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A comparison of the first fifty words of typically developing children to the first fifty words of typically developing children exposed to manual communication

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A COMPARISON OF THE FIRST FIFTY WORDS OF TYPICALLY DEVELOPING CHILDREN TO THE FIRST FIFTY WORDS OF TYPICALLY DEVELOPING CHILDREN EXPOSED TO MANUAL COMMUNICATION

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DEDICATION

To my wonderful family, for all of their encouragement, support, and love.

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I would like to thank the University of New Hampshire's Department of Communication Sciences and Disorders for their encouragement and guidance. I am also very grateful to the baby sign instructors who spread the word of this project and attracted participants. A final thanks to all of the busy parents who participated in this project.

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ABSTRACT

A COMAPARISON OF THE FIRST FIFTY WORDS OF TYPICALLY DEVELOPING CHILDREN TO THE FIRST FIFTY WORDS OF TYPICALLY DEVELOPING CHILDREN EXPOSED TO MANUAL COMMUNICATION

by

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University of New Hampshire, September, 2006

The purpose of the present study was to investigate the role of manual communication in the acquisition of the first 50 spoken words in typically-developing children. It was hypothesized that typically-developing children exposed to manual communication would have a different composition of their first 50 words compared to typically-developing children not exposed to manual communication. More specifically a greater portion of dual-functioning words and action words were predicted as a result of the visual and motor aspects of gestures and manual communication.

Twelve participants who were enrolled in a six-week baby-sign playgroup were involved in the study. Parents recorded their child's first 50 words in a diary. The diary was collected and spontaneous first words were analyzed. The first words of the current sample were then compared to Nelson's (1973) landmark study on the basis of six grammatical categories. These grammatical categories included general nominals, specific nominals, action words, modifiers, personal social words, and function words. Statistical analysis revealed a lack of

significant differences between each of the sample means in the current study and each of Nelson's means. A qualitative analysis suggested different trends in the first 50 spoken word lexicons for these two groups. Sixty-six percent of the participants were expressive in their functional use of language, learning a more self-oriented and social interactive language with less than 50% general nominals in their vocabularies, compared to 44% of Nelson's (1973) participants. Greater percentages of action words and personal social words were also noted for the study sample.

CHAPTER I

LITERATURE REVIEW

A word is a symbol that represents something without being part of it, and the relationship between a word and what it represents is arbitrary. Words are much more than simply a set of sounds that communicate meanings (Hoff, 2005). Words are an important component of language. The lexicon is central in language as well as in the acquisition of language. Through the lexicon one is able to capture a glimpse of the process of language acquisition as a whole (Clark, 1993).

First words are typically seen between the ages of 10 and 15 months of age (Hoff, 2005). A true first word is often an approximation of the target word in the language due to the fact that the child has not yet mastered the adult pronunciation. Criteria to determine a true or meaningful word considers the phonetic stability, production consistency in particular contexts, use in a plausible context, and resemblance to an adult target (S. Calculator, personal communication, October 27, 2005). First words include consistently used sound sequences, showing consistent meaning for the child. Children's first words are typically context-bound or used in limited contexts, however a child may use some first words in a referential manner. A word that is not bound to one particular context is considered to be referential. (Hoff, 2005). After the first word has emerged, new words are typically acquired and produced slowly and one at

a time. Variability is seen in lexical acquisition of children. Some children demonstrate a one-word stage lasting months, while others may produce multi-word utterances within weeks of their first word (Clark, 1993).

Language development does not begin with a child's first words; there are countless developments that contribute to language development before the first word is heard. From birth the child is exposed to language and receives input on a daily basis. The language exposure a child receives begins the language development process. Sounds of the language, phonological rules, intonation patterns and turn-taking patterns among others are all being learned and stored by the child. First words signify, not the beginning of language development, but specifically the beginning of productive language development.

Vygotsky's statement (as cited in Nelson, 1973) about first words, below, highlights their importance in understanding language development.

> The interpretation given to the first words of the child is the touchstone of every theory of child speech; it is the focal point at which all the major trends in modern speech theories meet and cross. One might say without exaggeration that the whole structure of a theory is determined by the translation of the first words of the child. [pp. 29-30]

Such great importance of first words encourages one to take a closer look at such and to investigate.

First 50 Words of Typically Developing Children

A child's first words are significant in understanding language acquisition by shedding light on the semantic basis of words and how those words play a part in the child understanding the world around them. The first words children produce signal that their vocabularies will begin to build slowly at first but then

gain increasing speed as they near the achievement of a 50-word vocabulary. The age thought to coincide with the 50-word vocabulary is that of 18 months, but a range of 15 to 24 months is seen and accepted as normal (Hoff, 2005).

Nelson's (1973) longitudinal study investigated the acquisition of first words for 18 children between the ages of one and two years. The data collected were analyzed in terms of grammatical form, content, and semantic structure. Nelson specified the following six categories of the children's words during this time period: specific nominals, general nominals, action words, modifiers, personal social words, and grammatical function words. The results showed that both general and specific nominals were the largest categories for these children. Specific nominals, which include words such as *Mommy* and *Pet Names*, comprised 14% of 50-word vocabularies and general nominals dominated the children's vocabularies by comprising 51% of 50-word vocabularies.

In a more recent study (Bates, 1994) of the stylistic and developmental aspects of vocabulary composition of 1,803 children, similar findings were noted. Common nouns dominate the vocabularies in the developmental period of one to 200 words, supporting the notion that the first stages of lexical development for English speaking children are dominated by the learning of names for common objects. Bates et al. (1994) found that development of predicates (i.e. verbs + adjectives) steadily increases later on in development, beginning with a low percentage of 7.6% in the 1-50 word vocabularies to 25.2% in the highest vocabulary group of 601-680 (Bates et al., 1994).

Benedict (1979) investigated the first 50 words comprehended and produced by eight infants. Benedict's (1979) system of categorization was based upon Nelson's (1973) study, but was modified to reflect comprehension development more accurately. She found that comprehension precedes production for lexical development. Both comprehension and production vocabularies revealed that the two largest categories were general nominals and action words, which together comprised 69% of the production vocabularies. Comprehension vocabularies were initially dominated by action words by 50%, which gradually decreased in importance to 36% of the words understood at the 50-word level. In contrast, general nominals only represented 14% of words in comprehension vocabularies and then increased to exceed the amount of action words at approximately the 50-word level by 39%. Production vocabularies showed a different composition and course of development than the comprehension vocabularies. General nominals dominated the productive vocabularies, occurring twice as frequently as action words, which appeared in no more than 25% of the productive vocabulary. This study highlights the view that there are differences in the processes and development of early comprehension vocabularies, compared to production vocabularies. Support for the noun-bias hypothesis in early production vocabularies is found in this study as well.

Harris, Yeeles, Chasin & Oakley (1995) reported a close relationship between early comprehension and production of words. It was also noted that contextually flexible words in productive vocabularies were also contextually

flexible in comprehension. Harris, Yeeles, Chasin & Oakley suggest that the early use of contextually flexible words is underpinned by comprehension; therefore comprehension must develop before production.

Interestingly, a study of early lexical acquisition in German reported relational and personal social words to dominate early vocabularies, not nouns. At no point was it found that nouns outweighed other word categories, however nouns did appear before verbs in the developmental sequence. This study does not strongly support the noun-bias hypothesis; however differences in the structure of languages must be taken into consideration. The noun-bias hypothesis supports the view that nouns are the dominant category throughout early acquisition of the lexicon. This hypothesis is interpreted in various ways including the notion that nouns are acquired earlier than verbs, nouns are the majority of a child's early vocabulary, nouns in an early vocabulary are mainly object labels and that a preference for nouns supports further language development (Kauschke & Hofmeister, 2002).

Nelson showed similar findings and noted that children begin to talk about concepts they can act on, such as toys, shoes, or bottles, as well as things that are action oriented such as cars and animals (1973). Nelson, Hampson & Kessler Shaw (1993) caution that the noun bias seen in early vocabularies is far from universal. In their analysis of 45 children, more nouns were acquired than other word categories, however only half of these nouns were names of basic level object classes. Rinaldi, Barca & Burani (2004) investigated the first words acquired by Italian children. They reported that nouns acquired first within a

child's vocabulary tended to be more imageable than the first verbs and adjectives, suggesting that nouns are easier to process than verbs due to their concrete nature.

Some argue that children acquire nouns before verbs, therefore causing the predominance of nouns that we see in early vocabularies, because nouns encode meanings that are easier for children to grasp than the meanings that verbs encode (Genter, 1978). According to Genter (1978), children are able to understand nouns because of their physical properties, they are entities or things, while verbs describe relationships among those entities or things. Verbs encode changes in state, transient events and may have multiple organizing principles. Predicates, verbs and adjectives are acquired later because of their dependence upon nouns as well as a dependence upon an existing base of conceptual and linguistic knowledge (Waxman, 1994).

