction.

5. Counting with one-to-one correspondence

Cam counted with correspondence to 20 on graph paper squares and pennies to 24.

CAM'S WORD CARDS

(discarded word cards)

HELICOPTER
SEA PLANE
GINGERBREAD MAN AND HOUSE
SANTA IN HIS SLEIGH WITH ALL 8 REINDEERS AND RUDOLPH GUARDING
SANTA'S SLEIGH AT EVERY STOP HE MAKES
FROSTY THE SNOWMAN
I LIKE SKIING AND SKATING AND TOBOGANNING
SANTA CAN'T GO WITH ALL 9 REINDEERS IN SUMMER BECAUSE THERE'S NO SNOW
I LIKE SWIMMING WITH MY LION AND HIS CUB
I HAVE A DOG AND HE IS 6 YEARS OLD
AND HE IS A GERMAN SHEPHERD
I LIKE THE COLOR GREEN AND PURPLE AND BLUE
I LIKE FIREMEN
CHOCOLATE

cards that were kept

ELEPHANT
DOG
CARE BEARS
DUKE
I LIKE MILK
I LIKE SANTA CLAUS
I HATE BEER
I like police helicopters
I LIKE CHOCOLATE MILK.
I LIKE POLICE AND I LIKE FIREMEN.
I LIKE MY SISTER.
CATS
I LIKE BRADLEY
BRADLEY IS A BRAT.
I like Greg and Robert.
KURTIS IS MY BEST BUDDY.
I like Kurtis.
I like black.
I like blue.
I like orange and yellow.
ME AND KURTIS ARE WEARING A WATCH.

CAM'S BOOK

1. DUKE IS MY DOG.
2. I LIKE MY SISTER.
3. ELEPHANTS.
4. I HATE BEER.
5. I LIKE MILK
6. I LIKE CHOCOLATE MILK.
7. I like orange and yellow cats.
8. I like police helicopters.
9. I LIKE POLICE AND I LIKE FIREMEN.
10. ME AND KURTIS ARE WEARING A WATCH.
11. I like blue and black.
12. I LIKE DURD. KURTIS IS MY BEST BUDDY.
13. BRADLEY IS A BRAT. I LIKE BRADLEY.
14. I LIKE GREG AND ROBERT.
15. I LIKE SANTA CLAUS.
16. CARE BEARS.
17. I HAVE A CARE BEAR COUSIN. HIS NAME IS LIGHT-HEART RACCOON.

KARLA (August, 1979)

1. Key word cards

Karla was never too enthusiastic about the activity, but I always gave her a chance to do it so that she wouldn't feel left out.

2. Reading the cards

Karla usually knew her cards, but only chose to get one new card as session, whereas most of the others wanted more than one new card. She read I LIKE MY HUGABUNCH for I LIKE MY NECKLACE. The next card was really the hugabunch one and she read it correctly. We discarded the necklace one.

3. Dictating her book

Karla was reluctant to expand her cards as we typed her book. She began with I LOVE DADDY and changed it to I LOVE DAD when she doublechecked her card. She looked at I LOVE MY MOM and said I LOVE MOM. I asked if she wanted me to type I LOVE MOM or I LOVE MY MOM. She said I LOVE MY MOM because " That's what it (the card) says!" She did not remember I LOVE HEARTS, but didn't want to discard it, so we kept it in her book.

4. Reading the book

Karla read I LOVE YOU DAD for I LOVE DAD and I LIKE YOU DARCIE for I LIKE DARCIE. When I asked her to reread those pages and point, she read them correctly.

5. Counting with one-to-one correspondence

Karla counted graph paper squares and pennies with correspondence to at least 22.

KARLA'S WORD LIST

LOVEY
ICE CREAM
I LIKE CHRYSTAL
I LIKE READING BOOKS
DARCIE
I love hearts.
I like my Hugabunch
I love my Mom.
I love Scott.
I LIKE AMANDA.
I like Sandi.
I like Ms. Wagner.
I love Collin.
I like Darcie.
I love Dad.
I like Chrystal.

discards: I LIKE MY NECKLACE
I LIKE JO ANN

KARLA'S BOOK

1. I love Dad.
2. I like Darcie.
3. I love Collin.
4. I like ice cream.
5. I like Ms. Wagnar.
6. I like Amanda.
7. I like Sandi.
8. I love Scott.
9. I love my Mom.
10. I like Chrystal.
11. I like my Hugabunch.
12. I like Lovey.
13. I like reading books.
14. I love hearts.
15. I like painting.

