WHEN FINGERSPELLING THROWS A CURVEBALL

by

JUDITH ALLEN OLIVER

(Under the Direction of William A. Kretzschmar)

ABSTRACT

Inquiry into Deaf adolescent use of sign language is an understudied subject. The major focus of this research was to provide a linguistic description of fingerspelling used by twelve Deaf teenagers in grades 9 through 12 at a residential school for the Deaf. The aim was to provide an account of how these Deaf adolescents use fingerspelling when it comes to frequency of use, word-class, abbreviations, compounds, lexicalizations, and to examine patterns and variations that appear in adolescent's fingerspelling. There is a great deal of research on acquisition of fingerspelling in early childhood as well as its use in the adult years but there is a limited look at adolescent fingerspelling behavior. In bridging the gap in literature, a sociolinguistic interview was used to gather corpus data, which was analyzed with the aid of the digital tool, ELAN. Using a complex systems framework called The Linguistics of Speech a frequency distribution was carried out and the most frequently produced fingerspellings emerged. Quantitative measures of the distribution of fingerspelled tokens were further expressed visually on the A-curve. The hallmark of this theoretical model is, first, that it has never been used in the study of Sign Language. Second, it considers the individual speaker's agency in use of variants and provides a way to deal with the considerable amount of variation that exists in

fingerspelling. While nouns are the most commonly occurring fingerspellings they are not the most frequent recurring in the language of these adolescents. This study showed that function words are the most frequently repeated fingerspellings by this group of adolescents and that a small set of ten fingerspellings makes up 35 % of the overall fingerspelling corpus. The curveball is that lexicalized forms of grammatical words and verbs more frequently reoccur as compared to a large set of nouns that occur only once.

INDEX WORDS: Fingerspelling, Deaf adolescents, American Sign Language, linguistics of speech

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DEDICATION

To Him, the One who guided me as I wrote each word because He is The Word.

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CHAPTER 1

INTRODUCTION

1.1 WHY DEAF ADOLESCENTS AND FINGERSPELLING? Research has examined differences in the way adolescents use language and has associated language in use with identity and local group norms. Eckert's 1995 study of hearing students in a Detroit area high school uncovered marked differences in vowel production in the speech of 'Jocks' as compared to 'Burnouts'. Norma Mendoza-Denton (2008) explained how differences in the language use of girls in Latina youth gangs were a symbol of identity. Steven Caldas (2006) systematically detailed the process of his own children's identity construction, through adolescence, to the end point of becoming confident French/English bilinguals. Whereas previous studies have examined adolescent language use, the findings are largely limited to the use of spoken language. Inquiry into Deaf adolescent use of sign language is an understudied subject. Even among researchers and linguists who specifically study signed languages the research on Deaf adolescents is meager and little attention has been paid to connections between how adolescents sign and what it says about their perceptions of self.

Another area in which the sign language research is meager is the investigation of fingerspelling. The study of fingerspelling is gaining momentum but it is still limited in quantity. A synopsis of the existing literature gives way to information most commonly associated with adults or very young children. In general, linguistic description of adult

fingerspelling patterns provides evidence that Deaf adults value it and use it in specialized ways. The data also substantiates that Deaf adults make use of fingerspelling with even the youngest of deaf children (Padden 1991) but that, often, hearing parents, teachers, and second language students are intimidated by it. (Gruskin 1998; Wilcox 1992). The acquisition literature lays out the path of Deaf children's fingerspelling development as well as the importance of its connection to reading and writing (Padden 2005). Literature also suggests that fingerspelling facilitates the growth of English vocabulary and improved literacy skills (Haptonstall-Nykoza & Schick 2007; Hile 2008). But what happens on the way from childhood to adulthood? How is fingerspelling being used by adolescents during this period of transition? Clearly, the study of adolescent fingerspelling use has been overlooked and examining the possibility of differences in fingerspelling has been ignored.

Interestingly, a few studies have shown age to be a significant factor in the frequency of fingerspelling use in signed discourse. Padden & Gunsauls (2003) state that younger signers spell more proper nouns than do older signers who fingerspell proper and common nouns equally. Moreover, research has suggested that younger signers incorporate new signs more readily and thus utilize fingerspelling less than older signers do. (Shembri & Johnston 1989; Sutton-Spence, Woll & Allsop 1990; Kelly 1991; Padden & Gunsauls 2003). These same studies have suggested that age differences could be correlated with linguistic conditions such as word class in addition to social conditions that are due to changes in Deaf education policy over time.

The current literature showing age differences confirms the need for more investigation into the role of fingerspelling in the discourse of adolescent signers. As seen

in the studies mentioned above there is some indication that adolescents and young adult signers use fingerspelling in their own way, as compared to older members of Deaf culture, but more research is needed to clearly delineate the differences. Another point in justifying the need for adolescent fingerspelling research is that adolescents are sometimes counted in fingerspelling studies of younger children and at other times counted in studies of adults. To date, little is known about what drives fingerspelling for the Deaf adolescent because rarely is this cohort given the undivided attention and examination in fingerspelling research. It is important to examine what is happening with fingerspelling through the lifespan as Deaf teens move from the childhood norms to the fingerspelling norms of Deaf adults. We cannot say if Deaf adolescents value fingerspelling as a marker of Deaf cultural identity or if they simply use it as a tool to mediate between English and ASL. Taking stock of adolescent fingerspelling may allow insight into how fingerspelling is passed from one generation to the next, how it changes, and how it varies. The lack of research in these areas drives my investigation and confirms the importance of looking carefully at Deaf adolescents' language in use, with a focus on fingerspelling.

The purpose of this study is to provide a linguistic description of adolescent fingerspelling in use. This study will attempt to answer: (1.) How does this group of Deaf adolescents use fingerspelling when it comes to frequency of use, word-class, abbreviations, compounds, lexicalizations, and citation vs. non-citation forms? (2.) How does fingerspelling vary among these adolescents within a community of practice? (3.) What patterns and variations appear in these adolescents' fingerspelling?

1.2 FRAMEWORK. The context for this study is situated in the variationist perspective of sociolinguistics and is grounded in the study of language in use. Furthermore, my analysis follows a complex systems approach consistent with *The Linguistics of Speech* framework presented by Kretzschmar (2009). The central point of this approach is that language behavior, whether speech or signs, exist on a continuum that holds realizations plus all of the possible realizations for any given unit of analysis. Additionally, that the language behavior, speech or signs, is full of variation that emerges due to it being a complex system that is open and active with many collaborative parts. Variations may appear to be chaotic on the surface but, in fact, they can be ordered and predictable when tokens are analyzed through a frequency distribution and then made visible on an A-curve, which is the hallmark of the 'speech as a complex system' model. Use of technology makes this quantitative methodology possible.

1.3 OBJECTIVE. Specifically, the aim of this study focuses on deaf adolescents who use ASL as their primary language. In order to describe fingerspelling I gained access to adolescent vernacular in a school for the Deaf. The self-contained school provides a daily environment where deaf students have consistent access to linguistic, cultural, and social information in their native language. For this reason, it is the chosen research site as compared to a mainstream setting. However, future studies should examine and compare language use of adolescents from a variety of educational placements; mainstreamed environments, day school sites, homeschool, as well as residential.

Observations along with videotaping of sociolinguistic interviews allowed me to gather samples of typical adolescent signing in which fingerspelling is a natural part. The questions for the interview are modeled after Martha A. Sheridan's (2002) work with deaf adolescents, asking the adolescents about their *"lifeworld development."* Lifeworld is similar to 'worldview' but Sheridan defines *lifeworld* as:

> "referring to the individual and collective elements and realities that are present within the participants' existential experiences, their relationships, and their truths. The term includes not only what exists, but also what they see as possible. It includes all elements of the self, their environments, and their relationships. It includes the dynamics of their activities and interactional with both animate and inanimate objects and the context of time and space in their lives" (2002; 4).

Framing the interviews around Sheridan's work stimulated participant-focused language data that is rich and purposeful, full of adolescent stories, real life experiences, and opinions that can be preserved for its historical, linguistic and cultural value for study both now and later much like the projects Roswell Voices (2002) and 20th Century Chicago Deaf Stories (2005). Adolescents in the participant group appeared enthusiastic to share their stories on video that would be archived at their school. Secondly, a fixed format elicitation consisting of a series of twelve pictures served as a further prompt for fingerspelling versus lexical sign choice and the data gathered in this section became a part of the corpus at large.

Through video, essential for sign language research, I gathered language data and applied ELAN (Max Plank Institute for Psycholinguistics) as a digital tool for annotating, manipulating, and storing the data in a machine-readable format. Data was transcribed,

annotated, and quantified by word class, initialization, abbreviation, and fingerspelling type: careful, rapid, and lexicalized. Despite it being a demanding process, technology such as ELAN has opened the way for researchers to use quantitative methodologies like 'speech as a complex system'. Subsequently, my language data can be added to the growing machine-readable signed language corpus accessible to researchers.

In the final analysis, I discovered the fingerspelling of adolescents and adults to be both similar and different. Nouns form the bulk of the corpus but each noun usually occurred only once during discourse. The most frequently occurring fingerspellings identified were lexicalized types made up of function words and verbs. These small words make up between 30%-40% of total fingerspellings in the corpus, which was an unexpected curveball. Overall, the students exhibited fingerspelling less than current statistics show for adults.

1.4 PLAN OF ACTION. This chapter has provided a rationale of why I am engaged in the study of adolescent fingerspelling and an overview of how I carried out this research. Chapter 2 is a sketch of the grammatical organization of American Sign Language and defines fingerspelling for the reader. A comprehensive literature review is laid out in Chapter 3 showing what we know and at the same time revealing the gaps that motivated my current study. The intention of Chapter 4 is to describe my methodology and to give compelling reasons for the framework that I chose followed by a detailed qualitative description of my participant group from a cultural model summarized in Chapter 5. The general quantitative raw data is presented in Chapter 6 but fleshed out in more detail in Chapter 7 with a complete analysis that shows how the data answers my research

questions and throws several curveballs along the way. In closing, Chapter 8 concludes with an overview of a few strengths and weaknesses of this study along with justification for further inquiry and hopes for future research.

1.5 CONCLUSION. In summary, utilizing a complex systems approach I identified and quantified fingerspelling variation in language used by Deaf adolescents. The value of a study such as this demonstrates patterns and idiosyncrasies in fingerspelling used by adolescents in ASL discourse and could provide insight to the role of fingerspelling through the lifespan. Understanding fingerspelling further could not only affect the education of Deaf children, but also second language learners. With this in mind, let us first turn our attention to a more detailed explanation of American Sign Language and the phenomena of fingerspelling.

CHAPTER 2

WHAT IS AMERICAN SIGN LANGUAGE AND FINGERSPELLING?

This chapter opens with a brief introduction of American Sign Language (ASL) and provides the needed framework for further defining and discussing fingerspelling, an integral part of ASL that is the motivation for this study. This section further outlines the historical markers in the evolution of fingerspelling from origins of religious practices to educational settings. Information here serves as a source of background for discussions in the next chapter that present the recent literature related to fingerspelling as an inherent part of ASL.

2.1 SIGN LANGUAGE. Sign Language is a visual-spatial language that uses a wide variety of handshapes distinguished by specific parameters of palm orientation, movement, and location. It is the native language and core of identity for those individuals who claim to be part of Deaf Culture. The popular belief is that sign language is universal but in reality, there are hundreds of uniquely different signed languages used around the world. Each signed language has its own inventory of handshapes, orientations, locations, and movements (Lane, Hoffmeister, & Bahan 1996:79). An example is that American Sign Language does not make any signs in the armpit, but Hong Kong Sign Language does. Some sign systems were invented specifically for educational purposes and follow

English grammar.[2] In contrast, natural sign languages are unique languages with distinct grammars and do not have a direct one to one translation to spoken languages. The similarities and differences between signed languages and spoken languages are not obvious but "what must be recognized is that the signed modality can serve as the primary medium for a set of natural languages." (Wilcox 1992:2).

2.2 GRAMMATICAL ORGANIZATION OF SIGN LANGUAGE. Natural languages, spoken and signed, show grammatical organization. Early impressions were that signs were whole gestures that could not be analyzed because they were void of internal structure (Wilcox 1992). Stokoe (1960) countered the prevailing thought and identified three internal parameters by which signs could be analyzed and contrasted: the placement location (tab), the designated handshape form (dez), and the action or movement (sig). His ideas sparked interest in the study of how ASL was organized at the phonological level. Phonology typically refers to the acoustic aspects of a spoken language. In this paper, I use the term phonology with respect to language structure from which essential building blocks of signs are formed. (Sandler & Lillo-Martin 2006; Brentari 1998; Wilcox 1992; Liddell & Johnson 1982; Stokoe 1965). In 1984, Liddell and Johnson expanded the labels of the "parameters" or articulatory features as handshape, location, orientation, movement, and non-manual markers. 'Handshape' describes the configuration of the articulator in a static position. The articulators play a central role in what the language can and cannot do and how it operates. In sign language the primary articulators include

[2] Invented Sign Languages following English grammar: Manually Coded English (MCE) systems including Signing Exact English (SEE), Linguistics of Visual English (LOVE), Conceptually Accurate Signed English(CASE).

fingers, hand, wrist, forearm, joints, and muscle-tendon groups. Handshape patterns based on the physiology of the articulators are inherently limited to extension, flexion, adduction and abduction (Ann 2006). The signs WHERE and DEAF (Figure 2.1) are both articulated with the index or 1-handshape but differ in other parameters. Location refers to "where the hand is located in relation to the body." (Marentette & Mayberry 2000: 71). The sign WHERE is articulated in neutral space which differs from DEAF which is produced on the cheek.

FIGURE 2.1 Parameter of index handshape

'Orientation' reflects the spatial situation of the palm of the hand. Notice the sign WHERE is orientated forward whereas the hand is oriented inward for DEAF. 'Movement' conveys how the hands move in space. Most signs have a starting point and an ending point perceived as up, down, contralateral, ipsilateral, arc, curved, and oscillation. Internal movement is illustrated in the sign WHERE while DEAF demonstrates a movement path. The final parameter, non-manual markers, imparts grammar using the face, eyes, and body. When the parameters of handshape, location, orientation, and movement are produced in isolation, they are meaningless units but when

combined in unique ways the result produces meaningful signs. Signs can share one or more of these parameters or the parameters can be contrastive (Lucas 2000). Consider the sub lexical structure in the classic example shown in Figure 2.2 from Klima and Bellugi (1979). SUMMER, UGLY, and DRY show the index or 1 handshape is shared in these three signs. The orientation of the palm is downward. The movement is contralateral to ipsilateral.[3]

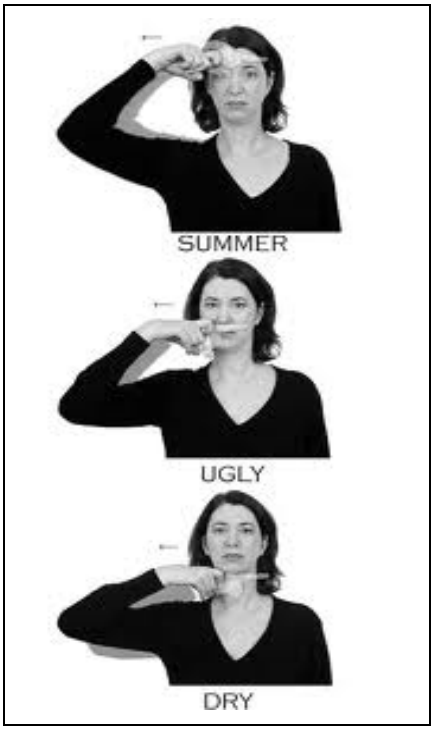

FIGURE 2.2. Minimal pairs for location

SUMMER, UGLY, and DRY share handshape, orientation and movement but they are contrastive in location. The difference in the location parameter encodes the meaning.

[3] These terms used by Battison (2003, revised) note which side of the body is touched when articulating a sign and are more relevant than left and right. Ipsilateral contact refers to the same side as the active hand and contralateral contact refers to the side opposite the active hand.

The signs SHORT and TRAIN in Figure 2.3 are minimal pairs for orientation. They share the same handshape, location, and movement but differ in orientation.

FIGURE 2.3. Minimal Pairs for orientation

Understanding the phonological description of sign language lexicon is fundamental in the study of fingerspelling because fingerspelling like lexical items has an internal phonological structure that can be analyzed. Before explaining more about the functions of fingerspelling and how phonological processes come into play, I will first offer a definition of the linguistic nature of fingerspelling.