Selectivity, organization, and individuality are important themes within a child's first lexicon (Nelson, 1973). Individual differences in the acquisition of language were also taken into account by Nelson. Massive variability can be observed by children during their lexical development, and analysis of vocabulary in terms of developmental level versus age is suggested (Bates et al., 1994). First words may also have several meanings (Braunwald, 1978). Braunwald (1978) suggested that creating new meanings for previously acquired words is a strategy for increasing vocabulary. Other important factors to take into consideration when analyzing the composition of early lexicons are the structure of languages, environmental factors and parental input.

Input/Noun & Verbs

Hoff & Naigles (2002) suggested that the process of word learning involves both the child's social interest and ability to interact with others, as well as the child's computational ability to extract information from the speech presented to them in those interactions. Children's early vocabulary development may be influenced by the input they receive. Tardif, Shatz & Naigles (1997), suggested that there are several specific factors in the input that should be taken into account when investigating the effect of input on vocabulary development. No single input factor determines the exact proportions of nouns and verbs seen in an early lexicon. No specific combination of input factors can determine the exact proportions of nouns and verbs either. The effects of input are complex and may not influence all children in the same manner, however the input a child receives does play some role in the overall composition of their early lexicon. (Tardif, Shatz & Naigles,1997).

Verbs tend to be less salient in the speech of English-speaking parents to their infants. Verbs are not frequently seen in single word utterances, and typically appear in the middle of long sentences, rather than the end, which would make them more salient. Verbs also tend to have more variations in form as compared to nouns. (Goldfield, 1993). Various factors in maternal speech to children learning English may favor the acquisition and production of nouns over verbs in children's early vocabularies. Goldfield (1993) examined the distribution of nouns and verbs in maternal speech to one-year-olds. She reported that nouns occur with greater frequency than verbs in shorter maternal sentences, in

sentence-final positions, and with fewer grammatical inflections. These features of maternal speech increase the saliency of nouns. Shorter maternal phrases may be easier for children to process, attend to, and remember. Nouns occur with less grammatical inflections than verbs, which may serve to increase the children's ability to detect them in the speech stream.

Goldfield (1993) suggested that early vocabularies will differ as a function of the kind of contexts in which the child and parent or adult commonly interact. Mothers elicited nouns from their children during toy play and looking at picture books. Physical play and games were less likely to elicit noun production. The importance of context of parent-child interaction is highlighted by Goldfield as a factor in the distribution of nouns and verbs in speech addressed to infants learning English.

In a more recent study, Goldfield (2000) suggested that pragmatic factors as well as the structural characteristics of our language contribute to the distribution of nouns and verbs in early lexicons. Through speech act analysis, parents were found to explicitly encourage production of nouns, while implicitly expecting the comprehension of verbs. Children can show their understanding of a verb by engaging in that action and for the child in this position, there is no pragmatic reason to talk about what they are physically doing. From a pragmatic standpoint, early verbs are used by parents and understood by children within contexts that are focused on the behavior of the child as opposed to the speech of the child (Goldfield, 2000).

Use of Manual Communication & Gestures

The use of manual communication with hearing children has exploded over the past few years. This use of manual communication is not only a popular trend, it is supported by a growing body of research. This powerful tool is now not only considered useful for children who are deaf and hard-of-hearing, but also useful for typically developing infants. Infants often use gestures as a means of communication before the onset of speech. Gestures are formal movements that have a primary function of communication. Gestures are signals that communicate a variety of meanings that are able to be consistently interpreted within a shared system (Zinober & Martlew, 1985). Speech requires the development of fine motor skills, therefore children may be able to access gestures as means of communication easier due to the development of their gross motor skills. The development and maturation of speech centers and muscles are not as advanced as the motoric centers at birth (Bonvillian, Orlansky & Novack, 1983). This issue of maturation explains children's early use of gestures over speech.

Bates, Benigni, Bretherton, Camaioni, & Volterra (1979) showed that infants develop gestural pointing, giving, and showing in order to express a desire or elicit joint attention. Acredolo & Goodwyn (1988) stated that symbolic gesturing is closely related to the development of verbal language. Their study revealed that gestural labels are positively related to verbal vocabularies and that gestures and early words develop in tandem. It was also noted that infants with many object signs reached the 10-word oral vocabulary level earlier. Pointing has

been thought to be the sensorimotor form of naming and closely related to language acquisition (Bates et al., 1979). Communicative points, those that involve a coordinated attempt to attain adult confirmation, were noted to be the strongest gestural predictor of the onset of conventional word use.

Goodwyn and Acredolo (1993) studied the onset of symbolic use of signs and words in 22 hearing children exposed to symbolic gestures from 11 months on and found a reliable tendency for gestural symbols to appear earlier than vocal symbols. It was reported that the size of this gestural advantage was relatively small, but statistically significant. Goodwyn and Acredolo's (1993) study supports the hypothesis that the gestural modality is easier for infants to master once certain cognitive skills are in place.

Symbolic gesturing has been shown to facilitate the development of oral language (Goodwyn, Acredolo & Brown, 2000). It was found that infants who augmented their developing vocabularies with symbolic gestures outperformed those infants who did not in a majority of language acquisition measures. Goodwyn, Acredolo and Brown used three different groups for their study. One group of infants received sign training, another group received verbal training and the third group received no intervention. The sign trained group showed significant advantages over the group of infants receiving no intervention. Advantages were seen in the Sequenced Inventory of Communicative Development: Receptive and Expressive scales and the MacAuthur Communicative Development Inventory as well as Expressive and Receptive One-Word Picture Vocabulary Tests. However the infants receiving verbal

training showed no such advantages, discrediting the idea that the advantage was merely a function of the involvement of families in language intervention.

Sign Language

The universal use of gestures by all infants, paired with the research revealing the benefits of gestural communication as well as enhancing gestures, through encouragement, modeling, and molding a child's hands, leads us to the topic of sign language. Many view sign language use among infants as a way to facilitate communication (Daniels, 2001, deVirverios & McLaughlin, 1982, Konstantareas, 1984, Robertson, 2004). Sign language is a manual means of visuomotor communication that employs the use of enhanced gestures along with facial expression and body language. Similarities in language acquisition across different language modalities, such as verbal language and sign language, have been seen. Some of these similarities seen in infancy include babbling, development of phonology, the onset of referential language, and vocabulary content (Bonvillian, 1999).

Konstantareas (1984) suggested using signs as an aid for complex speech production for children who may have some useful, but limited speech. The use of signs with children who have various language impairments was also found to play a facilitative role. Children who received both sign and speech training performed superiorly to those children who did not receive sign training in the acquisition and recall of functor words, such as prepositions and pronouns. Konstantareas found that there was a better chance of the child producing a specific word when it was modeled with both sign and spoken language.

Orlansky and Bonvillian's (1985) study suggests that the visuomotor modality may allow individuals with limited speech abilities to make significant gains in communication. Sign language is not a tool limited to populations with disorders; typically developing children also may benefit from such instruction.

Holmes and Holmes (1980) investigated the language development of a typically developing hearing child of hearing parents, who was exposed to both signs and spoken words in a total communication system by the parents. The subject acquired a 50-word vocabulary (both signs and verbal words) approximately 8 months earlier than the mean of the group studied by Nelson (1973). This first 50-word vocabulary followed the same distribution pattern seen in Nelson's (1973) subjects. The subject's first 50 spoken words were acquired 3.6 months earlier than Nelson's (1973) study. Overall the subject's expressive communication accelerated in both modalities. Holmes and Holmes (1980) hypothesized that the addition of sign input may have been responsible for the early language acquisition seen in their subject.

In *Dancing with Words: Signing for Hearing Children's Literacy* (2001), Daniels discusses how sign language can be used to improve the vocabularies, reading skills, spelling, self-esteem, and comfort in expressing emotions in typically developing children. Daniels (1994) studied the effects of sign language on preschool hearing children's language development. Her sample consisted of sixty pre-kindergarten children in four classes from Chapter 1 schools. Two classes received sign language input from the teacher and two did not. Other than the sign language input, the children received the same instruction. Children

receiving sign input scored an average of fifteen points higher on the Peabody Picture Vocabulary Test (PPVT-R), which is a test of receptive single-word vocabulary, than the children not receiving sign input. Daniels' findings indicate that simultaneously presenting words in a visual, kinesthetic, and oral manner may enhance a child's vocabulary development. Daniels did not conduct a pre-test, and results must therefore be interpreted with caution.