KARLA'S SECOND BOOK

1. I like birthday parties.
2. I like Jo Ann.
3. I like school and reading.
4. I like counting pennies and my Mom.
5. Me and my Mom go bike riding together.
6. I like reading books in the library.
7. I like things.
8. I like drawing hearts.

GEORGE (April, 1979)

1. Key word cards

George didn't recognize any of his initial words. In January, he began to recognize some slowly, looking at them thoughtfully and long. It took a bit of prompting to get George to think of new words.

2. Reading the cards

George read his cards very slowly, concentrating before anything. He called CHRISTMAS TREE, CARE BEAR. When he go to the card that said CARE BEAR, he was shown both of the cards together and chose the correct one. He didn't know what CHRISTMAS TREE said. He thought MOOSE was MOUSE. Many of his cards were discarded. He seemed a bit nervous about reading and would read cards like I LIKE POLICE CARS silently for awhile before saying the whole thing out loud.

By April, George began to recognize his cards consistently. He got stuck on FIRE ENGINE, but when I pointed to HELICOPTER and said it was so me type of helicopter, he remembered it. There was a noticeable difference in the last month in George's ability to read his word cards.

3. Dictating the book

George wanted to keep both capital and lower case letters in his book as that was how they were written on the cards. He was meticulous in setting out his cards and keeping them straight while dictation the book. He recognized all his cards except I LIKE LICORICE. He looked at it awhile, said the letters L I C, but couldn't fathom it. I asked it he wanted to keep it or get rid of it. He whispered, "Get rid of it" and tore it up himself into tiny pieces. This was unusual in that I don't remember any other children discarding their own cards in so definite a manner.

George chose the I LIKE ---- format all on his own without any prompting from me.

4. Reading the book

George read his book very slowly, without pointing. I asked him to reread one page and point to check his one-to-one correspondence. He did, and it was fine.

5. Counting with one-to-one correspondence

In May, George counted with correspondence to 24.

GEORGE'S WORD CARDS

(cards discarded)

CARTOONS
GHOST
AIRPLANE
CHRISTMAS TREE
SANTA CLAUS
CARE BEAR
I WANT A GHOST
I LIKE BEARS

word cards that were kept

RUDOLPH
I LIKE RABBITS
I LIKE GHOSTS
I LIKE MOOSE
I like police cars
MOOSE STEW
I LIKE FIRE ENGINE HELICOPTERS
I LIKE SAND BOXES
I LIKE POLICE HELICOPTERS
I LIKE RABBIT STEW
I like hospital helicopters.

GEORGE'S BOOK

1. I LIKE POLICE HELICOPTERS.
2. I LIKE CARTOONS.
3. I LIKE SAND BOXES.
4. I LIKE FIRE ENGINE HELICOPTERS
5. I LIKE RUDOLPH.
6. I like police cars.
7. I LIKE MOOSE STEW.
8. I LIKE RABBIT STEW.
9. I LIKE GHOSTS.
10. I like hospital helicopters.
11. I LIKE RABBITS.
12. I LIKE MOOSE.
13. I LIKE MY BOOK.

SAMMY (February, 1980)

1. Key word cards

Sammy did not initially recognize his words, but very much wanted to keep his cards. Shane was the only one to want I LIKE/I HATE eliminated so that he'd have words only. Sammy wrote his ABC's on a card and was the only first grader to do this. The alphabet was in sequence with no omissions and was written by Sammy under a table on his hands and knees.

Sammy wrote (and illustrated) many of his own word cards in a very charming manner. Since his response to this activity differed greatly from the general profile of the group, a more detailed description of his word cards follows in chapter five on "key incident" children.

2. Reading the cards

Sammy called SANTA RUDOLPH, "Santa Claus" and SNOW, "Santa." Sometimes he wouldn't recognize BEAR CUB and other times he'd call it BEARS.

3. Dictating the book

Sammy did not accummulate enough cards for a book and did not show the same interest as the others in having a book, so one was not done with him.

4. Reading the book

N/A

5. Counting with one-to-one correspondence

Sammy counted scissors from 1 to 27, by taking them one at a time out of a container. He maintained correspondence. He counted pennies with correspondence to 24.

SUE (June, 1979)

1. Key word cards

Sue went smoothly through the word card activity with nothing special noted.

2. Reading the cards

Sue remembered all her cards from week to week.