2.3 FINGERSPELLING DEFINED. The phenomenon of fingerspelling is the outcome of language contact between sign language, a visual modality, and speech, a spoken modality (Battison 1978). Fingerspelling is a manual alphabet that was initially used in conjunction with sign language by hearing teachers to teach deaf children to read and speak.[4] Not only does it represent acoustic information but it also represents the written form of a particular spoken language. In the United States due to the contact situation

[4] The historical timeline will be discussed in section 2.4 of this chapter.

between American Sign Language (ASL) and English, the expression of fingerspelling occurs in the form of handshapes in a one-to-one signed representation of the 26 characters of the Roman alphabet. Lucas & Valli (1992) make the case that fingerspelling is an outcome of language contact, but not in the sense of borrowing as Battison suggested (1978), or non-native vocabulary that restructures and is absorbed into the sign lexicon Padden and Brentari (2001). Rather, it is that sign language is encountering the orthographic system of English, according to Lucas & Valli.

Fingerspelling has become integrated into many sign language systems across the world. Just as there is an assortment of handshapes to express lexicon, there is also variety in handshapes used to express manual alphabets shown in Figure 2.4. One-handed alphabets are derived from the Spanish handshapes of the 14th century that are still used in Spain, France, USA, Norway, Belgium, Canada, Paraguay, Jamaica, Ghana and various other countries.

Two-handed alphabet systems are used in Britain and British Commonwealth areas including Australia, New Zealand, Scotland, South Africa and parts of India (Carmel 1982; 26). The two-handed alphabet used in Turkey is not a descendent of the British system. The Thai alphabet also uses two hands but each hand serves a different function as compared to the British system. In Thai Sign Language, one hand represents consonants while the other hand is required for expressing tones and vowels (Carmel 1982; 74). Originally, Deaf Indonesians used the British two-handed alphabet, but since 1979, an Asian variety of the one-handed alphabet has had a significant influence on changes in their manual alphabet (Carmel 1982). Egyptian and Iranian manual alphabets read from right to left, as opposed to systems such as American Sign Language that read

from left to right. Deaf communities represent the written form of their particular spoken language with diverse types of fingerspelling. Regardless of the form, manual alphabets have developed diachronically due to the rise of education and literacy.

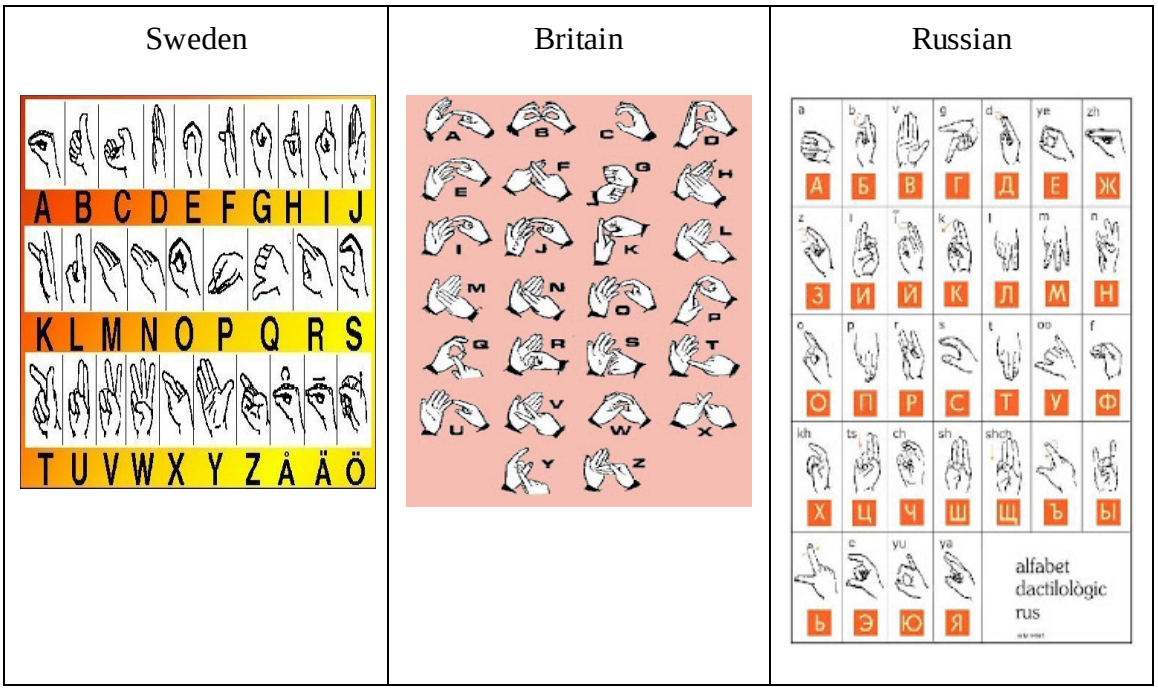

FIGURE 2.4. One-handed and two-handed manual alphabet charts

2.4 HISTORICAL BACKGROUND OF FINGERSPELLING. Historical accounts frequently start with Aristotle, Plato, and Socrates whose one-dimensional viewpoint was that Deaf people did not possess the ability to have a language. Aristotle claimed that intelligence was expressed through spoken language. To him, inability to express ideas through speech indicated a severe absence of reasoning skills and a lack of aptitude. Aristotle's erroneous ideas wronged Deaf people. Because they were deemed inherently unable to think, society did not offer them the opportunity to learn to speak or communicate. (Daniels 1997; 2). Aristotle also claimed that blind people were more capable than Deaf

individuals: “Accordingly, of persons destitute from birth of either sense, the blind are more intelligent than the deaf and dumb” (350 B.C.E.).

Paintings, sculptures, sketches of handshape charts and signs, diaries and chronicles by philosophers, doctors, teachers of the deaf, as well as government records, and writings from deaf people and their family members provide small snapshots into deaf-life of the past. The earliest evidence of organized signing was using the fingers primarily as a hand-sign numbering system. It was a well-known mathematical process called “finger calculus” used by the Romans and Persians. Not only was it an option to written problem solving in school and daily life but also was understood by a wide variety of businessmen of the day who spoke an array of different languages, thus making trade more manageable without a common spoken language. The details of ‘finger calculi were restated in Bede’s Ecclesiastical History, dating from 730. He explained hand numbering through the thousands. He described a few changes from the Roman version but the majority of the symbols remained unchanged. The combination of mental dexterity plus execution of “finger calculus” appears to be a sophisticated method. Bede’s account of handshape use in this context is not evidence for the fingerspelling used by deaf people but it is worthy of mentioning, in that, his manuscript details evidence of an

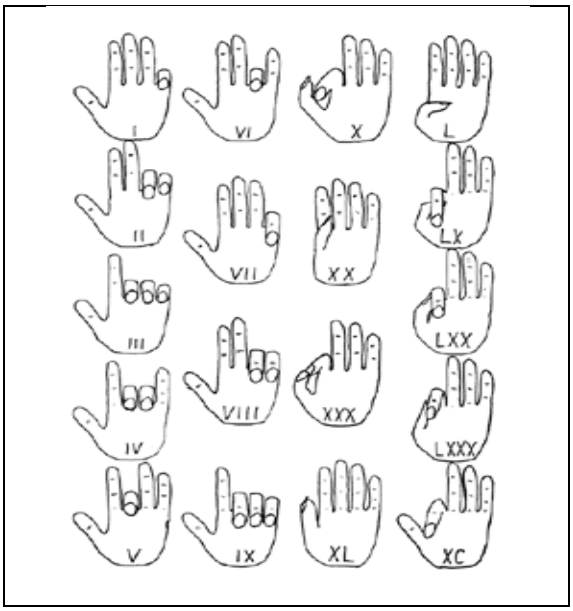

FIGURE 2.5. Bede's Finger Calculus

A different type of sign system was found in medieval monasticism. It was developed for purposes other than mathematical reckoning by a group of hearing people in Anglo-Saxon England. Monks, who needed to communicate without speech, developed handshapes and sign lexicon for use in their religious community. Scott Bruce (2007) details monastic customs found in manuscripts from the Burgundian abbey in Cluny. The culture of the cloistered abbeys promoted reverential silence. Yet, the abbey community owned land, was self-sufficient, powerful and required communication to run its day-to-day operations. Their oath of silence conflicted with their pressing need to carry out daily business (Bruce 2007). Their custom was also to minister to people and they became caretakers of children, the elderly, the sick, and the disabled. In early times, there was no established view on deafness, but by the 11th century (or before) Deaf people had no rights, could not inherit land or possessions, and were burdened with a guardian for most of their lives. Parents often sequestered their deaf children to monastic communities

where they could be tutored, become literate, and learn a trade (2007:173). Deaf children born into nobility needed education and status in order to inherit the family's wealth. Monastic schools where they could learn fingerspelling afforded them education and the legal right to inherit. (Padden & Gunsauls 2003). The commitment to education initiated a critical shift in the utility of the manual alphabet. Fingerspelling repositioned from serving religious purposes to serving educational needs. The earliest Spanish writings of Pedro Ponce de Leon, a Franciscan monk, recorded his teaching of a deaf child of nobility in the fourteenth century. Based on the historical record, it appears that Pedro Ponce began teaching students with gestures that evolved into signs, fingerspelling, writing, and speaking. (Daniels 1997:15). Documentation by Fray Melchor de Yebra, teacher to deaf nobles, explains that he decided to put into practice handshapes representing the letters of the Spanish alphabet for instruction. His writings indicated that he was not the first to employ fingerspelling, as he knew of deaf people who "have learnt the hand alphabet already" (Van Cleve 1989:11). In 1620, Juan Pablo Bonet recorded that he used de Yebra's passed-down alphabet chart to teach a child from another wealthy Spanish family. The one-handed alphabet of the sixteenth century was carried by teachers to various parts of the world for the purpose of starting schools for deaf children. Due to the rise of education and literacy, Deaf people needed access to spoken language and a way to represent it. (Padden & Gunsauls 2003).

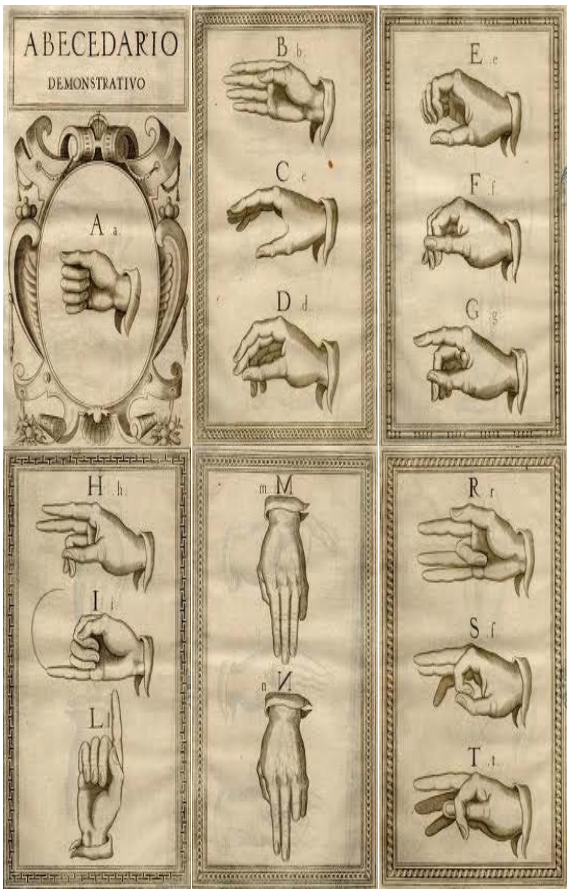

FIGURE 2.6. Bonet's Spanish Alphabet, 1620

George Dalgarno, a teacher in Oxford, developed the two-handed alphabet that diverged from Bonet's. Dalgarno utilized the open palm and designated on it 26 points of location associated with the alphabet. Consonants were on assigned points on the hand other than the fingertips, which represented the vowels. The passive hand served as the base and the dominant hand served as the indicator. In the British Sign Language in use today, the two-handed alphabet differs from Dalgarno's but the vowels remain unchanged on the fingertips.

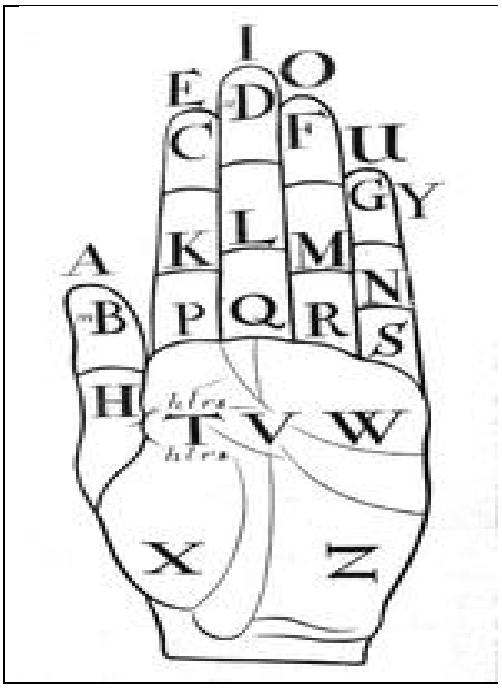

FIGURE 2.7. Dalgarno's fingerspelling model, 1680

The 17th century is the beginning of two divergent paths of manual alphabets: monastic one-handed and Dalgarno's two-handed. Both systems were set into place due to the rise in the interest in deaf education, in particular, the "documented force" of teaching deaf children to speak. Bruce (2007) points out the irony of monastic signs migrating to schools. Fingerspelling that was once used to restrict speech became a tool in deaf education to teach speech. Particularly, as this chapter paper relates to American Sign Language, the one-handed fingerspelling system used in America first made its way from Spain to the National Institute for the Deaf in Paris during the eighteenth century. The school founder, Charles Michael De l'Epee, also had speech as a goal but his primary focus was proficiency of the French language using signs and the manual alphabet. In the nineteenth century, an American minister, Thomas Hopkins Gallaudet, left Connecticut and headed towards Europe in search of the best way to educate deaf

children. After more than a year, he met Laurent Clerc, a deaf teacher from Paris, who was a graduate of De l'Epee's methods. Rev. Gallaudet found Clerc to be knowledgeable and capable as an educator and brought him to America. As the head teacher in the first American school for the Deaf in 1817 Clerc instructed students in his native French sign language and French manual alphabet. From the language situation created by the unification of deaf children at the American Deaf School, a natural sign lexicon and manual alphabet emerged. The manual alphabet used in ASL today remains similar to the French alphabet.

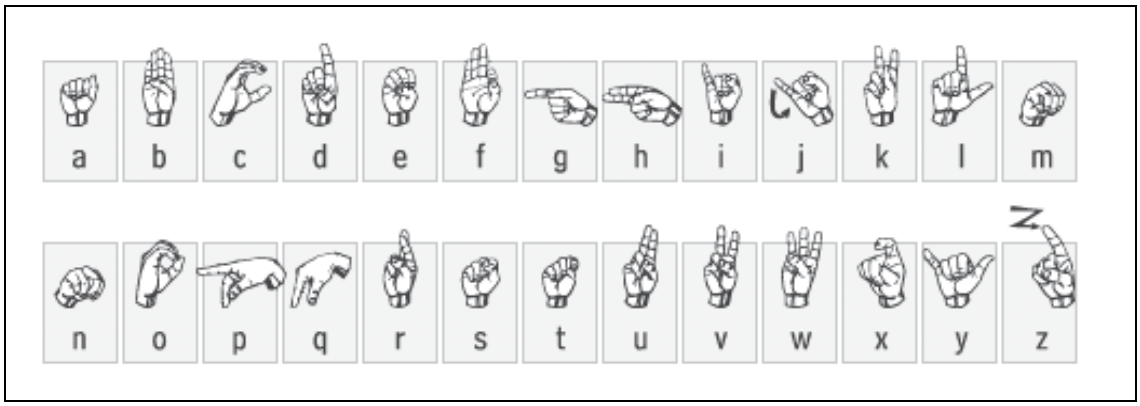

FIGURE 2.8. The American Manual Alphabet

Do Deaf Americans know their history includes the use of a two-handed manual alphabet? It is likely that they do not. Loew, Akamatsu, and Lanaville (2000) wrote an article describing a two-handed fingerspelling system used by Deaf Americans by some even up until 1950. Historical evidence suggests a two-handed American alphabet was probably used regularly in the U.S. before the founding of the deaf school in 1817. This alphabet was most likely a derivative of the British manual alphabet because there were some similarities with the British. However, the vowels were nothing alike. Researchers

suggest that the British immigrants from Martha's Vineyard influenced the two-handed American alphabet and several descriptions of two-handed representations have been reported by trustworthy sources. In the rare materials section of the Gallaudet library I found an archived missionary booklet written in 1923 by the Baptist missionary J.W. Michaels showing a two-handed chart of the "old alphabet" (1923;162). Figure 2.9 shows an example of the two-handed alphabet. The origin of the two-handed American manual alphabet is unclear but it is certain that there was widespread use before contact in schools with the one-handed French alphabet in place today. "Perhaps after French signs and fingerspelling became well established, this alphabet went underground and became a private, in-group code rather than a public means of communication." (Loew, Akamatsu, & Lanaville 2000:257). Discoveries like this one support how little deaf people know about their own history and prove the significance of continued research to further document their story (2000:257).