In a follow-up study, Daniels (1996) administered the PPVT-R at the end of the children's kindergarten year. The sign instruction was limited to their pre-kindergarten year. She found that the gains of children exposed to sign language remained stable throughout the subsequent kindergarten year. No memory decay over time was noted. Daniels' 1996 follow-up study revealed that student's vocabulary growth, specifically the 17.24 increase in the score, for receptive English vocabulary as measured by the PPVT-R, was sustained without any further use of sign language in their kindergarten program. However it is bold to interpret the differences in vocabulary as a gain or improvement without a pretest. The benefits of sign language input during the pre-kindergarten year were maintained, which supports Daniels' hypothesis that children who learn sign language during their pre-kindergarten year improve their acquisition of English vocabulary to a statistically significant degree. Again, without a pretest we cannot conclude these results are valid. Replication or further study is needed.

In summary, research has shown that sign language does have a positive impact on some aspects of a child's developing language, such as the afore mentioned studies conducted by Daniels (1994, 1996), Konstantareas (1984), as

well as Felzer's study (1998). Daniels has shown differences in vocabulary for children exposed to sign. If sign language has been shown to have some effects on vocabulary development then it is reasonable to speculate that sign input would also affect the overall content and composition of a child's first spoken 50-word vocabularies. Typically nominals have been identified as making up the majority of an English-speaking child's initial 50-word vocabulary. The proportion of nominals in children's vocabularies increases as the overall vocabulary size increases during the period between the first word and the fiftieth word (Nelson, 1973). Would these findings of the first spoken 50-word vocabularies remain with the additional input of signs and manual communication? By looking at the first 50-signs we may see how the visuomotor modality impacts vocabulary acquisition.

50 First Signs

The acquisition of signed vocabulary has been shown to progress at a faster rate, when non-referential words are considered, compared to the acquisition of spoken language. Orlansky and Bonvillian (1985) conducted a longitudinal investigation of sign language acquisition in children of deaf parents. The subjects in their study acquired their first recognizable sign at an average of 8.6 months. A vocabulary of 10-signs was reached at an average of 13.2 months, which is significantly earlier than the age Nelson's (1973) subjects reached a vocabulary of 10-spoken words. Orlansky and Bonvillian's (1985) study revealed accelerated vocabulary development, which may be attributed to several factors, particularly pertaining to the differences between a visuomotor language and

speech. One factor is that of cortical development. The areas of the brain related to motor and visual processing appear to develop faster than those areas related to the auditory and vocal mechanisms. Another factor mentioned is the greater visibility of the feature of gestures and signs as well as the greater amount of control a young child has over the hands as compared to the control of the vocal system. The visuomotor modality also allows opportunities for external physical control. For example, the child's hands can be physically manipulated into the appropriate shape for a particular sign (Orlansky & Bonvillian, 1985).

Prinz & Prinz (1980) studied the acquisition of American Sign Language and spoken English in a typically developing child of a deaf mother and hearing father. They reported the child's first sign to emerge at approximately seven months and that she consistently acquired and spontaneously used more signs than spoken words when communicating with others. Prinz & Prinz (1980) suggested that direct access and exposure to a visuomotor language may enhance communicative effectiveness at early stages of development in children who are deaf as well as children with normal hearing.

Within a study of sign language acquisition and motor development of 11 young hearing children, whose primary mode of communication was American Sign Language, many similarities to Nelson's (1973) study were revealed (Bonvillian, Orlansky, & Novack, 1983). Children learning sign language also classify their vocabularies into grammatical categories similar to those children not exposed to sign language input. The patterns of grammatical classification for children learning sign language greatly resembles the classification noted by

Nelson (1973) of typically developing children. General nominals comprised the largest category in the first 50 sign vocabularies of children, just as they did for the subjects of Nelson's study. Specific vocabulary terms of the children using sign language were similar to Nelson's subjects. Children named the same objects, actions, and properties of their environment. Researchers suggest this overlap of vocabularies is due to daily environment as well as parents' attempts to provide their children with a useful vocabulary (Bonvillian, Orlansky, & Novack, 1983, Brown, 1958).

A few differences in the acquisition of the first 50-signs were noted by Bonvillian, Orlansky & Novak (1983), and support previous research on the use of sign language with young children. The subjects learning sign language began using their first non-referential sign before Nelson's subjects produced their first word and also showed accelerated vocabulary development. Children were also combining signs at an accelerated rate. Differences were noted in the function of words produced by children using sign language. These children used less function words, which may be due to the difference in the two language systems. Another difference was that signing children used signs that referred to objects and actions simultaneously, such as "airplane" and "car" (Bonvillian, Orlansky, & Novack, 1983). The children who signed were also found to use the same amount of action words as typically developing children in Nelson's study. However one must take into consideration how the signs that were simultaneously expressing actions and objects were classified. Perhaps the children learning sign did in fact possess a greater number of action expressions

than those children learning spoken language only. Bonvillian, Orlansky, & Novack (1983) noted that despite a high interexperimenter reliability, a degree of ambiguity was inevitably present.

Volterra & Iverson (1995) argued that children exposed to sign language do not reach first milestones in vocabulary acquisition earlier than children exposed to spoken language only. They have suggested that there is no 'sign advantage' and that the 'sign advantage' reflects a more general advantage of the gestural over the vocal modality in early communicative development (Volterra & Iverson, 1995). Volterra & Iverson (1995) found that two-sign utterances in children exposed to a sign language appeared at approximately the same time as two-word utterances in children exposed to a spoken language, and that these two-sign and two-word combinations followed similar courses of development. Volterra & Iverson (1995) suggested an advantage for the gestural modality for early communication in children, however this advantage is only for communicative purposes, not an advantage in terms of the symbolic or linguistic domain. They emphasize looking at manual and vocal productions in terms of their symbolic status, degree of decontextualization, and if the production occurs outside of a communicative situation. When using these criteria, Volterra & Iverson (1995) reported that there is no evidence for a modality bias in the acquisition of first symbols. They also suggested that for children acquiring speech, the use of gestures serves as an important transitional mechanism during language acquisition.

Folven & Bonvillian (1991) suggested that there is a temporal advantage for the production of early non-referential language in sign, however the advantage does not remain once children begin to acquire referential language. They noted that the gestural advantage may reappear at the point of two sign combinations. Folven & Bonvillian (1991) also suggested that the gestural advantage in sign language is synchronized closely with cognitive underpinnings and is acquired earlier than spoken language due to the delay of motoric areas related to speech (Folven & Bonvillian, 1991).

Conclusion/Hypothesis

The children in Bonvillian, Orlansky, & Novack's (1983) study were learning ASL as their primary mode of communication. We know that children acquiring ASL since birth have early lexicons comparable to hearing children acquiring spoken language. However, acquisition of language of these two groups is not identical, and some differences are reported (Bonvillian, Orlansky, & Novack, 1983). These differences include earlier onset of the first non-referential sign and combining signs at an accelerated rate compared to children acquiring spoken language. Early signs used frequently refer to objects and actions simultaneously.

To date, however, the early lexicons of typically developing children exposed to sign in infancy have not been fully explored and studied. These children are receiving dual input. Within a signed vocabulary, a child may be encoding more than a single meaning into a single sign production. Based on the nature of signed vocabulary and differences compared to a spoken vocabulary

due to modality, it seems reasonable to speculate that these children would have a different composition of their first 50 words compared to typically developing children not exposed to manual communication. I hypothesize that the children will use a greater portion of dual-functioning words and action words. Due to a child's ability to employ the use of gestures more readily as a result of maturation of motoric centers as compared to the speech centers and muscles, children will be accessing communication and language earlier compared to children not exposed to manual communication. Through this opportunity to access language earlier, a child will begin developing a vocabulary and mapping meanings onto symbols. The ease of representing an action in a gesture or sign, due to iconicity in part but also as a result of the visual and motor aspects of gestures, may influence a child's acquisition of action gestures, which in turn may carryover to their spoken language development.

The purpose of this research is to investigate the role of language input on the acquisition of the first 50 spoken words in typically developing children. The following questions shall be considered:

1.) How does the first 50 spoken word lexicons of typically developing children receiving manual communication input compare to those typically developing children receiving oral input only in terms of:

   a.) word function

   b.) word form

   c.) word reference

2.) Does the rate of acquisition of the first 50 spoken word lexicons differ in children receiving manual communication input than those children receiving oral input only? Is there evidence of gradual acquisition or of a vocabulary spurt?

Research on the early lexicons of typically developing children exposed to signs or manual communication in infancy may help answer the theoretical questions:

3.) What factors play a role in the composition of a child's first 50 words?