3. Dictating the book

Sue easily expanded on one-word cards. She seemed to read her cards for meaning rather than word for word, sometimes leaving words out. But whenever she was asked to point and read,she matched up with one-to-one correspondence, although occasionally with jerkiness as if she was thinking it through.

4. Reading the book

Sue pointed without being asked to. She read McDonald's without an S, then noticed the S and went back to read it again, this time with an S. All else was read with correspondence and knowing all the words.

5. Counting with one-to-one correspondence

Sue counted with correspondence to at least 22.

SUE'S WORD LIST

I love Mom.
McDonald's is my favorite.
See See is my doll. She is good.
I love ice cream.
bears
Cabbage Patch kids
ice cream
Susie doll is my favorite doll
My dog
The dragon and lthe prince and princess
Care Bears
a mouse ran up the clock

red dad ABCD 1234 (own writing)

SUE'S BOOK

1. A mouse ran up the clock.
2. Care Bears. I watch on T.V.
3. The dragon and the prince and princess.
4. McDonald's is my favorite.
5. I love ice cream.
6. Cabbage Patch kids
7. My dog.
8. See See is my doll. She is good.
9. Red Bed 1,2,3,4 ABCD
10. Ice cream is good.
11. I love Mom.
12. Susie doll is my favorite.
13. Bears are hibernating.

SOL (November, 1978)

1. Key word cards

Sol was able to think of words that related to his private life (members of the family, favorite cartoons), but was not able to remember them from week to week.

2. Reading the cards

The only card that Sol was able to remember over time was MOM. He was not able to retain any of the others. A more detailed description of Sol's responses to this activity is contained in chapter five on "key incident" children.

3. Dictating the book

N/A

4. Reading the book

N/A

5. Counting with one-to-one correspondence

Sol counted squares on graph paper and said one word per square, but counted some squares at the beginning twice. He seemed to focus on counting one number per square, rather than on an actual quantity. He missed number 15 and got mixed up in the 20's, repeating some of the numbers and skipping others. When he reached 30, he continued with 30-11, 30-12, then continued from 33 with the correct numbers in sequence to 39.

When counting pennies in May, Sol seemed to have correspondence to 14, then said 16, 18, 19, leaving out 15 and 17. Once he got to 20, he continued correctly to 26, although there were only 24 pennies. He didn't move the pennies as he counted as most of the other first graders did and recounted some a second time. When adding three bottle caps to five bottle caps, Sol got the answer nine, because he recounted on the the caps twice.