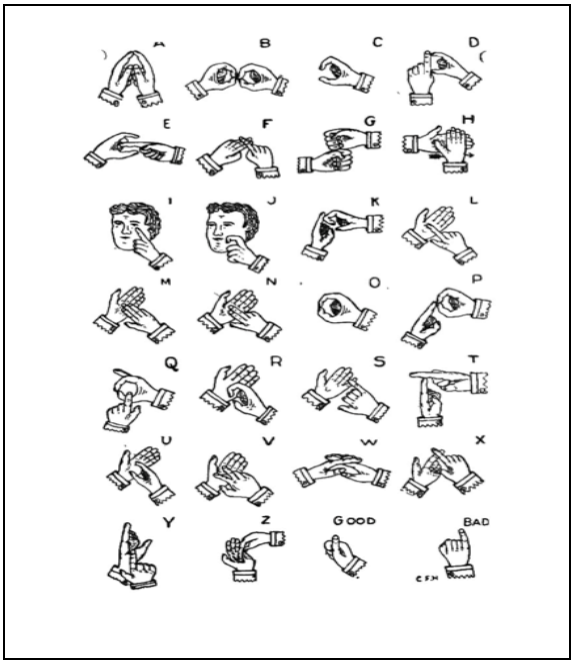

FIGURE 2.9.Two-Handed Alphabet Chart (J.W. Michaels, Missionary to the Deaf, A Handbook of the Sign Language of the Deaf, 1923)

In 1878, the Rochester School for the Deaf implemented a method of deaf education that excluded the use of signs in favor of a one-handed fingerspelling-only approach. All classes were conducted in a combination of fingerspelling and speech. A Canadian instructor from the Ontario Institution, Sylvia Chapin Balis, was a proponent of speech training and fingerspelling method for education. On her visit to the U.S., the first stop was the Rochester School. In her 1895 article "A Visit to Rochester and Mr. Airy", she writes: "Signs have not entirely disappeared from this department but, they are rarely used by the children, who prefer spelling unless they speak to one another. Among the instructors signs are not used. Their example will do much towards abolishing them altogether" (1895: 41). "Now that an edict has been issued practically banishing signs from the school-rooms and requiring spelled-language in its place, the advancement promises to be even greater than heretofore." (1895:42). Today the Rochester Method has vanished but American Sign Language remains strong. (Padden & Gunsauls 2003).

Often when sketching the historical timeline of ASL, we fail to consider the influence of history of the English language. It is understandable to ignore it because the harsh attitudes of English speakers have subjugated ASL and caused it to be devalued. In this chapter I am not referring to 'speech production' when I mention English. I am referring to the language of English, specifically American English. What was the sociopolitical climate towards English during the time that American English developed? A key player was Noah Webster and his Blue Book Speller. It could be that Webster's ideology towards spelling reform in the new America was a motivation for high frequency of fingerspelling use among deaf Americans. Webster was extremely influential in educational institutions in America in 18th and 19th centuries. Webster was

from West Hartford, Connecticut and lived in closed proximity to the American Deaf School. It stands to reason that Rev. Gallaudet, Mr. Clerc, and Dr. Cogswell as leaders of the newly established deaf school in Hartford in 1817 may have applied the cultural norms towards English and the new conventions for American spelling to the course of study for deaf students. Curriculum in the deaf school appears to have been very similar to the education in public schools. "Text books for this language instruction were the same books used in the common schools of the time." (Daniels 1997:59). In a Harper & Brothers 1845 advertisement for Webster's Dictionary, the principal of the American Deaf School, Thomas Gallaudet, posted his statement recommending the new revised edition. "I have no hesitation in saying, that Dr. Webster's English Dictionary is decidedly the best with which I am acquainted." (1845:125)

2.5 SUMMARY. From this historical sketch, we see that sign language is a natural language. Even as it coexists with the spoken language of the majority group, it stands as a separate and unique language with its own grammatical organization. The knowledge gained in this chapter shows that fingerspelling is a manual alphabet and part of the linguistic system we now call sign language. The hand alphabet has been passed down from Spain primarily for teaching children how to express spoken language. American Sign Language used by the members of the Deaf community in the U.S. and Canada employs fingerspelling to express written English but over the years it has come to be absorbed into the linguistic system of ASL. The focus of the next chapter is a synopsis of the recent literature on fingerspelling and explains how signers use fingerspelling for a

variety of functions and in a variety of ways. Chapter 3 digs into what we understand about the phenomenon and what we are yet to discern.

CHAPTER 3

LITERATURE REVIEW

An examination of the current literature draws our attention to what is already realized about the phenomena of fingerspelling used by deaf people. This section begins with an overview of how Deaf children acquire fingerspelling followed by a description of fingerspelling patterns and variations used by Deaf adults. Furthermore, this critical examination will explain a new way to think about language and study variation, which is the crux of my research methodology. Overall, this chapter confirms the need for an investigation on adolescent fingerspelling.

3.1 ACQUISITION. Deaf babies attend early on to visual cues in their environment and gather information from a wider visual range as compared to hearing babies (Marshark 2002). Deaf parents instinctively know this and pay close attention to the visual spatial signing space. They are experts at accommodating the visual needs of their deaf infants and "systematically alter their signing when communicating." (Emmorey 2002:179). They intuitively make eye contact, touch their baby to get attention for communication, and use facial expression for grammar, not only emotion. Deaf parents also fingerspell to their babies long before they can read. Children of deaf parents are exposed to fingerspelling as early as two to five weeks of age (Padden 2006; Erting et al. 2000; Maxwell 1988, Akamatsu 1982). Consistent fingerspelling exposure bolsters

metalinguistic awareness and gives young deaf children practice with processing the "movement envelope" (Akamatsu 1989). A deaf child's first fingerspelling production depends on physiology of the hand and maturation of motor skills. Boyes-Braem (1990) and Sidelecki and Bonvillian (1997) investigated the order of handshape development in young deaf children. Handshape is important because it is the basic parameter of the phonology of sign language. Results of studies on handshape acquisition have generated stages of development from easy to difficult handshapes. Figure 3.1 shows stage one, which pre-linguistic infants are capable of producing. Variants of those already produced in Stage I progress to stage II. Stage III variants are more difficult because they require dexterity of fingers and anatomical maturation of the hand as well as contraction and extension of middle finger, ring finger, and pinky, and Stage IV variants are the last to develop.

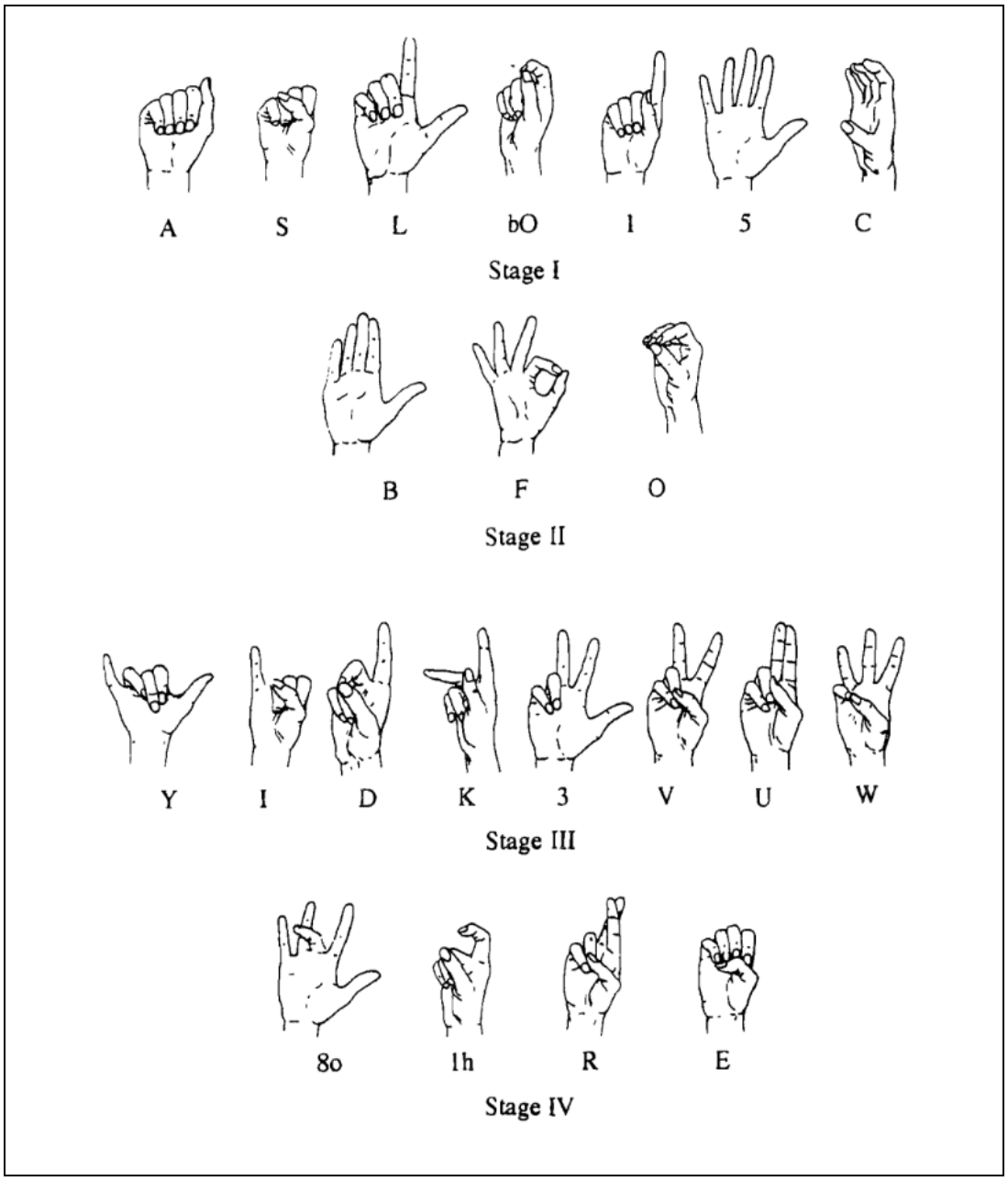

FIGURE 3.1. Stages of acquisition for handshape primes from Marentette and Mayberry (Language Acquisition by Eye, 2000).

Other Milestones- According to Erting, et. al. (2000) deaf babies acquire both ASL and fingerspelling at the same time. The typical path of acquisition for a deaf child of deaf parents shows metalinguistic awareness of fingerspelling developing between 1.5

to 2.3 years. A child imitates fingerspelling between 2.0-2.5 years of age and is able to use initializations (Figure 3.2.) such as such as the T handshape for TOILET (Maxwell 1988).

FIGURE 3.2. Handshape for toilet

The next milestone from 2.0-2.5 years of age is spelling of names (Maxwell 1988; Padden 1991). Young Deaf children typically fingerspell names of friends and family members, as well as other names that appear frequently in daily language, such as pets' names. They also attempt fingerspell common first words like I-C-E, R-I-C-E, B-U-S, and T-O-Y. In the same manner that hearing children attempt to read a book back to their parents after being read to or recognize their name but cannot write it, deaf children make stabs at fingerspelling in daily dialogue. Maxwell (1988) describes sign scribbling around age three. This is the time when the young child attempts to sequence hand configurations. In this way, a child signals their awareness of fingerspelling by producing rapid squiggling finger movements but the shapes are not recognizable as a meaningful unit. It is comparable to scribbling with a pencil in that there are controlled movements but illegible markings (Maxwell 1988; 388). Children focus on the movement of the hand early on but do not discriminate the handshapes. "The salient features of fingerspelled

words are their movement shapes, and the children produce those shapes when they replicate the word." (Padden 2006; 196). Children begin to fingerspell with no hesitation as awareness of handshape sequence emerges between 4.0 to 4.10 years. Fingerspelling of deaf children before entering school basically involves awareness of shapes, knowledge of what types of words are usually fingerspelled, realizing how fingerspelling is used and being able to attach meaning to simple fingerspelled shapes (Padden 2006). Around age five, when children enter school, they began to realize the differences between ASL fingerspelling and English 'spelling' and become more focused on the accuracy of each 'letter' as compared to the shapes.(Padden 1996). Fingerspelling, sign skills, and word memory "increase rapidly between ages 7-15" (Mayberry and Waters 1991:229). The influence of language input is central to the rate at which they develop these skills (Mayberry and Waters 1991).

3.2 LINKS TO PRINT. The role of fingerspelling in the development of bilingualism for deaf children is vital (Padden 1991; Padden 2006; Hirsh-Pasek 1987; Haptonstall-Nykaza & Schick 2007). Deaf parents report that bilingualism in ASL and English is very important to them (Erting, et.al 2000). Deaf parents also have a higher respect and value for reading and writing as compared to speech and lipreading skills (Padden 1991). Padden (2006) explains how deaf children initially acquire fingerspelling as part of the linguistic structure of ASL, not a separate language system. Upon entering school, they internalize a different kind of spelling used for reading and writing and are required to intentionally learn the relationship between fingerspelling and English (Padden 2006). In essence, she confirms that deaf children learn to fingerspell twice. Native users of ASL

apply two functions to fingerspelling. The first function leads to first language proficiency and requires visual literacy of handshapes. The second function is associated with attaching meaning to written print of the second language, in this case, English. Becoming a proficient reader does not, however, depend on speech skills or phonological awareness of speech, as there are many Deaf people that are proficient readers (Hirsh-Pasek, 1987). Padden and Hanson (2000) investigated the reading ability of deaf children through fingerspelling tests. Children were asked to look for a fingerspelled word in an ASL signed sentence. Then the child was asked to write down the fingerspelled word. They found that accuracy in writing the fingerspelling in ASL correlated to literacy in English. For deaf students, an alternative to acoustic cues as a means for decoding the spelling of English words is fingerspelling (Hirsh-Pasek 1987; Haptonstall-Nykaza & Schick 2007). Teaching methodology that utilizes fingerspelling for introducing English words produced better results in reading than traditional word based approach (Haptonstall-Nykaza & Schick 2007).

Classroom Use. Grushkin (1998) reported that parents and teachers were avoiding the use of fingerspelling with deaf children because their perception was that it was more difficult for students to grasp than lexical signs. Furthermore, hearing teachers report their lack of comfort and fluency with it (Gruskin, 1998). Deaf teachers as compared to hearing teachers incorporate fingerspelling into their teaching more readily (Padden and Ramsey 2000). Crume's 2011 study on teacher's perception of phonological awareness points out that the majority of educators in his survey continue to report a lack of exposure to phonological awareness teaching methodologies including fingerspelling in their college preparation programs. Nonetheless, many teachers intuitively know the

importance of fingerspelling with their students and make an effort to include activities that promote phonological awareness.

3.3 RECEPTIVE FINGERSPELLING OF ADULTS. Shape Contours**.** The second language learner of ASL interprets the handshapes of fingerspelling as English 'letters' and receives and expresses them one 'letter' at a time. This approach called neutral fingerspelling (Padden 1991) makes receptive understanding very difficult. Wilcox (1992) calls neutral fingerspelling a 'cipher model' because static handshapes come one after another much like beads on a chain. In other words, the shapes are produced in isolation and are not influenced by the other distinctive features. Wilcox (1992) surveyed thirty college students enrolled in ASL classes at the University of New Mexico and asked them to rate the level of difficulty of twelve tasks in learning ASL. The students ranked receptive fingerspelling as the paramount challenge. The most problematic task was understanding fingerspelling of a Deaf person. The next most demanding task was receptive fingerspelling when signed by a hearing person. The novice signer is not proficient in dealing with the speedy production of fingerspelling and can be intimidated by the shape contours produced. In contrast to second language learners, fluent signers are skillful in perceiving visual patterns of fingerspelling and most remarkably, they are experienced at perceiving the movements between handshapes. Movement in fingerspelling is an expression of the rate, the length of time required to move from one handshape to the other and the effects of co-articulation. According to Wilcox (1992), fluent signers process the information in the transitions between letters instead of solely attending to the static handshapes. In his attempt to describe receptive fingerspelling,

Wilcox used technical instrumentation to measure the duration of transition from handshape to handshape. What the analysis showed is that ¼ duration of a fingerspelled word consists of the actual handshape production while ¾ of the duration was the transition from one sign to another. Fluent signers are more proficient in managing information located visually in the movements from handshape to the next rather than in the actual static 'letter' representations of neutral fingerspelling. Even though deaf adults are quite competent to make use of English orthography and word structure they do not process handshapes in fingerspelling individually but identify fingerspellings as whole units. (Hanson 1981; Hanson 1982; Wilcox 1992).