4.) What is the role of language input in early vocabulary acquisition?

   a.) What is the relative effect of visual, action-orientated linguistic input? Does this visual depiction of action words and modifiers result in easier acquisition of such? If this is the case then a larger percentage of action and modifier words will be present in the vocabularies of children simultaneously exposed to both modalities of language.

Research in the field would also help to answer the applied questions:

5.) Is exposure to baby sign helpful in increasing the overall diversity of a child's early vocabulary?

6.) What implications might input of both manual communication and oral language have on a child's first words?

7.) What is the timetable for both signed and oral vocabulary development in those children exposed to both spoken language and manual communication?

CHAPTER II

METHOD

Participants

The original participants in this study included 15 typically developing children, six males and nine females. Equal distribution of sex proved to be a challenge to obtain and therefore was not a factor in enrolling willing participants. Participants were recruited from local baby-sign playgroups through the use of informational flyers or a brief presentation by the researcher. At the time the study began the infants ranged from 8 to 13 months of age.

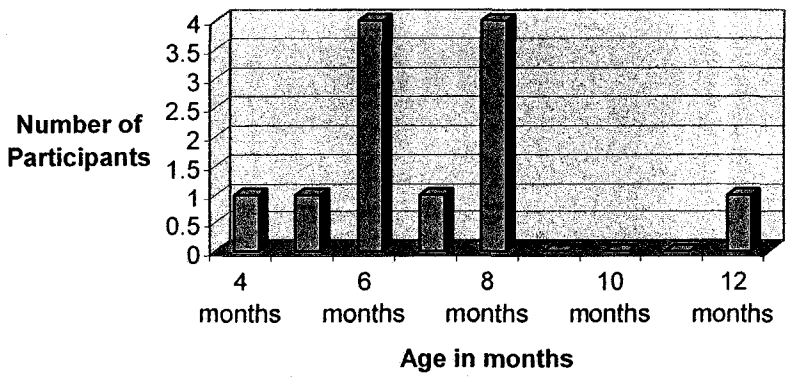
One participant began the study at the age of 16 months; however, his parents had been recording his first words and reported his first non-imitated word at approximately 12 months of age and joined the study. Two families participated through a retrospective-report, as they had kept very detailed records of their child's early lexicon. These two participants were 19 months and 36 months of age at the time of the study. Three of the 15 participants withdrew from the study after it commenced. One participant discontinued the study without explanation. One participant withdrew from the study as the mother reported that she was not able to accurately keep up with the diary. One participant's data were unusable due to later reports by the mother and related professionals of delays noted for the child.

The final samples for analyses consisted of 12 participants: seven participants were from southern New Hampshire, two from southern Maine, one participant from northeastern Massachusetts, and two participants from Maryland. All of the children lived in middle-class homes. Nine of the participants were from homes where English was the only language spoken. One participant reported both English and Spanish to be spoken in the home. Two participants came from a home where both English and American Sign Language were used in the home. The researcher's aim was to recruit participants from a monolingual home, however this was not possible and therefore not controlled for. Birth order was not controlled for in the current sample. Seven of the participants were firstborns and had no younger siblings. One participant was also a firstborn and had a younger sibling. Four of the participants were second born with one older sibling. The older siblings were 3.5, 5, 10, and 11 years of age.

Their parents ranged in educational level from high school to graduate studies. All of the mothers had been educated beyond the high school level with an average of 15.8 years of schooling. The fathers had an average of 15.3 years of schooling. The employment status of the mothers included a variety of professional occupations with four stay at home mothers. One mother was an ASL interpreter and educator. She participated via retrospective report for her eldest child as well as recorded her youngest son's first words. The employment status of the fathers also included a variety of professional occupations such as a firefighter, a pilot, and a business executive.

Baby-sign playgroups were run by an instructor who taught parents and their child signs and gestures to aid in communication. Typically the playgroups met once a week for one hour for six consecutive weeks. Parents attending baby-sign playgroups received instruction and materials to foster the use of signs and manual communication in the home. There were two primary baby-sign playgroups that participants were involved with. Seven participants were enrolled in a Baby Signs® *Sign Say & Play* class (Baby Signs® program, 2005), which is a manual communication program employing the use of gestures as well as signs. Three participants were enrolled in a baby sign class that used the Sign with your Baby™ program by Joseph Garcia (Sign2Me®/Northlight Communications, 2005). One participant was exposed to the formal syntax of ASL as well as participating in the Sign with your Baby™ program by Joseph Garcia and one participant was exposed to ASL exclusively. The ages of exposure to manual communication ranged from 4 to 12 months, as illustrated in Figure 1.

Figure 1
Age of Exposure to Manual Communication



Participants continued to receive exposure to manual communication or baby signs throughout the duration of the study, until the 50-word mark was reached or data collection concluded. The majority of input they received through manual communication consisted of single signs paired with a verbal word, however a few participants reported the combining of signs.

Procedures

An informational flyer was distributed to baby-sign class instructors to pass to their clients. The informational flyer introduced the study and requested their participation. The nature of the study and requirements of participants were shared with parents. Parents choosing to participate signed a consent form and completed a questionnaire. The Questionnaire was based upon the UNH Speech-Language-Hearing Center's *Case History Form*, and allowed the researcher to determine the approximate socio-economic status and education level of the parents as well as developmental and medical history of the child. Participants were provided with a diary and instructions for recording their child's first 50 words. Parents were asked to keep a diary until the 50-word mark had been reached. Once the child produced 50 vocal words, data collection concluded.

The diary instructions and recording form were based upon Nelson's (1973) diary form and asked for the following: word produced, the date, if it was a direct imitation, if it was said to someone else and the context in which the word occurred. There also was a section for parents to comment on any developments they may have seen. The diary had only an identifying number on it, therefore

allowing for confidentiality when the data were collected and analyzed. Parents were asked to record new words they heard on a daily basis. Parents were educated on how to record the data through a brief presentation by the researcher or through a phone conversation. Participants were contacted monthly throughout the study by the researcher via phone or e-mail, whichever they noted a preference for, in order to keep track of progress and discuss questions or concerns.

Data Analyses

The diaries of the children's acquisition of first words were analyzed for frequency of function type, form, and reference. Similar to Nelson's (1973) study, words were classified into the appropriate grammatical category. The following grammatical categories were considered: general nominals, specific nominals, action words, modifiers, personal social words, and function words. The researcher and one additional trained coder each coded the diaries according to the aforementioned grammatical categories and then compared results. The coder's reliability was approximately 95% in agreement, with the other 5% of discrepancies being resolved and agreed upon after discussion. This allowed for greater reliability in terms of classifying words into grammatical categories. Results of this study were compared to Nelson's (1973) study in terms of the function type, form, and reference.

CHAPTER III

RESULTS

Attrition

Three out of the 15, or 20% of the participants withdrew from the study. All three of those who withdrew signed the consent form and one had completed the initial questionnaire. One participant was assumed to have withdrawn from the study when all attempts to contact the participant were unsuccessful; no explanation was given as for the reason for withdrawal. Another participant withdrew from the study because the mother reported that she was not able to accurately keep up with the diary. An additional participant's data were unusable due to later reports the mother and related professionals shared of developmental delays.

Analysis of Form

The first words collected were classified based upon their *content* or *reference* into grammatical-form classes as defined by Nelson (1973). These classes include general nominals, specific nominals, action words, modifiers, personal social words, and function words. These grammatical-form classes were subdivided into semantic categories as set forth by Nelson (1973). The child's use of the word, as determined by the context or situation recorded by the parents, was used to determine the appropriate grammatical-form class

whenever possible. When insufficient context or situation notes were given, the classification of the word was determined based upon Nelson's (1973) categorization schema.

Grammatical Categories

The grammatical categories and subcategories that were used for classifying words were taken directly from Nelson (1973) so that comparison of results would be possible.

I. Nominals – words used to refer to the "thing world". May be used in labeling or demanding, in ostensive reference or relations involving agent or object.

A. **Specific Nominals**- words used to refer to only one exemplar of a category whether a proper name (i.e., a class with only one member) or not.

   1. People – mommy
   2. Animals – Dizzy, name of pet
   3. Objects - car

B. **General Nominals**- words used to refer to all members of a category whether child or adult defined. e.g.

   1. Objects – ball, car
   2. Substances – milk, snow, includes all mass nouns
   3. Animals and people – doggie, girl
   4. Letters and numbers – E, 2
   5. Abstractions – God, Birthday
   6. Pronouns – he, that

II. Action Words – words that describe, demand, or accompany action or that express attention or demand for attention. They may be used for notice, locative, or action relations.