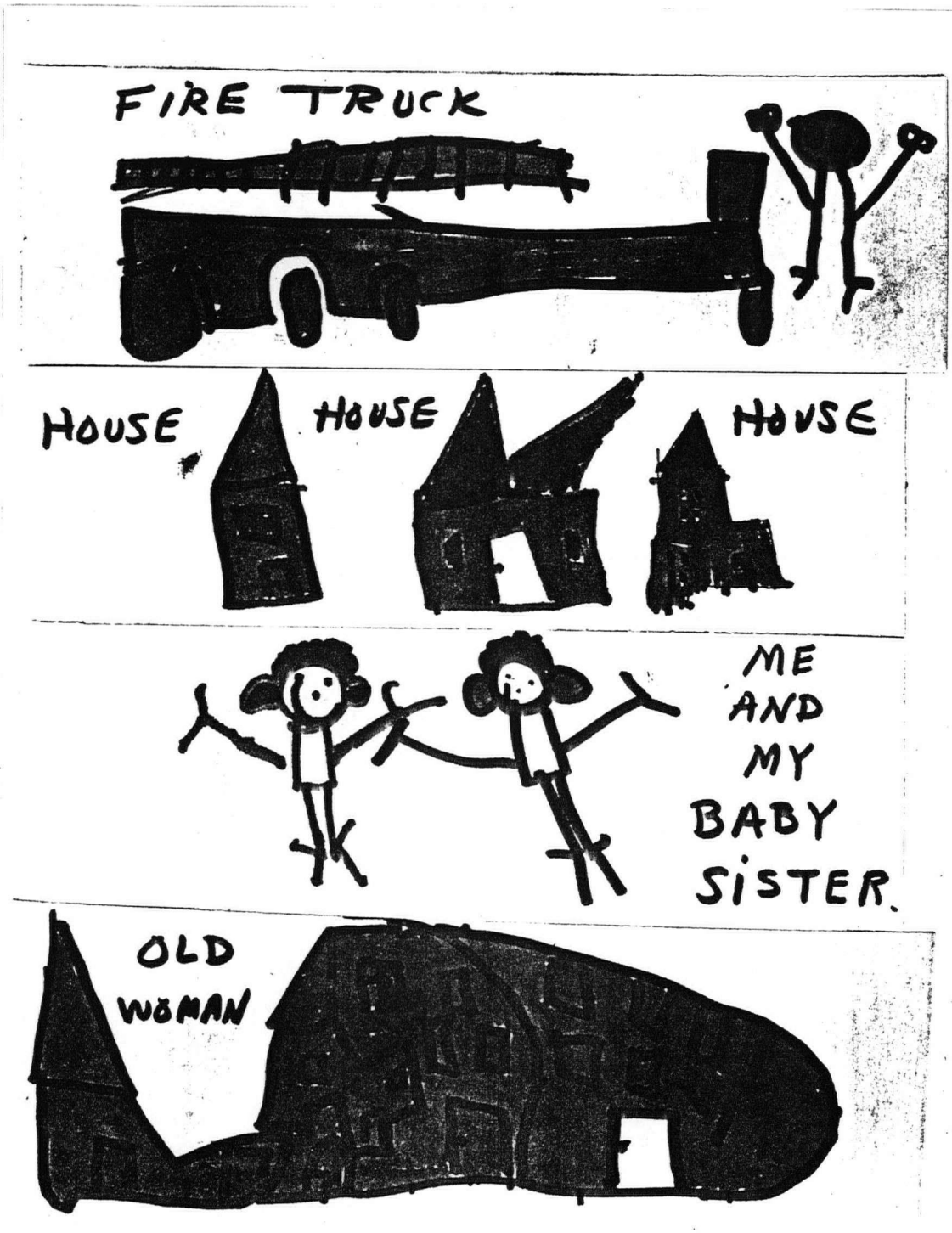
SOL'S "SECOND" BOOK

1. I like chicken.
2. I like books.
3. I like the library.
4. I like Ms. Dupont.
5. I like toys.
6. I like lunch.
7. I like money.
8. I like Donald Duck.
9. I like supper.
10. I like Indians.
11. I like Goofy.

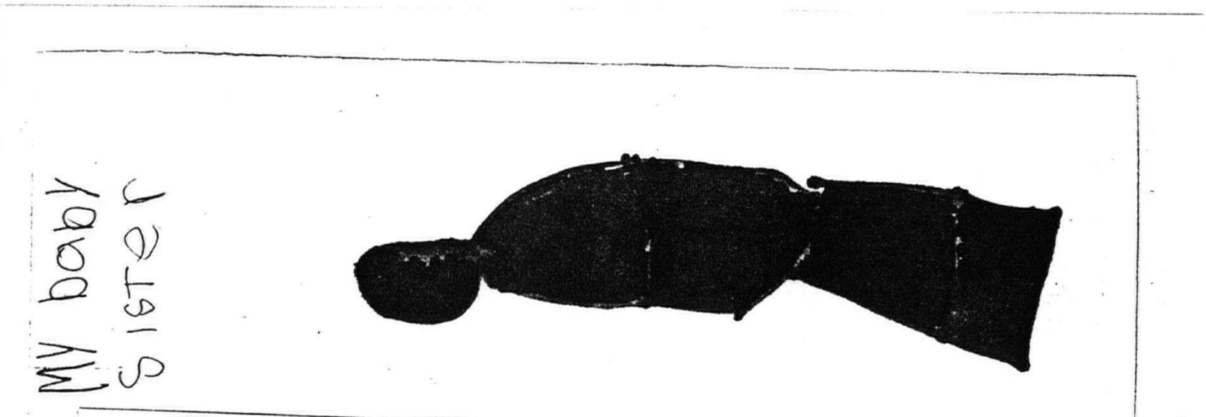
APPENDIX G

SAMMY'S KEY WORD CARDS

The first xeroxed page of Sammy's word cards includes cards with illustrations by Sammy and words written by the researcher at his request. The second and third pages contain cards both written and illustrated by Sammy with some spelling dictated by the researcher.


FIRE TRUCK
HOUSE
HOUSE
HOUSE
ME AND MY BABY SISTER.
OLD WOMAN


ABCDEFGHIJKLMN
OPQRSTUVWXYZ
MOM
MOAND



IMaplaying
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