Co-articulation. Co-articulation, the influence of adjacent handshapes on what precedes and follows it, operates the same as co-articulation of adjacent speech sounds and often results in lexicalized signs with reductions and changes in one or more parameters of handshape, location, orientation or movement. Co-articulation of rapidly executed handshapes produces shape contours when fingerspelling (Padden, 2006). An example of co-articulation in fingerspelling can be seen in the spelling of R-I-V-E-R. The handshapes V and the following R, both two-finger configurations, alter the canonical form of the E handshape. As a result of co-articulation, the canonical form of the sign E made with four bent fingers touching the folded-in thumb systematically changes to a two-finger form shown in Figure 3.3.

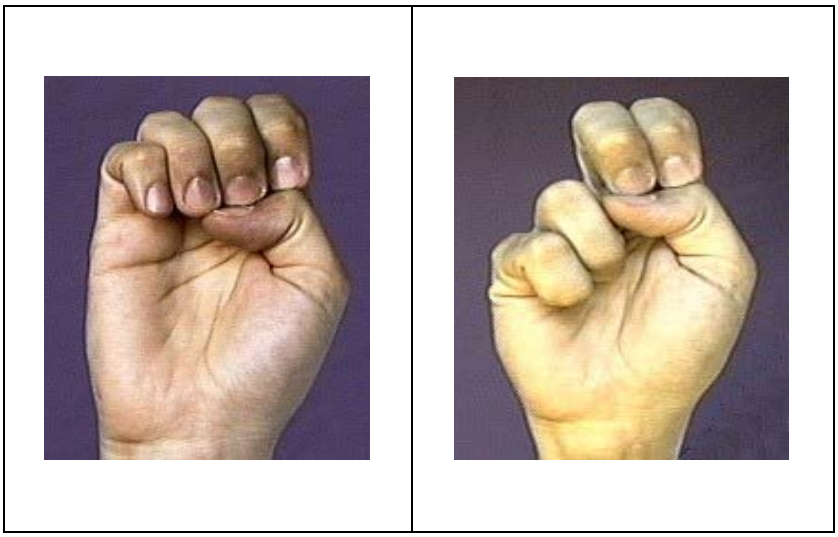

FIGURE 3.3. Canonical forms and variant of the sign E

Shape contours or the "movement envelope" created by the influence of co-articulation is the most prominent characteristic of fingerspelling. The movement envelope is significant because even pre-school deaf children can receptively comprehend fingerspelling forms at the lexical level and they expressively attempt at using it to spell while not having the ability to read and write English. (Akamatsu, 1982, Padden, 1991, Padden, 2006). Observations of young children's competence with fingerspelling suggests an intersection of language systems where fingerspelling plays different roles in spoken languages versus signed languages. Differentiated roles become more obvious when observing differences, in not only comprehension, but also fingerspelling use by fluent users of American Sign Language versus second language users. Wilcox (1992) points out that fingerspelling is shared between two languages and has a variety of functions. He describes fingerspelling as a 'tertiary system'.

3.4 EXPRESSIVE FINGERSPELLING OF DEAF ADULTS: FUNCTION AND USE. Rate. Quinto-Pozos (2010) studied the rate at which fingerspelling was expressed. He asked two native

signers to present a pre-designed ASL narrative to one audience of schoolchildren plus two audiences of deaf adults. The narrative contained 240 fingerspellings of three or less handshapes and 271 longer words of four or more handshapes. Quinto-Pozos noticed that the long words were produced faster than the smaller words with three handshapes regardless of the audience. He also found that while signers can potentially differ in their fluency and speed when spelling in this particular study, they showed similar rates of production to be 7.5 – 8 letters per second.

Function. "A fingerspelled word can never be described as English. Fingerspelling, by its very nature, is an ASL phonological event." (Davis 1989; 97). Overall, fingerspelling performs a complex role for native signers and is used for a much more extensive set of functions than solely spelling words that one does not know (Battison 1978, Lucas, Valli, & Mulrooney 2003; Padden 1998). Fingerspelling is widely used to expand the ASL lexicon in a variety of ways (Brentari & Padden 2001; Lucas & Valli 1991; Battision 1978).

1. Lexicalizations- Within the internal linguistic nature of ASL the most general use of fingerspelling is loan signs or lexicalized spellings (Battison 1978). Fingerspelling becomes lexicalized when static handshapes become restructured and integrated into ASL producing a sign-like form. Restructuring requires changes to the internal phonology of fingerspelling in one or more parameters (handshape, location, orientation, movement). The internal construction of each lexical sign in ASL is constrained by two handshapes and a maximum of two movements (Battison 1978). In other words, the fingerspelling changes its form from the neutral fingerspelling B-U-S to #bus (# represents lexicalizations). In the

lexical form #bus, the orientation changes and movement is added. Restructuring yields a single movement-unit or shape contour. Other examples of lexicalizations are #yes, #high school, #back, #apt, #fix, #hurt, and #would. These signs, once fingerspelled, are now lexical items. "Some of the systematic changes a fingerspelled word undergoes in the process are deletion of handshape letters, dissimilation of handshapes and assimilation of number of fingers involved, location changes, movement additions and orientation changes and semantic restructuring of the signs." (Davis 1989; 96). As a rule, loan signs keep the first and last letter and modify the remaining morphemes. Battison (1978) used the example DOG has become lexicalized by signing the morphemes D and G quickly in sequence while the O is deleted. The folktale about this sign is explained as a visual representation of snapping one's fingers for calling the dog. In linguistic terms, the sign DOG is a lexicalized fingerspelling.

2. Abbreviations- Abbreviations are plentiful in ASL. Fingerspellings such as P-O for post office, O-T for overtime, B-S for bullshit, V-P for Vice-President, BBQ for barbeque, and D-R for doctor are identical to English abbreviations. Other fingerspelled abbreviations do not follow English but prefer ASL ways of doing things. NG (no good) and TB (too bad) are examples. State abbreviations are typically linked to ASL instead of English in such spellings as A-L-A (Alabama), M-I-C-H (Michigan), F-L-A (Florida), and M-I-S-S (Mississippi), A-R-K (Arkansas) (Padden 2005;191). Additionally, there are reduplicated abbreviations, as in G-A-G-A (Georgia) and Louisiana (L-A-L-A) that are different from Los Angeles (L-A).

3. Emphasis- Emphasis is often expressed through fingerspelling expressions such as NO WAY! and WHAT? instead of using the lexical signs. Most ASL dictionaries show a lexical sign for EARLY but for emphatic purposes I fingerspell #EARLY to my son when I stress what time he must wake up. Used in this manner fingerspelling is discourse marker. George Veditz, in the 1913 National Association for the Deaf film, used fingerspelling emphatically to seal his position on the value of preserving American Sign Language by spelling entire sentence and phrases. (Padden 2004).
4. Initializations- The function of initialization demonstrates English interference. Battison (1978) points out the effect of sociolinguistic and political conditions surrounding the use of initialized signs. In 1973 a group of parents and educators came together in order to set up an artificial signing system called Signing Exact English (SEE). This system used a few ASL signs and countless newly invented signs in an exact representation of English vocabulary and grammar. They chose to initialize signs to specify words. Using initialization is a common characteristic of Signing English used in schools so ASL users avoid initializations but these forms have crept into the lexicon since SEE is commonly used in the classrooms. For example, I have noticed that my son and his Deaf friends already prefer the ASL influenced A handshape for TRY instead of the T shape that would follow more closely with English representation routinely used in their middle school. Signing Exact English initializes the months of the year but ASL uses lexicalized fingerspelling for the months. Fossilized initializations in ASL include color words BLUE, GREEN, PURPLE, YELLOW. The days of the week, Monday

through Saturday, are also initialized and family labels such as AUNT, UNCLE, NEPHEW, NIECE, and COUSIN. Other signs that are predictably initialized include name signs for people and cities. Sometimes the application of initialization forms a group of semantically related signs. The ASL lexical sign for the word GROUP is made with symmetrical C shape hands. The use of initializations forms a group of semantically related signs by changing the native C handshape to the F shape for family, O for organization, T for team, G for group. The latest initializations that I have observed are the I handshape at the cheek for I-phone, FB in neutral space for Facebook and V-P for Videophone.

5. Compounds: English contact also creates new signs by compounding forms that already exist. Lexical items combine two signs with reduced movement of the first sign: BOY + SAME = BROTHER, LOOK + STRONG = RESEMBLE, and SLEEP+SUNRISE = OVERSLEEP. Some compound forms contain a lexical sign plus a fingerspelled word: s-u-n-burn and m-a-i-l+box.
6. Grammatical function: Nouns are fingerspelled 75% of the time while verbs are spelled least (Padden, Lucas, Valli, & Mulrooney 2005; Shembri & Johnston 2007). Often fingerspelling shows semantic class. The noun P-I-C-K-U-P truck is fingerspelled as compared to a lexical sign used to communicate the verb, PICK-UP the kids (Brentari & Padden 2001).

3.5 FREQUENCY AND VARIATION OF FINGERSPELLING**.** Sign Language, in the same manner as spoken language, displays variation at all levels but it is constrained by factors at both the linguistic and the social levels (Lucas, et al, 2002). Some words in the English

language are typically fingerspelled because they do not have corresponding ASL signs such as AVOCADO and FOIL. Nevertheless, fingerspelling can still be used even if there is no lexical gap, as "fingerspelling does not exist in place of signs but in fact, it coexists with already existing signs." (Padden 1995). Fingerspelling can be used instead of a lexical sign at any point in signed discourse. This variation reflects personal preference, stylistic intent, or other social or linguistic variables (Davis 1989). Fingerspellings that co-occur with a lexical sign are called a doublet (Lucas & Valli 1992). Some common doublets are FUN and #FUN, WHAT and #WHAT, GO and #GO, YES and #YES.

Beyond the similar linguistic and social variables with spoken language, there are factors considered unique to sign language that condition variation. Age and region are distinctive factors in the study of ASL because "age and region need to be understood specifically within the context of deaf education." (Lucas 2001:109). Lucas, et al, reminds us to pay close attention to the language used in the home of deaf subjects and additional unique variables. Is the signer a native or early learner of ASL before eight years of age? Are the parents deaf or hearing? What was the age of onset of deafness? What type of school attended? "…other factors such as those with whom a person interacts on a daily basis and a person's desire to project a particular identity to others may also play a central role in constraining variation." (Lucas, Bayley, & Valli 2002; 118).

Frequency of Use - How frequently is fingerspelling used? Scholars claim that deaf Americans fingerspell more frequently than deaf people do globally but there is no agreement on the frequency used. Padden (1991) suggested 10% of ASL discourse employed fingerspelling and Sutton-Spence (1994) claimed British Sign Language

contains about 10% fingerspelling. Most recently, Morford and MacFarlane (2003) identified only a 6.4% frequency rate in conversation but Padden & Gunsauls posit that fingerspelling constitutes from12-35% of signed discourse in ASL and that native signers fingerspell more than non-natives (2003:3). Padden and Gunsauls' research examined the differences in frequency of fingerspelling use in first and second language users of ASL. They divided thirty-six subjects into two equal groups: natives and non-natives. The researchers counted the fingerspelled words within a continuous segment of 150 signs and analyzed the frequency of fingerspelling use. Three patterns emerged. First, native signers, as a group, used fingerspelling at 18%, whereas non-native signers fingerspelled at 15%. Second, topic influences frequency. The more technical the topic the more fingerspelling is utilized. Third, education is a significant factor. A higher level of educational attainment yields an increased use of fingerspelling for native signers. Postgraduate native signers demonstrated fingerspelling use at 21% while high-school natives fingerspelled 15% of the time. Among non-native signers, educational level was insignificant.

Lucas points out that age and geographical differences were identified in Blattberg's (1995) study. Adolescent groups of signers (15-25 years) and adult signers (55 years +) from Maryland were compared to similar groups from Massachusetts. Frequency of fingerspelling use was greater by subjects of all ages in Maryland as compared to the subjects in Massachusetts (Lucas 2001; 145). The adolescent groups from both geographical areas fingerspelled differently than the adults who added more movement similar to locative signs. Similarly, Shembri & Johnston (2007) found that the variables of age and geography conditioned Australian fingerspelling frequency. Their

study of 211 subjects between the ages of 15-71 showed that young people fingerspelled less than older people did. Demographics influenced less fingerspelling frequency in regions where the larger groups of young people reside in contrast to more use where larger groups of older people reside. Frequency of fingerspelling based on age possibly reflects changes in Australian deaf education curriculum and policies over time.

Mulrooney (2002) showed gender differences in fingerspelling production. Women tend to utilize more standard forms of handshape, orientation, and movement when fingerspelling and they locate their fingerspelling in closer proximity to their body. In contrast, men commonly produce non-citation forms of fingerspelling and make use of a larger signing space. Mulrooney defined non-citation forms as "any variation away from citation forms" or standard articulation. Variation pertaining to grammatical word class is limited. Of the words fingerspelled during discourse, the most common occurring spellings are nouns followed by adjectives, verbs, function words, and pronouns (Lucas et al 2003, Mulrooney 2002, Padden & Gunsauls 2003, Shembri & Johnston 2007). There is limited research on gender differences between Deaf adolescent boys and girls. Due to the size and structure of my informant group it appears that gender will be a straightforward way to group my participants for analysis.

3.6 APPROACHES FOR STUDYING FINGERSPELLING. What we know about fingerspelling has come to us through variety of research methods that examines video data of signers in face-to-face interactions or in pre-recorded footage. It is obvious that a given requirement in sign language research is that data must be collected and documented in video format. The rise of new technology brings easier ways to now document and save larger

quantities of video data. Recent literature even suggests new ways of using technology to collect sign language data. Studies have used iPhone, web cams, Face Time, video phones, and also virtual surveys on websites with responses collected by Deaf informants uploading their signed answers in video format (Lucas, Mirus, et.al 2013) Along with the new approaches to data collection are new methods of handling larger quantities of language data and thereby being able to analyze more specifically what signers are actually signing. Knowing what deaf people are actually signing is important and, as Lucas, et. al remind us, was even brought up by Croneberg in the 1960s. In the *Dictionary of American Sign Language* (1965), he made a point that often signing is labeled good or bad. He said that in reality what people are actually signing as compared to the so-called "good signing" are usually different things altogether. My research doesn't ask about good versus bad fingerspelling, neither does it ask about systematic rules, but seeks to investigate the exact point made by Croneberg concerning what people are actually signing. The next section gives a brief review of a different approach to identifying what Deaf people, in my case adolescents, are actually fingerspelling and it serves as the basic framework for the analysis of my work.

In *The Linguistics of Speech* (2009), Kretzschmar introduces a methodology for examining variation that looks at an aggregate of speech data. He begins with discussing Saussure's dichotomy of *langue* and *parole*. Langue being language as a system of systematic rules or language structure and static in nature. Parole is explained as language behavior expressed by individual speakers, in other words, speech, or an aggregate of what people actually say. Kretzschmar constantly reminds the reader that both the 'linguistics of structure' and the 'linguistics of speech' are equally important and he calls

our attention to the fact that it is ultimately our choice as to how we prefer to study language. Saussure's focus was the linguistics of linguistic structure and his aim was to make it a science. Kretzschmar outlines Saussure's arguments for making the decision to study linguistic structure instead of linguistics of speech and goes on to say that Saussure's arguments are "all strong points… as the result of a choice (44) and that "Saussure made a definite choice…" (53) and also influenced by his time, "He chose to focus on linguistic structure as a result of that analysis of the available ideas and tools for study." (53). In essence, Kretzschmar asserts, in his book *The Linguistics of Speech*, that the linguist decides which road to travel in getting to the information that he or she wishes to investigate.

What is the 'linguistics of speech'? The basic premise is analyzing speech stems from a complexity science model and seeks to answer the question, "who says what where?" (100). Kretzschmar lists five conditions of speech that characterize it as a complex system. The five conditions are observable and include: (1) speech is open and dynamic, thus not at equilibrium (2) speech includes a very large number of interactive components (3) speech shows emergent order (4) the distribution of units in speech is non-linear (5) speech has the property of scaling (Kretzschmar, 2009:184).