1. Descriptive – go, bye-bye
2. Demand – up, out
3. Notice – look, hi
    - In practice it proved impossible to determine reliably descriptive versus demand use from Nelson's records. Therefore she pooled these two categories.

III. Modifiers – words that refer to properties or qualities of things or events. They express recurrence, disappearance, attribution, location, and possession.

1. Attributes – big, red, pretty
2. States – hot dirty, all gone
3. Locative – there, outside
4. Possessives – mine

IV. Personal Social – words that express affective states and social relationships; these range from highly idiosyncratic to highly conventional (thank you). They do not express basic operations or relations.

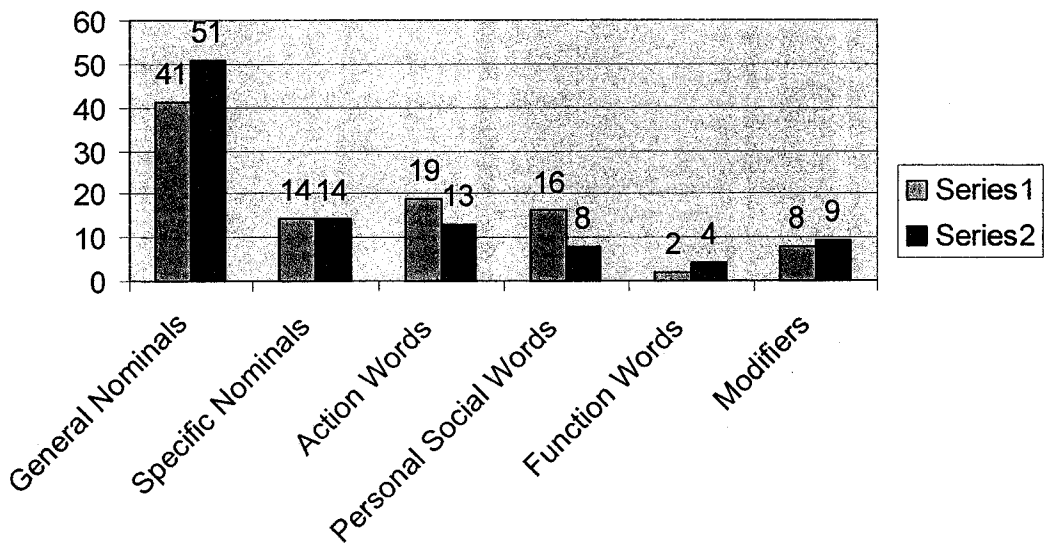
1. Assertions – no, yes, want, know
2. Social Expressive – please, ouch

V. Function Words – words that fulfill a solely grammatical function, words relating to other words.

1. Question words – what, where, etc
2. Miscellaneous functions – is, to, for

Figure 2 illustrates the breakdown of grammatical categories for the current study as well as Nelson's (1973). Refer to Table 1 for further breakdown of grammatical categories and mean percentages.

Figure 2
Grammatical Categories
Percentages



Series 1 = Current Study / Series 2 = Nelson (1973)

TABLE 1

MEAN PERCENTAGE OF COLLECTED VOCABULARIES BY CATEGORY COMPARED TO NELSON (1973)

Category	Current Study (*N*=12) %	Nelson (1973) (*N*=18) %
I. Nominals		
Specific:		
People	11	12
Animals	1	1
Objects	2	1
Total specific nominals	**14**	**14**
General:		
Objects	19	31
Substances	11	7
Animals and people	10	10
Letters and numbers	0	1
Abstractions	<1	1
Pronouns	<1	3
Total general nominals	**41**	**51**
II. Actions words:		
Demand-descriptive	17	11
Notice	2	2
Total action	**19**	**13**
III. Modifiers:		
Attributes	2	1
States	4	6
Locatives	<1	2
Possessives	1.5	1
Total modifiers	**8**	**9**
IV. Personal-social:		
Assertions	3	4
Social-expressive	13	4
Total personal-social	**16**	**8**
V. Function words:		
Question	2	2
Miscellaneous	0	2
Total function	**2**	**4**

Note - Percentages do not add up to 100 due to rounding

Results of Grammatical Category Analysis

The desired 50-word vocabularies were not attained for all of the participants, due to the fact that many of the words recorded in the diaries were imitations. Imitated words do not meet the criteria for spontaneous usage to be considered a true word. Therefore, only words that were recorded as spontaneous were analyzed. A total of 280 words were included in this analysis.

The exact proportions and classifications of general nominals, specific nominals, action words, modifiers, personal social words and function words can be seen in Table 1. In the current study general nominals were the largest category for these children, consisting of 41% of the vocabularies. Nelson (1973) also reported that general nominals were the largest category for her participants, consisting of 51% of the vocabularies. The second largest grammatical category in this study was action words, consisting of 19%. Nelson (1973) reported action words to comprise 13% of the vocabularies. Nelson (1973) reported the second largest grammatical category in her study to be specific nominals, consisting of 14%. A t-test uniformly revealed a lack of significant differences between the sample means and Nelson's (1973) means for the six grammatical categories (see Table 2).

TABLE 2

GROUP DIFFERENCES FOR GRAMMATICAL CATEGORY MEANS

Category	Current Study	Nelson's Study	Current S	Nelson's S	t-stat	Comment
Specific Nominals	14	14	10.02	8.18	0.00	Not significant
General Nominals	41	51	14.20	11.78	-0.70	Not significant
Action Words	19	13	11.32	7.92	0.53	Not significant
Modifiers	8	9	7.83	6.75	-0.13	Not significant
Personal Social Words	16	8	10.58	6.39	0.76	Not significant
Function Words	2	4	4.04	4.62	-0.50	Not significant

The proportions of this analysis show that general nominals do in fact still predominate for typically developing children exposed to manual communication. The proportion of objects, substances, animals and people subcategories of general nominals also support the notion that "label learning" is of great importance and tends to dominate early vocabularies, similar to the reports of Nelson (1973). While statistical significance was not reached, the proportion of action words is greater in the current sample, consisting of 19%, while Nelson (1973) reported only 13%. Similar to Nelson, not all of the action words are verbs in adult language such as the action words *up, down, bye, again,* however, when used by the children they expressed an action.

An inspection of the proportions of the grammatical categories in the current study compared to Nelson's (1973) sample shows that, while still not statistically significant, the percentage of personal social words in the current study is twice that of Nelson's, respectively 16% and 8%.

Individual Vocabulary Differences

The vocabularies collected for each participant varied greatly in terms of the number of spontaneous words to be analyzed; one participant with as few as six words and another participant with as many as 52 words. The reasons for the difference in words that were analyzed for participants are in part due to the recording of imitated words and the overall data collection method as well as some contribution of individual differences in age and rate of acquisition. The distribution of words across the different grammatical categories for each participant was investigated as well. General nominals were the predominating category for 10 of the participants. Action words were the predominating category for one of the participants, comprising 44% of the vocabulary. Personal social words were the predominating category for one of the participants, comprising 51% of the vocabulary, followed by action words, which comprised 31% of that participant's vocabulary.

When looking at individual vocabularies, differences between some of the participants were revealed in terms of the distribution of words among the grammatical categories. The distributional patterns for four of the participants are shown in Table 3. General nominals for participants two and 12 comprised over 50% of their vocabularies, suggesting that they were learning primarily an object-oriented language. Action words comprised 44% of the vocabulary for participant six, and general nominals comprised only 20%. These percentages suggest that this child was not learning an object-oriented language, but language geared towards expressing actions and social interaction. Personal Social words

comprised 51% of the vocabulary for participant seven, which suggests a more self-oriented language focusing on social interactions rather than an object-oriented language.

TABLE 3

PATTERNS OF WORD ACQUISITION BY CATEGORY
OF FOUR PARTICIPANTS

Participant and Category	%
Participant 2	
General Nominals	58
Specific Nominals	18
Action Words	15
Personal Social Words	6
Function Words	0
Modifiers	3
Participant 12	
General Nominals	53
Specific Nominals	12
Action Words	10
Personal Social Words	19
Function Words	0
Modifiers	6
Participant 6	
General Nominals	20
Specific Nominals	12
Action Words	44
Personal Social Words	16
Function Words	0
Modifiers	8
Participant 7	
General Nominals	6
Specific Nominals	6
Action Words	31
Personal Social Words	51
Function Words	0
Modifiers	6

Nelson (1973) reported division by functional type of language and used the term *referential* to refer to the children who had 50% or more general nominals in their vocabulary, and *expressive* to refer to the children who had less than 50% general nominals in their vocabulary. She described the referential group as those primarily learning an object-oriented language and the expressive group as those learning a more self-oriented and social interactive language. Using these criteria for determining if a child fell into the referential or expressive group in the current study, four participants were identified as referential and eight participants as expressive. By comparison, Nelson's (1973) group of 18 participants consisted of 10 children in the referential group and eight in the expressive group. The breakdown of grammatical category percentages for each group, referential and expressive is shown in Figures 3 and 4.

Further analysis revealed a greater percentage of general nominals in the referential than the expressive group. The expressive group has a greater percentage of action words, personal social words, and modifiers. The comparison between the current study and Nelson's (1973) study by functional group can be seen in Table 4.

Figure 3
Referential

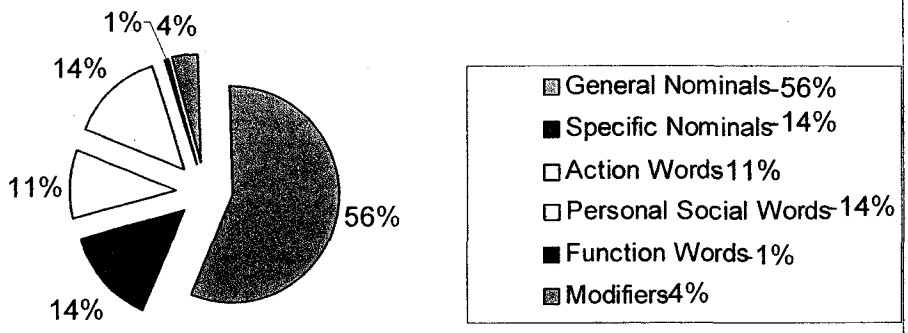


Figure 4
Expressive

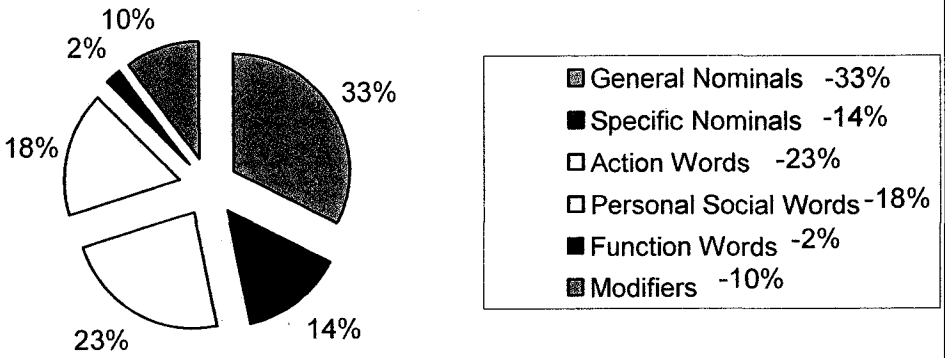


TABLE 4

DISTRUBITION OF COLLECTED VOCABULARIES BY GROUP

	Functional Groups			
	Current Study		**Nelson (1973)**	
Category	Referential (*N*=4) (%)	Expressive (*N*=8) (%)	Referential (*N*=10) (%)	Expressive (*N*=8) (%)
Nominal Specific:				
Total.....	14	14	13	15
Nominal General:				
Total.....	56	33	62	38
Actions words:				
Total.....	11	23	12	15
Modifiers:				
Total.....	4	10	7	12
Personal-social:				
Total.....	14	18	5	11
Function words:				
Total.....	1	2	1	8
Total.....	100	100	100	99

*Totals do not add up to 100 due to rounding.

Analysis of Content

General Nominal Categories

The meaning of a child's first words was also considered here through closer inspection of the general nominals category. General nominals were chosen for a content analysis as their meanings or referents are more easily identifiable and are more likely to share common meanings than words from other grammatical categories. The categories of general nominal words produced by all of the children are shown in Table 5.

TABLE 5

GENERAL NOMINAL WORDS BY SEMANTIC CATEGORY

Semantic Category	% of General Nominals	% of Total
Animals	20	8
Food	20	8
Toys	15	6
Vehicles	5	2
Household Items	15	6
Clothing, personal	9	4
People	5	2
Miscellaneous	11	5
Total	100	41

The most common content for the study sample were words referring to animals and food. The animal and food categories together comprised 40% of the total general nominal words used by the children. Household items and toys were the next frequently occurring categories, together comprising 30% of the total general nominal words. The categories of clothing, people, vehicles, and miscellaneous were less predominant. Nelson (1973) conducted a content analysis of general nominals as well; however, unlike the current study, she investigated specifically the first 10 words and the last 10 words (41-20) of the vocabularies collected. Nelson (1973) reported animals to be the most predominant semantic category along with food items being the second most predominant semantic category for the first 10 words. Nelson (1973) reported that the food category increased in importance for the last 10 words, while animals became less important. Clothing words and household item words increased for the last ten words also.

Consistencies were seen between the current sample and Nelson's (1973) sample in terms of similar semantic categories. Both samples showed the animal and food categories to be the most salient. Table 6 gives a tabulation of all the general nominals produced in 10 categories by the children in the current study.

TABLE 6

GENERAL NOMINALS BY SEMANTIC CATEGORIES

Category and Word	Frequency	Category and Word	Frequency
Food and drink:		Clothes:	
Cheese	1	Hat	1
Chicken	2	Sock	2
Cracker	1	Shoe	1
Pumpkin	1	Boot	1
Water	1	Pants	1
Milk	3	Bra	1
Toast	1	Total	7
Carrots	1		
Ice	1	Toys / Play Equipment:	
Banana	1	Boat	1
Apple	4	Ball	7
Waffle	1	Train (variants)	2
Cookies	1	Balloon	3
Juice	1	Bear	1
Bar	1	Slide	1
Bagel	1	Book	1
Some	1	Bat	1
Total	23	Total	17
Animals			
Dog (variants)	6	Vehicles:	
Cat (variants)	3	Car	4
Fishy	1	Bus	1
Pig	1	Tractor	1
Cow (variants)	2	Total	6
Sheep (variants)	2		
Horse (variants)	1	People/Body parts:	
Puppy	2	Mouth	1
Duck (variants)	1	Cheek	1
Deer	1	Teeth	1
Frog (variants)	1	Baby	1
Bug	1	Boy	1
Bunny	1	Bum	1
Total	23	Breast	1
		Total	7

TABLE 6 CONTINUED

Furniture/Household:	
Mail	1
Light	1
Door	2
Bell	1
Clock (variants)	2
Bath	2
Trash	1
Potty	1
Cup	1
Ladder	1
Lawn mower	1
Scissors	1
Bench	1
Bowl	1
Total	17

Personal items:	
Keys	1
Button	1
Total	2

Miscellaneous	
Blood	1
Bubbles	4
Boo-boo	1
That	1
Lala (music)	1
Poo	1
Blue	1
Total	10

Outdoor Objects:	
Flower	
Moon	
Star	
Total	3

Total General Nominals: **115**

CHAPTER IV

DISCUSSION

The purpose of this pilot study was to investigate the role of language input in the acquisition of the first 50 spoken words in typically developing children. It was of interest to the researcher to see how the first 50 spoken word lexicons of typically-developing children receiving manual communication input compared to those typically-developing children receiving oral input only in terms of word function, word form, and word reference. Based on the nature of signed vocabulary and differences compared to a spoken vocabulary due to modality, it was hypothesized that the current sample would have a different composition of their first 50 words. A greater portion of dual-functioning words and action words were also predicted for the current sample.

Statistical analyses revealed a lack of significant differences between the sample means in the current study and Nelson's means for the six grammatical categories. A qualitative analysis was conducted in order to look for trends and patterns within the data collected, which suggests that even though statistical significance was not achieved, there may be differences in the first 50 spoken word lexicons for these two groups.

An examination of the proportions of the grammatical categories in the current study compared to Nelson's (1973) sample reveals differences. As predicted, a greater percentage of action words was found for the typically

developing children exposed to manual communication, 19% action words for the current sample as compared to Nelson's (1973) 13% action words in her study. The percentage of personal social words in the current sample is twice that of Nelson's, respectively 16% and 8%. The current sample yielded a lower percentage of general nominals and similar percentages for specific nominals, function words, and modifiers. The differences and trends noted for the grammatical category analysis suggest that the role of manual communication input may indeed have an influence on early vocabulary acquisition.