To expound point one above, non-equilibrium is a condition that equates to vitality, change, and massive variation because it is an open system with high energy. This type of energy is needed for speech. In contrast, equilibrium denotes a return to a sense of balance and stability following a burst of energy. A common example is a bobble-head figure when the energy in the side-to-side force dissipates resulting in a natural state of rest and unchanging calm. If a similar state of rest or equilibrium appears

in the complex system of speech it indicates that the language is dead. Kretzschmar cited Stuart Kaufman's statement that "for speech, equilibrium corresponds to death" (185).

Condition two above maintains that speech requires a large number of interactive parts and their interaction provides stamina to the system. I will explain condition two from the viewpoint of sign language, which is the purpose of my research. The components including fingerspelled words and lexical signs are essential parts of the system. The means of articulation necessitates fingers, hands, arms, shoulders, face, eyes, mouth, and eyebrows are also components. Additionally, there are 26 canonical handshapes for fingerspelling and more for lexical signs as well as locations, movements, and orientations of the signs and other units that express word class and a variety of features. When these components interact they result in fingerspelled words or lexical signs. Some of the fingerspellings come to be more frequently used than others but we cannot predict which variants will emerge. It is the random combining and intermingling of the component parts that yields emergent order. Emergent order, which is the third condition above is the byproduct of the arrangement of the interactive parts and reflects the "whole" instead of the individual parts. Kretzschmar calls our attention to Mandelbrot's assertion that emergent order "comes from the operation of chance within the components and their interactions" (2009; 178). What looks like haphazard chaotic interactions "leads to the emergence of non-random distributions, such as clusters or regular patterns without immediately apparent cause" (2009; 179). In other words based on the example of sign language, emergent order demonstrates the unpredictable behavior of the system of fingerspelling, which can be seen in predictable distributions and patterns.

The anticipated non-linear distribution is a distinct characteristic of complex systems and satisfies condition four above in opposition to linear distribution. "Gaussian statistics are linear by nature, so that observed effects are always proportional to their causes" (2009; 179) and appear on a graph as a straight line. Conversely, complex systems, examine exponentially a rank and frequency distribution. When plotted on a graph the distribution appears not as a straight line but as an asymptotic hyperbolic curve. This type of curve "corresponds to a hyperbolic curve of actual values from observations, not a Gaussian straight line for actual values" (2009; 179). Not only does an A-curve show up in complex systems but it emerges at all levels of analysis and displays the property of scaling, which is the fifth condition cited above.

Evidence to support scaling comes from the large-scale survey used for the Linguistic Atlas of the Middle and South Atlantic States (LAMSAS). This model views speech on a continuum and it can be seen "in the frequency of realizations of feature variants" as well as "possible realizations" (185). Using the LAMSAS data, Kretzschmar shows that "the basic unit of analysis for the linguistics of speech is each separate token of a linguistic feature" (88). The tokens were identified, counted, and plotted by frequency of occurrence on a graph. The distribution in all of the LAMSAS data always revealed the same asymptotic curve or A-curve. It also showed a pattern that a small group of variants occurred frequently but the majority of tokens occurred only once. For example, in the instance of examining the variants of *bureau* the frequency distribution when graphed produced an A-curve for LAMSAS overall, as well as in subsamples for South Carolina, Georgia, Florida, New York, and also subsamples of women speakers

(2015; 31). The A-curve lets us see what people are actually saying and can be displayed at all levels of scale.

An exciting element of this research is that, largely due to technological advances, we can now employ new approaches like the 'linguistic of speech' framework to study variation because we can gather and manage large samples of speech or signing and carry out its analysis through digital means. In order to hone in on what fingerspelled tokens and variations exists in adolescent signing I examined the frequency distribution of fingerspelled tokens in my data set through Kretzschmar's model and thereby answered my research questions. I chose to examine fingerspelling as a complex system with massive variation and in the end put forth a description of what these Deaf adolescents are actually fingerspelling.

3.7 CONCLUSION. Fingerspelling exists at the intersection of signed language and spoken language and its origin is an orthographic representation of spoken language for educational purposes. Many sign languages worldwide use some type of fingerspelling with diversity in the handshape inventories. Fingerspelling is used concurrently with the sign lexicon, has an internal structure that can be analyzed, is shared between two languages, and serves a wide variety of functions (Wilcox 1992).

Empirical evidence has identified the typical milestones of fingerspelling acquisition by native deaf children learning to master their first language of signs. The "shape envelope" characterizes the way young deaf children receptively and expressively handle fingerspelling, a distinct task from a reading. Skill in perceiving the "shape envelope" is the foundation for later learning to read and write the second language,

English. Often hearing parents, teachers, and second language learners of ASL are uncomfortable using fingerspelling with young deaf children but new research suggests that, at least in the classroom, teachers instinctively present it in daily learning activities.

Deaf adults in the U.S. use fingerspelling with a high rate of frequency in discourse. Some scholars claim that American Deaf people use fingerspelling more than other Deaf people from other cultures do. Fingerspelling expands the sign lexicon primarily through lexicalizations that adopts the linguistic nature of American Sign Language. Coarticulation of rapidly produced handshapes influences variation in ASL at the phonologic level. Other variables that condition variation in fingerspelling are age, geographical location, education, and gender.

The study of fingerspelling is growing. Current scholarship yields information on history, structure, acquisition, and adult patterns of use and variation, but there is still more to uncover. An obvious lack is that few studies investigate the Deaf adolescent. My research will investigate this understudied population of Deaf teenagers.

To date, few investigations have focused on language use in the adolescent group as a community of practice. Narratives related to Deaf adolescent life give insight into changing patterns in Deaf education (Kluwin & Stinson 1993), family life (Gregory, et.al. 1995), adolescent perspectives on family, school, social life, and hopes for the future (Sheridan 2008; Holcomb 1996). A dearth of sufficient investigation into adolescent language still exists. A handful of studies examine adolescents' use of fingerspelling but only when included as a part of larger groups of mixed ages (Blattberg 1995; Hirsh-Pasek 1987; Shembri & Johnston 2007; Puente, Alvarado, & Herrera 2006). More than a decade ago Grushkin acknowledged concerns about how teenagers use the manual alphabet.

"Although there do not seem to have been any recent studies, there is a general and anecdotal consensus among deaf adults that the current generation of deaf children does not spell as proficiently as a past generation, or even as well as the deaf students of 20 to 30 years ago." (1998: 413). I have personally witnessed a conversation where deaf adults were discussing their concern with teenagers not knowing what to spell or how to use fingerspelling conventions in ASL. My research will pay attention to the Deaf adolescent with the goal of my study to provide a description of adolescent fingerspelling and make comparisons to what has been previously learned about adult fingerspelling. The framework for my study will employ the 'linguistics of speech' methodology that analyzes the non-linear frequency distribution of fingerspelled tokens. The following chapter will explain in detail the methodology supporting my study.

CHAPTER 4

METHODOLOGY

The purpose of this study is to examine variation and patterns in adolescent fingerspelling with the focus on those who use American Sign Language as their primary language. This chapter lays out the research framework and design that was followed throughout my investigation in order to answer my research questions. In like manner, I will give details about the data collection process, justify why I chose to use the ELAN software for analysis of the raw data, clarify how I designed the ELAN template's units of analysis to capture specific details of fingerspelling, and explain the glossing conventions used for transcription and annotation. In closing, I will review the process used for analyzing the language data and explain the limitations of my study.

4.1 RESEARCH SITE. In order to describe fingerspelling, I was able to gain access to adolescent vernacular in a state-funded residential school for the deaf located in the southern part of the United States. This school reflects a rich history of deaf education. The self-contained school community of practice provides a daily environment where deaf students have consistent access to linguistic, cultural, and social information in their native language. For this reason, it is the chosen research site as compared to a mainstream setting where students return home at the end of each day.

The campus is set on 160 acres with many beautiful antebellum buildings. Its history not only includes the founding of a deaf school in 1849, but establishing a course of study for blind students shortly thereafter. In the 1970's, a school for students with additional disabilities along with deafness or blindness was added. Currently, the School for the Deaf, the School for the Blind, and the Academy for sensory multi-disabled students, operate in separate well-defined spaces on the property. According to the high school administrator, students from the three campuses are sometimes cross-programmed based on the IEP team decisions. Students from the three campuses may also attend work based/vocational training classes together as needed.

My study concentrated on students enrolled in the School for the Deaf. This particular campus primarily serves residential students who are transported by bus to live at the school during the week and are returned home each weekend. There is an option for students who live in nearby counties to attend as a local day student. If this is the case, either parents or busses from the local educational agency are required to transport day students each morning and pick them up each afternoon. All deaf students statewide between 3-21 years of age are eligible to attend this residential school. Placement at the residential site is determined after assessment and consensus between parents and professionals as to how to best meet the student's individual needs. The school offers a full academic program of study during the day plus a well-rounded schedule of extra-curricular and after-school activities. The total school enrollment is eighty-eight students. The high school population is thirty-eight students of which eleven are day students and do not live in the dorm.

All faculty, staff, and personnel at this site are required to use ASL. Teachers at this state school hold certifications in deaf education as well as in their particular subject area. Additionally, they are required to demonstrate advanced level proficiency in American Sign Language. There are seven teachers at the high school level with six being Deaf and one being hearing.

4.2 RECRUITING PARTICIPANTS. The first step for recruiting participants was to become visible on the school grounds, as it was essential for me to build familiarity and trust with the students. Three preliminary visits included meetings with school administrators, touring the campus, joining students for lunch, walking the halls, and exploring various parts of campus. During the second visit, an outgoing student approached me in the cafeteria. With friends watching, she began asking my name plus a wide variety of other questions. She discovered that I was hearing, was a former Deaf education teacher, had Deaf friends, was proficient in ASL, and had a deaf son. Chatting with this student facilitated the beginnings of trust and common ground between the other students and me. By the third visit, more students initiated conversation with me in the cafeteria, asking questions about my son and engaging in conversations. Two weeks later, I returned to begin the three-week recruitment process.

Initially, the school principal was instrumental in encouraging students to participate in the study. During the lunch period, a time when the students were normally assembled, the principal officially introduced me to the entire high school student body and the project was presented in American Sign Language. I explained that I was seeking volunteers to take part in a video production about Deaf adolescent life, which consisted

of individual interviews and other segments of random filming around campus during the day, after school and in the evenings. Students would not be given extra credit for participating nor were they required to participate. Interested students were instructed to meet me individually for the full details of participation. Due to the relaxed and casual nature in the cafeteria, and the previously established rapport, over the next few weeks many students approached me with questions. I communicated the project's protocol to them individually in ASL and followed up with giving a written form of the protocol. (see Appendix 1) Potential subjects ages 18-21 reviewed procedures with the researcher and legally signed their own assent forms. Introduction letters, consent forms, and assent forms for minors 17 years of age and younger were sent home with students for parent signatures (Appendix 2). The school administration had agreed to mail consent forms provided by the researcher to parents for granting permission but it was not needed as permissions were returned to the principal in a timely manner and held for me. At the beginning of this project, suppositions led me to believe that video documentation may limit student participation, but in the end, I found this age group enthusiastic and open to sharing their stories on film.

Originally, I had hoped to engage juniors or seniors who had been attending this particular school since age 8 or younger. In consideration of various backgrounds and countless variety of language profiles of deaf students, together with the small size of student population at the school, it was difficult to find enough students who met my initial criteria. Considering this challenge, the final criteria used for participation in this study were: a) high school student; freshman through senior class b) Deaf native (Deaf parents) or have used ASL since age 8 (native-like). Twenty students returned

participation forms, which is a small group yet good considering the small size of students in the overall pool. Because the collective number of juniors and seniors was small, eligible students were placed in order from oldest to youngest and selected randomly from top down. The final group consisted of 7 male and 5 female participants. Table 4.1 describes the demographics. There were three seniors, six juniors, one sophomore, and two freshmen. Subjects were further classified as nine African American, two Latino, and one Caucasian. Eleven participants moved to this school from a mainstreamed public school environment and one moved from nearby residential school in the Southeast due to the father's job transfer. The average age that students transferred into this Deaf residential school was 9.3 years of age. Ten subjects were from hearing families and only two were from Deaf families. The two participants from Deaf families were siblings whose mother was Deaf; one was a junior and the other a freshman. I had no way of knowing that the two students were siblings until further along in the research process. The students from Spanish home language backgrounds reported Spanish as the primary language used in the home and English used outside the home. They also use Spanish Sign Language and ASL. A visual outline of the demographics of my participant group is summarized in Table 4.1. A more detailed qualitative description of my participant group is included in Chapter 5.

TABLE 4.1.The demographic classification of subjects

Subject	*Ethnicity*	*Age*	*Grade*	*Age of enrollment in school*	*Parents hearing status*	*Home communication mode with family*
Boy1	African-American	19	Junior	No information	Hearing	Writing
Boy2	Hispanic	18	Junior	11 from mainstream	Hearing	Sign language Also Spanish & English
Boy3	Hispanic	20	Senior	17 from mainstream	Hearing	Lipreading Spanish. write Spanish & English
Boy4	African-American	19	Junior	8 from mainstream	Hearing	Text, some signing fingerspelling,
Boy5	Caucasian	17	Sophomore	16 from residential, other state	Hearing	Text, fingerspelling
Boy6	African-American	17	Junior	8 from mainstream	Hearing	With hearing aid I talk a little bit
Boy 7	African-American	17	Junior	No information	Hearing	Lipreading
Girl1	African-American	21	Senior	10 from mainstream	Hearing	Sign language
Girl2	African-American	15	Freshman	11 from mainstream	Mom-Deaf	Sign language
Girl3	African-American	17	Senior	7 from mainstream	Hearing	Lipreading, little sign
Girl4	African-American	17	Junior	13 from mainstream	Mom-Deaf	Sign language
Girl5	African-American	16	Freshman	11 from mainstream	Hearing	Lipreading, little fingerspelling

4.3 PRINCIPLED RESEARCH IN THE DEAF COMMUNITY. A key consideration when it comes to ASL research is respect for confidentiality of Deaf participants. Singleton, Jones, and Hanumantha (2014) remind researchers that confidentiality for subjects in video data is problematic due to the visual nature of ASL and the closely integrated social network of Deaf Culture. They point out that it is likely that Deaf participants may be recognized in images when presenting data at research at conferences. For this reason, researchers must be highly conscientious and careful to respect the rights of Deaf subjects. Singleton, Jones, and Hanumantha met with three focus groups from Gallaudet University to discuss research practices with Deaf subjects. The findings concluded that Deaf participants have concerns about confidentiality. They desire more cultural awareness and want more collaboration between Deaf and hearing researchers. For the most part, they distrust hearing researchers who do not have fluency in ASL. As a researcher designing an investigation with Deaf adolescents, I considered the findings of Singleton, Jones, and Hanumantha and incorporated their recommendations for best practices in ASL research in the following ways:

1. Consent was available to the participants in written form and in sign language as requested by the individual student. Information was given them pertaining to the research, how long it was to last, how to contact the researcher for questions or to withdraw from the study at any time, and also information concerning use of their photos for future presentations and articles. Additionally, all consent forms and procedures had been presented to the school administrator, who was Deaf, for review before the investigation began.

2. I incorporated cultural and linguistic awareness by collaborating with a Deaf transcriptionist who coded the data as well as a Deaf individual who served as a video tech.
3. I pledged to make research results available to the school not only through a presentation to staff but also in written form for the school to keep.
4. I also promised to compile edited video footage from interviews, as well as video captured on the school grounds, extra-curricular activities, cafeteria, and other after school experiences will be compiled into a DVD format and given to each participant in addition to the school.

4.4 ADDITIONAL RESEARCH PERSONNEL. Video Crew: Two support personnel assisted the primary researcher, a videographer, and a video-technician. The videographer was a twenty-six year old man who currently runs his own business where he produces commercials, short films, and original projects. He was hearing and did not know ASL. A video technician assisted the videographer with various tasks related to filming, setting the room, setting lighting. The video tech was a Deaf woman who graduated from a residential deaf education environment. She not only comes from a Deaf family of several generations but also has three Deaf children and Deaf grandchildren.

Transcriptionist: It was vital to have a native signer work with the raw data to guarantee accuracy in transcribing and annotating in ELAN thus increasing validity of this project. To assure sound data transcription a Deaf transcriptionist was recruited to work with me. She was a 23-year-old Deaf woman who comes from a Deaf family and is a native user of American Sign Language. She holds a Master's degree in ASL

Linguistics and currently teaches ASL at the post-secondary level. This particular transcriptionist was chosen based on the quality of the reference from a Deaf professor at her graduate program who told of her proficiency in the use of ELAN. She completed five semesters of training in ELAN during her graduate coursework and completed a variety of ELAN projects as a graduate assistant under a professor who regularly uses ELAN in research.