Manual communication, a type of linguistic input that is visual and action-oriented in nature, could be considered a contributing factor to the greater percentage of action words found in the current sample. The visual depictions of action words through manual communication may influence the acquisition and use of spoken action words. One could also speculate that the additional interaction between the child and caregiver through the use of baby-signs and manual communication may have enhanced or encouraged words that expressed social relationships and affective states, therefore resulting in the greater percentage of personal social words produced by the current sample. Goldfield (1993) suggests that early vocabularies will differ as a function of the kind of contexts in which the child and parent commonly interact. Perhaps the effects of using baby-sign influenced and expanded the contexts in which the child and parent interacted, thus influencing early lexical acquisition. While the exact cause for the greater percentage of personal social words in the current

sample can only be speculated, it should be noted that approximately 35% of the 46 personal social words analyzed were animal sounds.

A closer look at the general nominal category for the current sample suggests that typically developing children exposed to manual communication are learning object labels similar to typically-developing children not exposed to manual communication. A content analysis was performed in order to look closely at the general nominals acquired and was conducted similar to Nelson's (1973) study. The general nominals were divided into 8 semantic categories, with the animal and food categories comprising 40% of the total general nominals produced. Nelson (1973) conducted a content analysis specifically for the first 10 words and the last 10 words (41-50). She reported the animal and food categories to be the most salient for the first 10 words and the food category to be the most salient for the last 10 words. The content analysis of the current sample suggests both groups of children are learning labels for similar items, and that food and animal labels are of significance in their lexicons.

The individual differences and distributional patterns across the different grammatical categories for each participant were quite interesting as well. When the current sample was categorized by functional type of language used, the data indicate that a greater percent of typically developing children exposed to manual communication are *expressive* in terms of their functional language. Eight out of the 12 participants, or 66%, fell into the *expressive* category, with a greater percentage of action words, personal social words, and modifiers. The children in the *expressive* group had less than 50% general nominals and seemed to be

learning a more self-orientated and social interactive language. This is an interesting contrast to the 8 out of 18, or 44% of expressive children found by Nelson (1973). The nature of manual communication, interaction style of manual communication, as well as the nature of the caretakers in the current study could be possible factors in the greater amount of participants who are *expressive* in their functional use of language.

Some of the trends noted in this pilot study are of theoretical interest. While this pilot study and trends should be reexamined with additional research, it suggests that manual communication does play a role in the composition of a child's first 50 words. If the above is in fact true, it lends support to the notion that language input plays a significant role in early lexical acquisition. Further it suggests that exposure to baby sign is helpful in increasing the overall diversity of a child's early vocabulary.

The effects of input are complex and may not influence all children in the same manner; however, the input a child receives does play some role in the overall composition of their early lexicon (Tardif, Shatz & Naigles, 1997). Tardif, Shatz & Naigles (1997) suggest that when investigating the effect of input on vocabulary development many specific factors in the input should be considered and that no specific combination of input factors can determine the exact proportions of nouns and verbs either. The trends found in this pilot study may support the notion that the type of input children receive plays an important role in their early lexical acquisition as opposed to the notion that the perceptual

saliency of nouns and action verbs in the environment are the major explanatory factor for the proportions of such in a child's early lexicon.

Overall, these findings suggest that typically developing children exposed to manual communication before and during the acquisition of the first 50 words may tend to have a greater percentage of action words, personal social words, and a more diverse lexicon than those not exposed to manual communication. While these preliminary findings are provocative, several limitations of the study should be noted.

The first deals with recruitment and the participant pool. The sample used was comprised of volunteers, a sample of convenience. The sample size was also smaller than desired, which affects statistical measures and limits the generalizations that can be made. Another factor to consider when reviewing the results of the study is the inability to obtain the planned spoken 50-word vocabulary count. The planned 50-word vocabulary count was not attained for all of the participants due to lack of clarity in instructions to parents. Some diaries had 10 non-imitated words recorded that were suitable for analysis, while others had close to 50 words. The different number of analyzable words for each participant constitutes a limitation because it did not allow for the planned investigation into rate of acquisition. The recording sheet asked the parents to circle either yes or no to whether the child's spoken word was an imitation. While this information is necessary to determine if the word was used spontaneously, it would have been beneficial and yielded more accurate data collection if the researcher had specified to the parents at the start of the study that words

produced that were imitations would not be counted towards the 50-word vocabulary. Many of the imitated words were recorded only once, and therefore the specific date of their first spontaneous usage was not collected, and thus not analyzed as part of the data.

A third limitation of the study deals with differing methods of data collection relative to Nelson's (1973) work. Unlike her study, where diaries were collected each month, the current study required the diaries to be collected only once the child had reached the 50-word mark. Without monthly opportunities to inquire further about new words, classifications were based solely on the context and information recorded in the diary. Monthly collection of words would have allowed for the opportunity to ensure the words were being recorded accurately. Parents were contacted monthly by e-mail or phone, which was useful for the purposes of checking on participation and addressing any questions the parents had, but did not allow for detailed discussions or inspection of diaries.

If this pilot study were to be replicated in order to confirm the trends seen here, the aforementioned limitations should be considered and revised in order to protect and enhance validity. Future studies of first words utilizing the diary method should be sure to specify the criteria for a true first word with parents, or to emphasize the importance of the first spontaneous usage to parents. Further research may also want to control for order of birth, language spoken in the home, and the amount of manual communication input. One way to control for the latter might be to draw all participants from the same baby-sign class with clear guidelines as to the timing of sign input. For the purposes of this research

study the exposure of a 6-week baby sign class with some carry over at home was sufficient.

In summary, this pilot study represents the first investigation of the effects of manual communication input on the acquisition of the first 50 words in typically developing children. Findings from this exploratory study suggest that language input plays a significant role in early lexical acquisition. Specifically, the findings suggest that the use of manual communication with typically developing children does play a role in the composition of their first 50 words, and that a greater portion of action words and personal social words may be expected. The results also suggest that exposure to baby-sign is helpful in increasing the overall diversity of a child's early vocabulary. Although the data on the effects of manual communication input in the first 50 words are preliminary, the trends seen are worth further exploration.

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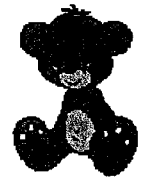
APPENDICES

APPENDIX A

INFORMATIONAL FLYER



Research Opportunity
We Need You!

My Name is Emily Woodacre and I am a graduate student at UNH in the department of Communication Sciences and Disorders. I am currently seeking participants for my thesis research. Enrollment in a baby-sign group or daycare that uses manual communication makes you eligible to participate. This is an exciting opportunity to become involved in current research on children's first words!

Title of Research

"A comparison of the first fifty words of typically developing children, to the first fifty words of typically developing children exposed to manual communication."

What is Manual Communication?

Manual communication is gestures used as a means of communication. Teaching and using some signs with your child is a form of manual communication. I am interested in investigating the effects of this sign input on your child's first fifty words!

What will Participation Entail?

You will be asked to keep a diary of your child's first 50 words. Simply write down your child's first words and in what situation they were produced. This will allow you to have a record of your child's first 50 words! What a memory! (Great scrap-booking material too!)

INTERESTED????

Please contact

Emily Woodacre
(774) 289-6974
woodacre@cisunix.unh.edu

APPENDIX B

CONSENT FORM

CONSENT FORM FOR PARTICIPATION IN A RESEARCH STUDY

TITLE OF RESEARCH STUDY

My name is Emily Woodacre and I am a graduate student in the department of Communication Sciences and Disorders at the University of New Hampshire who will be conducting the proposed research on your child's first fifty words. The research study is "A comparison of the first fifty words of typically developing children, to the first fifty words of typically developing children exposed to manual communication".

WHAT IS THE PURPOSE OF THIS STUDY?

The purpose of this research is to investigate the effects of the additional input of manual communication, if any, on the composition of your child's first fifty words. Children receiving exposure to manual communication through a playgroup or daycare are of particular interest in this study.

WHAT DOES YOUR PARTICIPATION IN THIS STUDY INVOLVE?

Participation in this study requires that your child receives exposure to manual communication through a daycare or playgroup. You will be asked to attended an informational meeting regarding the purpose and requirements of the study. Participants will be asked to complete a questionnaire and to keep an on-going diary at home of their children's first words as well as the context that they appeared until the 50-word mark has been reached. The typical length of time for the diary to be completed may vary due to individual differences and variations, however typically from the appearance of the first work to the fiftieth word is approximately 6 months. The researchers, myself, will be in contact via e-mail or phone calls throughout the study in order to answer questions and check in on progress.

WHAT ARE THE POSSIBLE RISKS OF PARTICIPATING IN THIS STUDY?

This study poses no risks for participants.

WHAT ARE THE POSSIBLE BENEFITS OF PARTICIPATING IN THIS STUDY?

Upon completion of the diary you will have a record of your child's first fifty words! (A copy will be submitted to the researcher) A copy of the thesis will be available for participants to review if interested, and a summary of findings will be shared with participants.

IF YOU CHOOSE TO PARTICIPATE IN THIS STUDY, WILL IT COST YOU ANYTHING?

No.

WILL YOU RECEIVE ANY COMPENSATION FOR PARTICIPATING IN THIS STUDY?

My sincere gratitude and thanks.

WHAT OTHER OPTIONS ARE AVAILABLE IF YOU DO NOT WANT TO TAKE PART IN THIS STUDY?

You understand that your consent to participate in this research is entirely voluntary, and that your refusal to participate will involve no prejudice, penalty or loss of benefits to which you would otherwise be entitled.

CAN YOU WITHDRAW FROM THIS STUDY?

If you consent to participate in this study, you are free to stop your participation in the study at any time without prejudice, penalty, or loss of benefits to which you would otherwise be entitled

HOW WILL THE CONFIDENTIALITY OF YOUR RECORDS BE PROTECTED?

The researcher seeks to maintain the confidentiality of all data and records associated with your participation in this research.

You should understand, however, there are rare instances when the researcher is required to share personally-identifiable information (e.g., according to policy, contract, regulation). For example, in response to a complaint about the research, officials at the University of New Hampshire, designees of the sponsor(s), and/or regulatory and oversight government agencies may access research data.

Data, questionnaires and personal information collected from this study will remain in a locked file cabinet in the researcher's office. Only the researcher and the project supervisors will have access to this data. Diaries and questionnaires will be identified by an assigned number, and only the researcher and project supervisors will have access to the identifying information. Results will be reported anonymously, revealing no identifying information.

WHOM TO CONTACT IF YOU HAVE QUESTIONS ABOUT THIS STUDY

If you have any questions pertaining to the research you can contact Emily Woodacre, 774-289-6974 or woodacre@cisunix.unh.edu to discuss them.

If you have questions about your rights as a research subject you can contact Julie Simpson in the UNH Office of Sponsored Research, 603-862-2003 or Julie.simpson@unh.edu to discuss them.

I, _____ CONSENT/AGREE to participate in this research study

_____ _____

Signature of Participant Date

APPENDIX C

QUESTIONNAIRE

ID # ____

I. INDENTIFICATION INFORMATION

Today's Date:_____

Child's Name: _____Date of Birth:_____Age:_____

Sex: _____Male _____ Female

Address:

_____

_____

Person Completing the Questionnaire: _____

Relationship to the Child: _____

Mother's Name:_____Home Phone: ( )_____

Occupation:_____

Education (highest grade completed)_____

Father's Name:_____Home Phone: ( )_____

Occupation:_____

Education (highest grade completed)_____

Language(s) Spoken in the Home:_____

Other Children in Family (in order of birth):

Name	Age	Sex	Living with you?	Is child a stepchild or adopted?
_____	___	___	_____	_____
_____	___	___	_____	_____

II. CHILD'S MEDICAL & DEVELOPMENTAL HISTORY

1.) Duration of Pregnancy:

2.) Were there any complications/unusual conditions associated with the birth? If so, please explain.

3.) Birth Weight:

4.) Was there any special care given to the baby following birth? If so, what and why:

5.) Is your child currently taking any medications? If yes, what medication, how often and why:

6.) Has you child ever been hospitalized? If so, when and for what reason:

7.) Has your child ever been diagnosed as having any of the following disorders or problems? If yes, place a check in the appropriate space.

___Hearing impairment
___Allergies
___Kidney disorder
___Cleft lip/palate
___Sickle cell anemia
___Ear infections
___Nutritional deficiency
___Tuberculosis
___Muscular dystrophy
___other

___Learning disabilities
___Hearing disorder
___Blood disease
___Epilepsy or other seizure disorder
___Breathing irregularities
___Visual impairment
___Bone disease
___Poliomyelitis

If you checked any of the above, please explain:

8.) Please describe your child's general health:

9.) Is your child now receiving special care from a physician, psychologist, speech pathologist, occupational therapist, or other health professional? If yes, for what condition?

10.) Is there any family history of:

	Relationship to the child:
___Hearing problems	_____
___Vision problems	_____
___Mental retardation	_____
___Learning problems	_____
___Speech-Language Problems	_____
___Emotional	_____
___Other health or medical issues	_____

11.) Do you feel that your child is slow, average, or rapid in his/her general development thus far?

_____slow _____average _____rapid

III. MOTOR DEVELOPMENT

1.) Please give the age in months at which your child first did the following (if this has not occurred, write "NA" on the line.)

_____ sat unsupported (months)
_____ crawled on hands and knees
_____ rolled over
_____ walked alone

2.) Please describe your child's general motor skills and activity level.

Other Comments:

IV. SIGN INPUT / MANUAL COMMUNICATION / CHILDCARE

1.) Is your child enrolled in a childcare program/daycare? If so, please list the name of the center, type of program, days/hours child attends.

2.) When was your child first exposed to sign language input or manual communication? (age in months)

3.) Are signs or manual communication used in the home? If so, please describe frequency and manner.

4.) Does your child use signs or manual communication at all? If so, please describe.

5.) If the child has any siblings, approximately when did they produce their first word? (months)

6.) If the child has any siblings, how would you describe their language development in terms of their first 50 words? (words emerged quickly, slowly, etc)

7.) How did you learn about or become familiar with 'baby sign' or the use of signs with infants?

8.) Have you attended any workshops on the use of sign input with infants/children?

THANK YOU!!!

APPENDIX D

DIARY INSTRUCTIONS

Guide to Keeping Word Records/Diaries

Column 1:Word – Report any sound that the child makes which (imitates a word said by an adult or older child) or (is used as a word by the child to indicate some thing, person, action, want, etc) whether or not it sounds like the adult words for the same thing

- Please record the child's pronunciation and the adult word that it means as often as possible. If you are not sure whether the child is using the word to mean something, you can note this under Comments or Other.

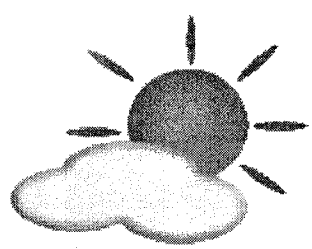
Column 2: Date Used – Date that your child first used this word.

Column 3: Imitations – Yes or No, please circle one. (Did you child just say the word after someone else said it?)

Column 4: Was the Word Said to Someone? – Yes or No, please circle one. (Did your child say this word to themselves or were they saying the word to someone who was with them at the time?)

Column 5: What Was Going On? – Please make a brief note of:

- Where your child was? (home, store, outside)
- Who was present at the time? (other family members? Siblings? Children the same age?)
- What was your child doing? Were they playing with something or using something? If so, what?
- What kind of mood was your child in? Happy? Irritable? Fussy?
- * What do you think you child was trying to say? (What was the message they were trying to get across when using this word?)



APPENDIX E

RECORD FORM

Word (1)	Date Used (2)	Was it an Imitation? Yes/No (3)	Was the Word Said to Someone? Yes/No (4)	Context/Situation: What was going on? (See Attached Instruction Sheet) (5)	Other Comments (6)
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		
		Y N	Y N		

APPENDIX F

IRB APPROVAL
UNIVERSITY of NEW HAMPSHIRE

April 28, 2005

Emily Woodacre
Communication Sciences & Disorders, Hewitt Hall
Durham, NH 03824

IRB #: 3435
Study: A comparison of the first 50 words of typically developing children to the first 50 words of typically developing children exposed to manual communication
Approval Date: 04/27/2005

The Institutional Review Board for the Protection of Human Subjects in Research (IRB) has reviewed the protocol for your study as Expedited as described in Title 45, Code of Federal Regulations (CFR), Part 46, Subsection 110.

Approval is granted to conduct your study as described in your protocol for one year from the approval date above. At the end of the approval date you will be asked to submit a report with regard to the involvement of human subjects in this study. If your study is still active, you may request an extension of IRB approval.

Researchers who conduct studies involving human subjects have responsibilities as outlined in the attached document, *Responsibilities of Directors of Research Studies Involving Human Subjects.* (This document is also available at http://www.unh.edu/osr/compliance/IRB.html.) Please read this document carefully before commencing your work involving human subjects.

If you have questions or concerns about your study or this approval, please feel free to contact me at 603-862-2003 or Julie.simpson@unh.edu. Please refer to the IRB # above in all correspondence related to this study. The IRB wishes you success with your research.

For the IRB,
Julie F. Simpson
Manager

cc: File
Penelope Webster

UNIVERSITY of NEW HAMPSHIRE

April 28, 2005

Emily Woodacre
Communication Sciences & Disorders, Hewitt Hall
Durham, NH 03824

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For the IRB,
Julie F. Simpson
Manager

cc: File
Penelope Webster