4.5 DATA COLLECTION AND INSTRUMENTS USED. Data was collected via observation and videotaping for the duration of three days during March 2014. The team stayed on campus for the entire duration of the data collection period and was provided on-site accommodations by the school. To ensure that all signing and fingerspelling data during the interviews were clearly captured from different angles two cameras on tripods (Shembri & Johnston 2004) were pre-set in a conference room assigned by the school. A Canon 60D and a Canon t2i were used for videography, as well as proper lighting that was essential for capturing images. For example, the lack of lighting in the school's conference room made it necessary to use one fluorescent soft box coming from the front as a key light and an LED light from the back as a backlight. In addition to filming inside the conference room, the videographer carried a Canon 60D outside to catch scenes around the campus during after-school activities.

Once the research began, the subjects were asked for demographic information including name, grade, age, hearing status, when they began using ASL, parents hearing status, parents signing status, and language(s) used in the home. The research design used two instruments to collect data: an interview and a fixed format elicitation.

The first task was a guided sociolinguistic interview approximately 20-25 minutes in length. The average length video for the boys group was 19 minutes and 64 seconds. The average length of video for the girls group was 19 minutes and 34 seconds. The individual interviews allowed me to gather samples of typical adolescent signing in which fingerspelling is a part.

After filming for three days, the raw data revealed inconsistencies in video length or quality of completed interviews with two male subjects and one female subject. In order to rectify the discrepancy, I returned to the school to re-do three interviews several months later. I was able to interview B5 again and gather 20 minutes of data but B6 was absent. With this in mind, I decided to include his original 7:41 minute interview in my data set but also to add an additional male subject. From the previous signed permission forms, B7 was chosen and present at school on the day of filming. The original female student, whose video quality was in question, was no longer at this school, so it was necessary to add another female student. G5 was chosen based on previously signed parental permission and her availability. The students were interviewed in a classroom instead of the conference room as before. There was no special lighting. One digital consumer quality camera was set up on a tripod and operated by a Deaf assistant. The result of going back and obtaining three video interviews each between 12-18 minutes provided me with twelve interviews of comparable quality and length. B6 and G5, however, did not include the elicitation task.

Upon completion of data collection, the video from both tasks was uploaded onto a hard drive for analysis and given to the transcriptionist. The data from the interviews documented the fingerspelling tokens of deaf adolescents for the purpose of describing

distributional patterns of fingerspelling and comparing findings with current research. The questions for the interview were modeled after Martha A. Sheridan's (2002) work on deaf adolescents but the interviewer also followed cues from the subjects. These types of prompts chronicle the telling of the students' personal stories and real life experiences in their preferred language of signs. The interview was prefaced by the question, *"If you could make a movie or write a book about Deaf teenagers, what would you want to tell them?"* and the following prompts were provided:

1. What would you tell them about family?
2. What would you tell them about school?
3. What would you tell them about your friends and your social life?
4. What would you tell them about social media?
5. What would you tell them interpreters?
6. What would you tell them about communication/language?
7. What would you tell them about perceptions about hearing people and deaf people (how we see each other)?
8. What would you tell them about your future?

Besides the interviews, a fixed format elicitation consisting of a series of picture prompts for fingerspelling was the second condition. Images used in this task were based on an email survey that solicited help in identifying items that Deaf teenagers signed "incorrectly." Specifically, I asked for any signing noticed where Deaf adolescents used a fingerspelling in place of a sign or use a lexical sign rather than fingerspell. Emails were sent to fifteen Deaf adults, and five responses were received. The final list for elicitation task included common nouns and several proper nouns such as names of businesses

(Appendix 3). The final elicitation task was presented in a series of pictures via a Power Point and students were asked to tell me about the pictures. Padden and Gunsauls (2003) maintain that younger signers fingerspell more proper nouns than common nouns. This task examined patterns of my informants' choices between fingerspelling or signing proper nouns, as well as variation.

To supplement my research project the school administration gave permission for filming additional video footage around the school grounds. This part of the video incorporated all residential high school students and documented activities such as track practice, free time in the gym, swimming, and other extra-curricular activities. Extended filming on campus was not included as part of the corpus for analysis but in the hope of becoming acquainted with the culture of the school more fully as well as with the students. Most importantly, I will present the additional video footage to the school for their historical record as well as for use by the school's Public Relations director. Through this gesture, I will be able to give back to the Deaf community as well as to the school.

4.6 ELAN SOFTWARE. Hochgesang defines transcription as "the general act of recording language data which includes notation, while annotation refers specifically to recording phonetic information about language" (2013:1). In order to analyze my raw video data I needed to do both, record exactly what was signed and then annotate the transcription with the specific details about the fingerspelling. I chose ELAN (EUDICO Linguistic Annotator http://tla.mpi.nl/tools/tla-tools/elan/)) developed at Max Planck Institute for Psycholinguistics, Nijmegen, Netherlands, for organizing my data. ELAN was the best

choice for two reasons. First, ELAN is a digital software tool for transcribing and annotating language data. It is a helpful tool for researching sign language because it has the ability to deal with video data. Video files can be synchronized to ELAN files and viewed simultaneously which is essential for sign language. ELAN has capability for merging up to four videos, searching annotations in single and multiple files, and exporting files into various formats. Another feature of ELAN is the ability to view the tiers or units of analysis in numbered in chronological order on the grid (Figure 4.1) or as a whole entity by way of text function (Figure 4.2).

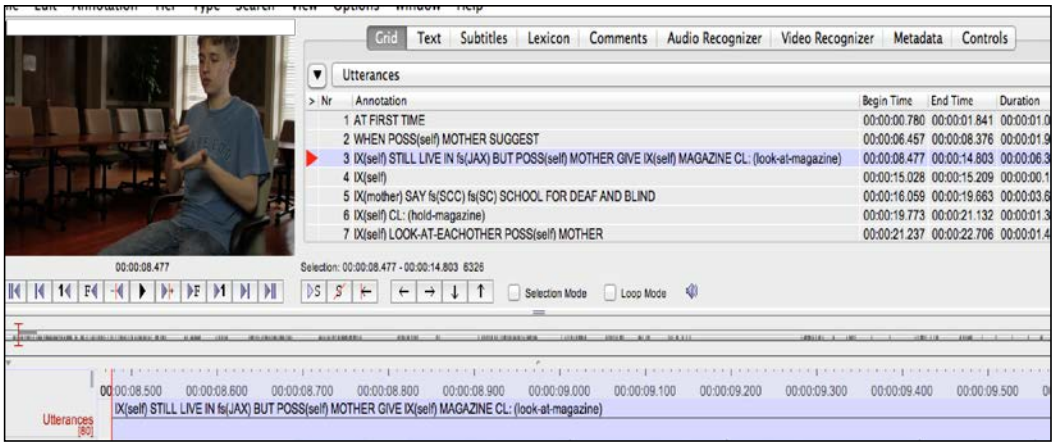

FIGURE 4.1. Utterance tier and annotations listed on the grid

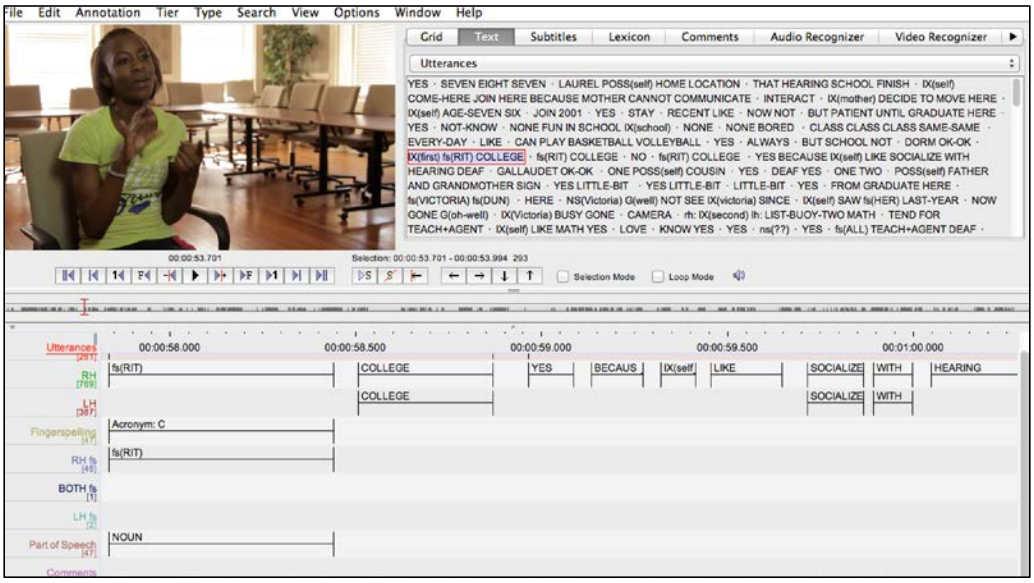

FIGURE 4.2. Annotations in tiers and utterance tier in the text function

Aside from its value as a tool for organizing video data, a second consideration for selecting ELAN is the need for preserving sign language in digital format for use by sign language linguists (Johnson & Crasborn 2006). Johnson and Crasborn point out that archival of language data is good but not good enough because these collections are not freely accessible to researchers and others who study sign languages. The focus they say should be on preserving language in accessible formats for future study. Accessible sign language corpus enables research that more clearly answers questions about sign language, tests the intuitions of native speakers, and follows language change. With software like ELAN, sign language researchers have the means to build a language corpora that are accessible and machine-readable (Johnson and Crasborn 2006). While my corpus is modest, it nevertheless collects naturalistic language data that is worthy of preservation in a standardized format that is usable for myself and other researchers.

Using a tool such as ELAN allows me to organize, analyze, and share my data in a machine- readable format for my current project and for future study.

4.7 TRANSCRIPTION OF DATA. Initially, the corpus data was compressed via handbrake.com, uploaded into Dropbox, and then shared with a transcriptionist who transcribed the raw data. To ensure reliable data transcription the following points were established:

1. Utterance will be defined as a continuous gloss of each sign forming a complete thought. Gloss will note articulator as right hand and/or left hand.
2. Fingerspelling- The second task is to identify and annotate each fingerspelled word - document right hand, left hand or both hands used to form the fingerspelling and code each as careful, rapid, or lexicalized as defined by Patrie and Johnson, 2011. Also, code articulators as right hand, left hand, or both.
3. Parts of Speech- Code each fingerspelling as noun, verb, pronoun, conjunction, adverb, adjective, interjection, or determiner
4. Comments- Document on this tier any questions about fingerspellings such as lack of clarity or other reservations.

Glossing conventions were also established to guarantee correct interpretation of the transcription and annotation between the transcriptionist and myself and are detailed in Table 4.2. Transcription of sign language data is labor intensive and time consuming. The transcriptionist reported that the transcription annotation process required an average of 15 to 20 hours per video and, in the end, it took approximately five months. At the end of the fifth month, the transcriptionist and I met face-to-face for a

rigorous eight days of cross checking the transcriptions and annotations. While there was no calibration or formal measurement of inter-rater reliability, there was an attempt to estimate reliability. For one week, the two of us reviewed eight of the twelve videos that had been completed and there was a high percentage of agreement. An additional three months were required for the transcriptionist to transcribe and annotate the three videos that were redone. All told, the transcription process took eight months.

4.8 UNITS OF ANALYSIS. In order to deal with the raw language data, ELAN requires the user to set up tiers that provide locations for posting the transcriptions and annotations (Figure 4.3). The tiers indicate the units of analysis. ELAN offers unlimited multi-level tiers, but if too many tiers are established, the data can become confusing, disorganized, and complex. It is important to remember to select tiers that represent units of analysis that will answer the research question (Hochgesang 2013). In order to answer my research questions I established nine tiers or units of analysis that I will explain in detail:

(1.) Utterance or GLOSS: ex. POSS (self) NAME FS (Christopher)
(2.) Right Hand utterance
(3.) Left Hand utterance
(4.) Fingerspelling (FS) type: (careful, rapid, lexicalized)
(5.) FS right hand
(6.) FS left hand
(7.) FS both hands
(8.) Word Class (Noun, verb, adjective, adverb, preposition, conjunction, interjection, pronoun, determiner)
(9.) Notes

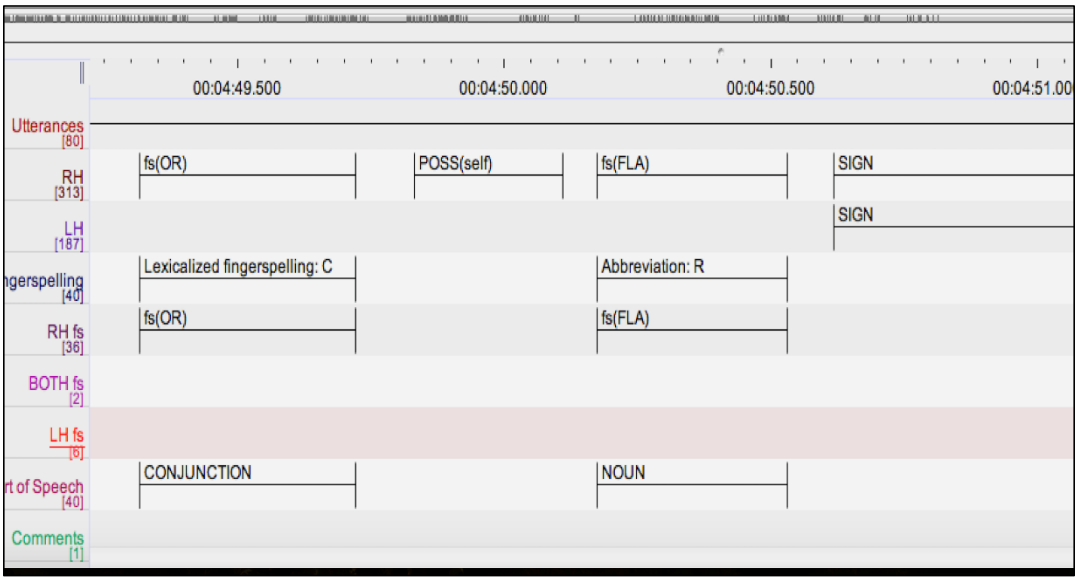

FIGURE 4.3. Nine tiers in ELAN

Utterance: The first three tiers relate to the *'Utterance'* including which hand is used for articulation of the signs. The *'Utterance'* is defined as a group of signs that form a complete thought and the GLOSS creates a transcript of the signed message. The glossing conventions (Table 4.2) used in my research are not standardized but are commonly used in ASL research. These conventions provide information about the signs and are needed to make the transcription understandable. In the example below, Figure 4.4, we notice that there is only one fingerspelling in the utterance. We also see that the signer did not carefully spell out the proper noun but used a *name sign* to represent Victoria, hence, NS(Victoria). The annotation FS(her) denotes the signer fingerspelled the pronoun. Gestures support and accompany lexical signs and as seen in the example 4.6 the student used the gesture 'well', which is coded G(well).

ENGLISH: I haven't seen Victoria since last year. ASL: NS(Victoria) G(well) NOT SEE IX(victoria) SINCE IX(self) SAW FS(her) LAST YEAR.

FIGURE 4.4. Example of a glossed utterance using coding conventions

TABLE 4.2. Glossing conventions

Units of Transcription	*Glossing Convention*	*Example of Gloss*
Fingerspelled terms	FS(fingerspelling)	FS(Julie)
Name signs	NS(name sign)	NS(Julie)
Personal pronouns	IX(referent)	IX(boy)
Possessive pronouns	POSS(referent)	POSS(self)
Reflexive pronouns	SELF(referent)	SELF(man)
Gestures	G(meaning)	G(stop-it)
Lexical signs	Gloss in upper case	BOY, GIRL, etc.
Lexical signs that require more than one English word	Gloss in upper case connected by hyphens	NOT-YET
Classifier signs	CL:handshape (meaning)	CL:1 (person-walking)
Compounds	GLOSS^GLOSS	BOY^FRIEND or FS(pre)^MEDICAL
If two signs are produced at the same time, and if they are produced on the right or left hand	GLOSSrh GLOSSlh	IX(boy)rh BOYlh

The following excerpt shows the "*Utterance* tier" (Figure 4.5). This segment shows that the annotations are time aligned to the video footage. Also note that lexical signs are represented in all caps as listed in the glossing conventions chart (Table 4.2). The *IX(self)* notation represents first person pronoun as compared to the POSS*(self)* pronoun. We also see the fingerspelling of Jacksonville as *fs(Jax)*.

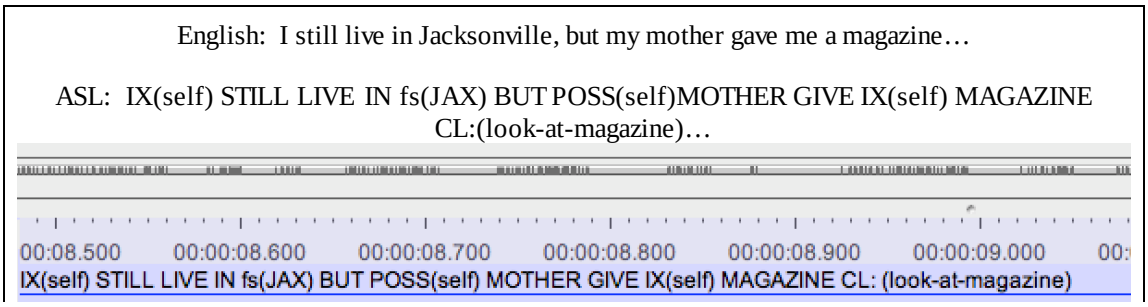

FIGURE 4.5. Segment of *Utterance* tier

Type of Fingerspelling: The remaining six tiers were created with the aim of providing detailed information about fingerspelling. Each fingerspelling token expressed is identified on the tier labeled *'Individual sign'* along with an additional annotation of *'C'* (careful), *'R'*(rapid), or *'L'*(lexicalized) to signify the type of fingerspelling used. "We must recognize there are different kinds of fingerspelling in ASL" (Patrie &Johnson 2011; 57). Patrie and Johnson classify careful and rapid types of fingerspelling in their research. Careful fingerspelling is defined as a first presentation of a fingerspelling token. Wager (2012) correlates careful fingerspelling to clear articulate speech patterns distinguished by less reduction to schwa, well-defined vowel spaces and hyper-articulation. The typical presentation for the careful type is moderately slow and clear with attempts at forming each canonical handshape in even rhythm. Careful fingerspelling, Patrie and Johnson surmise, is a way of priming the receiver for subsequent fingerspelling of the same token.

The subsequent fingerspelling tokens appear more sign-like but they are not fully lexicalized. Patrie and Johnson label this type rapid fingerspelling. Rapid spellings serve as a reminder of which word is being represented from earlier in the discourse and there is "variability among different rapidly fingerspelled presentations of the same word"

(Patrie & Johnson 2011; 95). In rapid fingerspelling, handshape forms are unclear and uneven in rhythm.

Lexicalization is another type of fingerspelling marked by speed and regularity of pattern. According to Patrie and Johnson, "The speed and rhythm represented in these lexicalized signs are decidedly different from those presented in careful or rapid fingerspelling" (2011: 119). Lexicalization is the process whereby structural changes take place over time and the fingerspelling becomes a sign. It is important to realize that lexicalization is commonly seen in fingerspelling (Battison 1978) and "is a gradual process where some fingerspelled signs may be more completely lexicalized than others" (Lucas, Valli, Mulrooney 2000; 67). In my units of analysis I label fingerspellings as lexical if they are composed of two handshapes (Battison, 1978) or if they are still in the process of lexicalization with more than two handshapes (Lucas, Valli, and Mulrooney 2000). Lucas, Valli, and Mulrooney use the example of #NO and #DO as lexicalized but #BACK and #EARLY as still in the process because their form still retains more than two handshapes. There are other descriptive labels such as neutral fingerspelling, full fingerspelling, and nonce fingerspelling. However, for the purpose of my study, I used Patrie and Johnson's three classifications: careful, rapid, and lexicalizations.

Handedness: There is no empirical evidence suggesting that a signer uses one hand over the other to fingerspell during discourse. Prescriptively second language students are taught to use a dominant hand versus a non-dominant. Lucas & Valli point out that both hands can be used for fingerspelling. People may "sign with one hand and fingerspell with the other, either at the same time or alternately during a conversation" (1995; 67). While I am not examining handedness directly, I felt it important to document

handedness for current and future study. *Handedness* occupied the next three tiers and included right hand, left hand, and both hands.

Word Class: The eighth tier was created to examine fingerspelling in relation to *'Parts of Speech'*. The reasoning for this tier is based on previous research explaining that fingerspelling is connected to word class with nouns being most common (Padden & Gunsauls 2003). This tier will identify grammatical classes of fingerspelling tokens in adolescent language.

Notes: *'Notes'* is the last tier was set up to clarify a point when needed or to add a notation of supplementary information that would not fit into another tier, for example, that the fingerspelling was not understandable or that the signer omitted the last two handshapes of a fingerspelled word. Figure 4.6 is a screenshot of a small section of the ELAN template complete with video synchronized to ELAN, the tiers created, and the transcriptions and annotations posted.

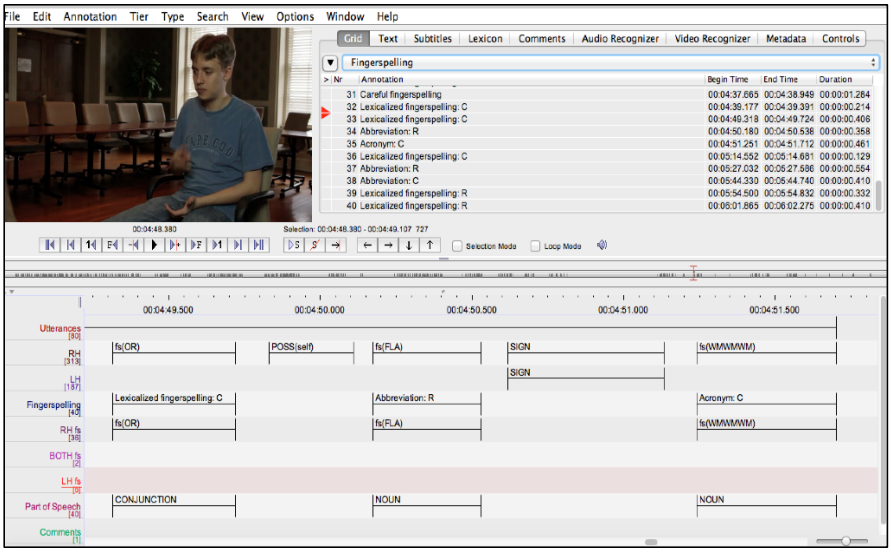

FIGURE 4.6. Video data time-aligned to ELAN with tiers, annotations, and grid

4.9 RESEARCH FRAMEWORK. In the early days of sign language research James Woodward acknowledged variation and commented that "traditional linguistics is not adequate to explain the complex linguistic variation that has been observed in the deaf community" (1972: 198). His work applied sociolinguistic principles to account for variation in sign language by considering social variables. Categories such as age, gender, and race deal with similarities that may be easier to reckon with in comparison to the existing variations that we observe but may not know what to do with. According to Chambers, traditional ways of looking at language ascribe to "the simplifying assumption that data for linguistic analysis must be regularized to eliminate real-world variability" (2003:12). Chambers calls this generality the "axiom of categoricity'. In other words, it has been our tradition as researchers, in an effort to make sense of language, to look at language behavior and order it into what our minds can 'perceive' as categories and regularities that tidy it up. At times, the variation of language can be unsettling, much like curveballs, because irregularities do not fit into a fixed set.

My research does not examine rules and categories in traditional ways but is based on the variationist perspective of sociolinguistics and grounded in the study of language in use. More specifically, I used the model of *The Linguistics of Speech* (Kretzschmar, 2009) to examine fingerspelling as a complex system. "The central assumption of the linguistics of speech is the existence of the linguistic continuum, the continuously variable behavior of individual speakers" (Kretzschmar 2010:62). Furthermore, in fingerspelling I was able to observe and describe the same conditions that typify complex systems. Namely that the frequency distribution of tokens are expressed in a non-linear distribution on any given level of scale.

A great deal of work has been done on variation in ASL over the last fifty years but efforts toward fingerspelling variation remain limited. My study exploits corpus data in conjunction with new technology to fill this gap and supply facts about variation and patterns in adolescent fingerspelling. "Understanding the nature of a language requires an understanding of variation" (Lucas, Bayley, & Valli 2002; 63).

4.10 SPEECH, SIGN, AND MODALITY DEFINED. To understand the nature of sign language we must come to an understanding about its modality. "As anyone familiar with recent linguistic research or even with popular culture must know, there are at least two language modalities, the auditory-vocal modality of spoken languages and the visual-gestural modality of signed languages" (Meier 2004; 1) In *The Linguistic of Speech* Kretzschmar discusses Saussure's description of the circuitry of the speech act and the physiological articulation process of spoken language. For purposes of this research, I am examining the modality of signs albeit through a 'linguistics of speech' framework. Our attention is not focused on the modality as such but on the shared properties of both spoken language and sign language. Signing, unlike speech, requires different physiology for articulation, through the hands and eyes. Other distinctions are that sign language calls for heightened requirements of vision versus audition and the use of motion versus acoustic cues. Even with these differences signed languages and spoken languages share several linguistic properties including similar timelines for acquisition, processing in the left hemisphere, duality of patterning, a broad lexicon expressing parts of speech, and also the use of derivational morphology, compounding and borrowing to add new signs (Meier 2004). Sign languages make up a natural set of languages and its modality should be accepted as

legitimate (Wilcox 1992). The human brain holds the capacity for receptive and expressive language in either modality speech or signs. For these reasons, I chose to use the speech as a complex system framework to show that fingerspelling (in the modality of signs) is also a complex system existing on a continuum and varying by the individual signer.

4.11 ANALYSIS. The initial task of analysis began with qualitatively describing the narratives of my participants in order to acknowledge the diversity of language backgrounds and profiles yet to establish a likeness based on Deaf Culture. The first step required reviewing each interview, from beginning to end, and viewing it more than once. The twelve prompts from the sociolinguistic interview served as natural themes from which I organized students' responses and identified various patterns.

Secondly, and most importantly, I analyzed the quantitative data, which was the primary purpose of my research. Using ELAN, I searched multiple files and exported data in various formats as needed in order to answer my three research questions. The initial overview of the raw data used more traditional ways to gather facts and figures. The first step was to document basic information including the length of each individual interview in minutes and seconds as well as quantify the number of signed and fingerspelled tokens in each corpus.

In order to answer research question #1, " How does this group of Deaf adolescents use fingerspelling when it comes to frequency of use, word-class, abbreviations, compounds, lexicalizations, and citation vs. non-citation forms?", it was first necessary to generate a comprehensive list of the fingerspelled tokens of each informant. Second, I computed the grand total of all signed plus fingerspelled tokens combined for each

informant. From these numbers I calculated the percentage of fingerspelling in discourse of each informant. I also analyzed the tagged annotations for careful, rapid, and lexicalized fingerspelling and generated a token list for each informant by type. The data confirmed that these adolescents incorporate all three types of fingerspelling into their discourse. Additionally, notes were made on handedness, misspellings, abbreviations, and acronyms but were not analyzed quantitatively, I further analyzed grammatical classes of fingerspelled words from each subjects' token list. I calculated tokens by word class first on the individual domain and then compared boys to girls.

To answer question #2, "How does fingerspelling vary among these adolescents within a community of practice?", I presented picture prompts from PowerPoint to elicit language for documenting signer choice and variation. Tokens were analyzed as a lexical sign or as a fingerspelling, and variants were noted. The final tally presented conventional findings, which were followed by a more thorough investigation using the linguistics of speech approach.

In order to answer research question #3, "What patterns and variations appear in the fingerspelling of these adolescents?", the linguistics of speech methodology allowed me to examine patterns and variations through a frequency distribution of fingerspelled tokens. I first established four domains: individual, boys, girls, and total group. Using ELAN I exported tokens by domain, arranged them in descending order of occurrence, and plotted the data on a graph for each domain. All of the graphs for all of the domains exhibited A-curves. With the visual information now in sight I looked at a greater extent to analyze the most frequently occurring tokens. This was done by arranging the top ten most frequently occurring fingerspelling in descending order and compiling a chart

showing their number of occurrences, the word class, the percentage showing the frequency of occurrence out of all fingerspelled tokens and also the cumulative frequency.

The final analysis investigated variation and signer's choice in the use of lexical items versus fingerspelling. I showed picture prompts from a power point to elicit language and document signer choice. Tokens were analyzed as a lexical sign or fingerspelling and variants were noted.

4.12 LIMITATIONS. There were several limitations to this study. Firstly, the labor-intensive nature of video data being transcribed into ELAN is time consuming and detailed especially when there is just one person coding. An additional coder would have facilitated a quicker time frame for completing the task but locating skilled transcribers was the first obstacle. Secondly, the constraints of the school schedule itself were rather rigid. Activities of a typical high school day interrupted some of the filming and shortened the process of data collection. Third, the sample size was small and will not lend itself to generalizations, except to, possibly, that of a similar size and type of adolescent group.

Regardless of these shortcomings, the data at hand provided a creative approach and a new perspective toward adolescent fingerspelling and variation. More research is imperative. Before moving to the quantitative analysis, the next chapter will provide the reader with an insightful description of the typical teenagers in my subject group.

CHAPTER 5

FINDINGS: QUALITATIVE DESCRIPTIONS

5.1 WHO ARE DEAF ADOLESCENTS? The first task in this research project was the sociolinguistic interview in order to access student vernacular. The questions asked informants about family, school, friends, social life, technology, interpreters, communication, and language, hearing and Deaf people, and where the future will lead them. In the process, a vast amount of additional demographic data emerged. This chapter revisits the interview prompts and explores various themes that were revealed in their narratives. Quotes used to illustrate responses by the subjects are translated into written English.[1] While it is not required that I complete a qualitative analysis in detail I am doing so in this chapter on behalf of my subjects, the reader, and information that will benefit the researcher. Deaf adolescent voices are left out of traditional texts, as it is typical for hearing parents, teachers, and other professionals to write about them from their point of view (Sheridan 1991). This chapter offers a space where they can share their own narratives in their own words. The take-away of providing more in-depth demographic information is for the reader to have a more complete and well-rounded description of participants in this population and glimpse the various sociocultural factors that shape the language and identity of adolescents who claim Deaf culture. Similarly, it will remind me, the researcher, to consider how Deaf culture affects the ways that my

[1] The American Sign Language corpus has been transcribed via the ELAN software and is available through the Linguistic Atlas at the University of Georgia.

participants use fingerspelling and ASL and how the results of this study can or cannot generalize to other groups of deaf adolescents. The following discussion is based on the subjects' responses to the prompts used in the sociolinguistic interview.

5.2 PROMPT #1- FAMILY. Asking someone to tell you about their family could generate a variety of replies, most of which may tell where they grew up, the makeup of sibling groups, a description of parents' jobs, or a family memory. For the subjects in this study, the automatic response to the probe '*Tell me about your family'* was relegated to defining the hearing status of family members. Table 5.1, further in this chapter, outlines their responses.

> *My family is all hearing. The only Deaf person in my family is me.*
>
> *My family is all hearing. I'm the only one Deaf and I have no sisters or brothers.*
>
> *I have a hearing family so I have to write on paper for clear communication. I gave my family a sign language book.*

Describing hearing status is more than a label of hearing acuity. More clearly Deaf teens call attention to hearing status as a marker of language and identity. The unanimous response shows the significance of communication to the Deaf family member and the implications of living in a home where language modalities are not shared.

> *My mom is hearing. She can't communicate with me.*
>
> *Home is boring.*
>
> *At home there's nothing to do except maybe read a book.*

> *I prefer to stay in the dorm than to go home. Home makes me bored because there's nothing to do. Maybe watch TV or do homework. I like the dorm because it's fun and I enjoy socializing with friends.*

Nine of the participants in this study come from hearing families. In these households, the Deaf adolescents described how they have taken on the responsibility of fostering communication between their parents, siblings, and themselves. They want interaction with their families, but the consensus of the Deaf teens is that home communication is, on the whole, inadequate. One student explained

> *I'm deaf but my parents and two sisters are all hearing. I'm the only one deaf. They do no signing at all. They tend to forget any signs and fingerspelling. I mostly text to my family. We gesture or just a few signs because I live in the dorm every day and there's not much communication with them- only on the weekends.*

The primary communication mode used in the home by six of the hearing families is speech. For this reason, students said that communication in the home was difficult and gave accounts of texting, writing back and forth, fingerspelling, gesturing, and purchasing ASL books for their families.

> *My parents want to communicate with me but sometimes they struggle with ASL. I try to remind my family to sign but sometimes they forget so I keep reminding them. I'm there but they just start talking.*

> *I hear with my hearing aids and write on paper. I'm trying to teach my family ASL.*

> *I tried to teach my family how to sign but they told me it's hard. That's why I bought an ASL book for my mom. My mom tries to fingerspell but my mom doesn't understand.*

> *I'm bored at home, I live in the country. I try help my family do sign language but my family tells me it's hard.*

Three students reported that their hearing families signed with them.

> *My mom and sister (hearing) have known sign language since I was baby.*
>
> *My mom went to a college and a deaf person taught my mom. My mom interprets for me in church.*
>
> *My family is hearing but my mom learned to sign.*

Two students, sisters, are from a Deaf family where signing is the primary language used between them and their mother. The mother and daughters have a strong bond and the mother serves as a language model. When asked about a particular sign that she was using to express something she replied:

> *I learned that sign from my mom.*

Two of the subjects are Hispanic. They reported that their families speak Spanish in the home and English outside of the home. These two students lip-read both Spanish and English, write Spanish and English, know Spanish sign language (from their home countries), and currently use American Sign Language as their primary mode of communication. One of the subjects clarified it this way:

> *I speak four languages. I can write and lip-read Spanish and I know Spanish signs. Plus, I know English and ASL. It's all hard work.*

In sum, my participants come from all types of family backgrounds but similarly the students describe their families in terms of either hearing or deaf. In other words, they describe their own families as 'the same as me' or 'different from me'. In most cases, the adolescents take on the role for negotiating communication in the home between themselves and their hearing families. While they love their families they reported being

bored at home and looked forward to returning to school each Monday where their friends and teachers share and language and culture. This leads us to the second prompt, *'Tell me about your school'*.

TABLE 5.1. Tell me about your family

Informant	*Family mode of communication with the Deaf family member*
B1	Hearing family uses spoken English and writing to communicate to the Deaf family member
B2	Hearing family uses spoken and written English, ASL, spoken and written Spanish, Spanish signs
B3	Hearing family uses spoken and written English ASL, spoken and written Spanish, Spanish signs
B4	Hearing family uses spoken English and writing
B5	Hearing family uses spoken English and writing
B6	Hearing family uses spoken English and writing
G1	Hearing family uses spoken English and ASL
G2	Deaf mother and sister use ASL primarily and also lip-read spoken English. Other family members are hearing and use spoken English and writing
G3	Hearing family uses spoken English
G4	Deaf mother and sister use ASL primarily and also lip-read spoken English. Other family members are hearing and use spoken English and writing.
G5	Hearing family uses spoken English and writing

5.3 PROMPT #2- SCHOOL. When I inquired with the statement, *"Tell me about your school"*, the narratives generally opened with the story of how they arrived at the school and the situation surrounding it. All of the subjects came to the residential school at different ages (see Table 5.2). Two of the students had been enrolled in a Deaf school in another area and came to this school by way of family relocation. In all cases, the students' answers positioned American Sign Language as the prime impetus for moving from mainstream education to the residential school environment. Similar to the previous section on family, language and communication is of utmost importance in the educational setting for these students. The fact that sign language was the major motivation is not surprising because American Sign Language is the native language used by Deaf people in North America. It is highly valued and carries with it social capital. The result of a common language between teachers and students leads to increased opportunity for socialization as well as unobstructed communication during classroom instruction. This, in turn, overflows into three areas of student life: (a.) quality of education, which I will discuss in this section and (b.) extra-curricular activities that contribute to (c.) friendship networks to be discussed under Prompt #3.

TABLE 5.2 Summary of school information

Informant	*Age entered this residential school*	*From what type of previous placement*	*Reason for school transfer*
B1	No info	No info	No info
B2	11	Deaf school	Better education
B3	17	Mainstream	Better education
B4	8	Mainstream	Better education
B5	16	Deaf Residential School	Father's job transfer Moved from another state
B6	8	Mainstream	Better education
B7	No info	Mainstream	Better education
G1	10	Mainstream	Better education
G2	11	Mainstream	Better education
G3	7	Mainstream	Better education
G4	13	Mainstream	Better education
G5	11	Mainstream	Better education

Quality of education and academic opportunity was extremely important to the participants. They felt inspired at the Deaf school and mentioned that the quality of their education was due to their teachers. In fact, all participants addressed the major influence of teachers. A corporate feeling among the group was appreciation and gratitude for teachers. In explaining specifically what they valued in their teachers the topmost descriptors were words like helps, pushes, advises, and supports. Students reported that they like being challenged to learn by teachers at this school who are native signers or

fluent signers because it affords clear communication in the classroom. They liked that teachers had high expectations for them in contrast to the mainstream experience. According to their narratives, students said that teachers in the Deaf school helped them envision their future by discussing life after high school, laying out options for them to consider, and sharing about their own college experiences. All but one of the teachers in the high school is Deaf and, according to the participant group, "*they understand me*." The teachers at this school appear to be strong role models and are influencing the lives of the participants in this study.

> *My favorite teachers are tough. I like that! We focus on work and classes all day.*
>
> *Deaf teachers understand how I feel.*
>
> *She is a great teacher. Awesome! She helps me pull up my grades. She encourages me.*

As an extension of finding out what they specifically liked at school, I asked students to "*tell me about your favorite class*". It was somewhat surprising that English tallied up as the favorite subject for all but one of the participants who favored Math. Reports from my participants highly favor reading and explain the value and importance they place on English as a second language. They often read at home where there is no one with which to communicate. Social media and captioned movies also encourage them to read.

> *I'm from another country and knew another language. How can I communicate here? I need to know English.*

> *At home I like to read. It helps improve my grammar. I like Miss Murphy books that my teacher told me about. I like tough books.*
>
> *My favorite class is English. I like to read and write.*

Students were straightforward and quick in expressing that they liked school and all but one was positive about the residential placement.

> *I like school. We focus on education. We catch up. We write and have face-to- face discussions. There is much more challenge!*

Based on responses from the subjects in my study, the following Figures (5.1 and 5.2) provide a visual description of their well-rounded educational experience in a Deaf culture residential school versus the mainstream situation from which they came. While this may not be true for all deaf students, the Deaf Cultural school environment offers academics, teachers, friends, and extra-curricular activities sustained by the common language of ASL.

> *We have everything Deaf. We have library books, newspapers, magazines, and computers.*

The mainstreamed educational placement, as reported by the subjects in my study, appeared fragmented with a limited network of friends and extra-curricular activities, for the most part, an education that hinges on an interpreter's proficiency with ASL rather than teacher support.

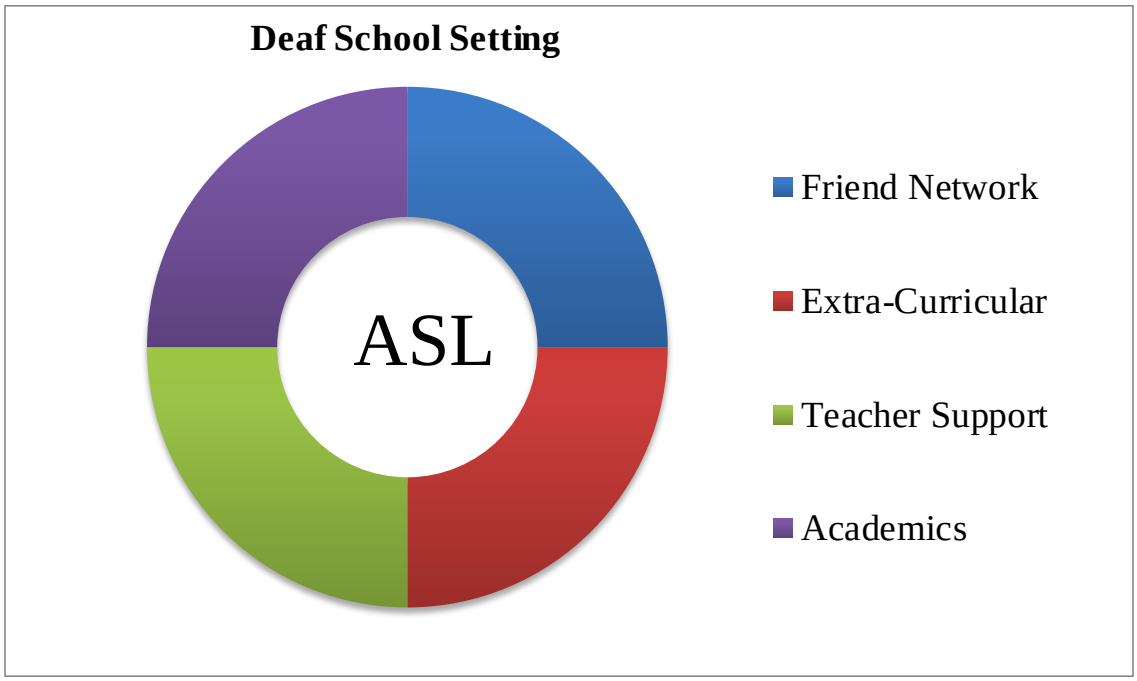

FIGURE 5.1. Access to well-rounded education

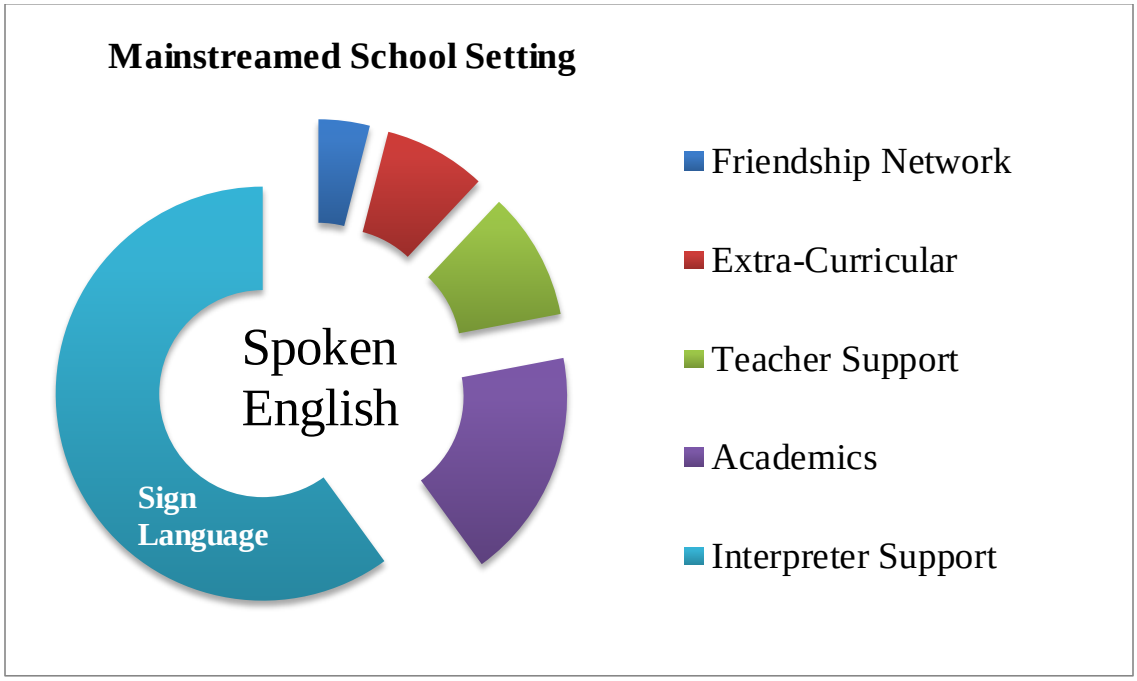

FIGURE 5.2. Fragmented educational placement

5.4 PROMPT #3- FRIENDSHIP NETWORKS AND SOCIAL LIFE. In adolescence, social life involving peer groups is vitally important for continued development of identity and independence and was a theme that emerged in the school section above. Students acknowledged that there is always something to do on campus and always someone to talk with. Several students pointed out that they dislike the turmoil and drama that are common in their peer groups but even when steering clear of it there are plenty of friends to hang out with on a regular basis. They spoke about friends with delight and were happy to have many friends at this school as compared to the mainstream setting. Subjects explained that more friends translate into more fun.

> *I have many friends here. It's fun. We play, have more chatting, and more Deaf support.*
>
> *I needed interpreters to go to the hearing school before. When I got older I came to camp here. At first I observed and visited. On my first visit I met new deaf friends because here always supports Deaf culture.*
>
> *I transferred here in 6th grade. Mom decided that I needed to transfer to this school because of education. An interpreter told my mom about this school. I felt like I didn't want to come here. I said, "I don't want to go! I don't want to go!" I wanted to stay in the hearing school. But now I feel thumbs up' because of friends. We do things. It's fun. We play and have activities and so on. That's what I like!*
>
> *I like here. Deaf girls help me with my make-up, hair, and things like that.*
>
> *I will miss many friends from here when I graduate. I will come back to visit.*

The participant group expressed more chances to build friendships because of inclusion and involvement in all aspects of student life. They portrayed the Deaf school experience as much richer due to access to sports, cheerleading, art, theatre, leadership,

and dorm life. They were also challenged to examine political issues within the Deaf community and take on leadership positions within the school culture.

> *I am involved in the Jr. National Association for the Deaf club and I've had lots of different experiences. It helped me learn more about how to support this school. Groups from all fifty states went to Gallaudet University and I made lots of new friends.*
>
> *Deaf school is better because more communication with Deaf people. In hearing school there is no communication. Here is better. We have more sports, more education, more Deaf awareness, and more Deaf Culture. I'm more happy here than in hearing school.*
>
> *Dorm activities do something better than nothing. After school we do homework, study, watch TV, eat dinner, play games, watch movies, or night activities like basketball, football, soccer, chat with friends.*
>
> *I like it here for socializing and communication. All of the people use sign language. It's fun. We have sports and field trips.*

When I prompted the students with, *"Tell me about your social life"*, the most common point that emerged was that the subjects take pleasure in keeping busy. The participants' definition of *keeping busy* covered a wide range of behaviors. The most popular activity preferred by this group of adolescents was to be involved with school-based sports of all kinds as a team member and as a fan. All but one student discussed involvement with sports. Other mutual interests, common to teens in every culture, were popular movies, video games, TV, family, church, hanging out with friends (both Deaf and hearing), texting, and other forms of social media. All of the students reported having hearing friends and enjoyed spending time with those that made an extra effort to communicate with them. Six of the students discussed their love of reading. Students in this study are very energetic and are well immersed in and knowledgeable of popular culture.

> *I like to read Greek and Egyptian mythology. I like to sleep, do art, and play games like 3DS or Xbox. I like fantasy science fiction movies and also action and comedy. I usually watch Netflix!*
>
> *I like to read. I like the Twilight series and I like Movies.*
>
> *I like Marvel comic books and movies. I like to play X-box 360 and play in Tekkon tournaments.*
>
> *I like Toya Wright's clothing and hairstyle.*

My informants report having a busy social life and support of friends. They appear to be well versed in popular culture and mentioned their use of texting and other forms of technology. I quickly prompted them with *"Tell me about technology"*.

5.5 PROMPT #4- SOCIAL MEDIA. All of the participants were highly active users of social media and keen consumers of technology. The girls reported their use of YouTube for entertainment, to learn how to do things and to watch videos of Deaf people from the USA and other countries.

> *Technology is good for education like when I learned how to braid hair. I looked at a video on You Tube just like hearing people do.*
>
> *I use Facebook, Videophone, and Face Time.*
>
> *…when I'm lazy I text.*

5.6 PROMPT #5- INTERPRETERS. Certified sign language interpreters provide a service of facilitating communication between Deaf individuals that use ASL and hearing individuals that do not know ASL. The main point brought up in response to prompts about interpreters was that the subjects appreciate them, but they prefer to have straight communication with interlocutors.

> *Interpreters are just for emergency and public whatever, etc. Sometimes the interpreter is not very clear and it's confusing. I prefer teachers sign to me straight. It's better than interpreters!*
>
> *The mainstream had interpreters. I understand interpreters but prefer the teacher to sign to me. I prefer Deaf teachers!*

5.7 PROMPT #6 COMMUNICATION AND LANGUAGE. In response to, *"Tell me more about communication"*, all of the participants in this study use both ASL and English consistently in their daily lives. They live in two worlds: Deaf and hearing. Their families realize the importance of ASL and for this reason have chosen to place their children in a Deaf residential education program. However, more than half of their families do not know ASL or even use fingerspelling. As discussed previously, the majority of families use speech only. Deaf adolescents reported that they have come to depend on texting, writing, and gesturing as primary methods of communicating with their family members. They negotiate communication situations in the hearing world endlessly. One students reports having to ask the school for interpreters when his parents come to the school for meetings.

> *I have to remind them when we discuss things here at school that they need to bring in interpreters for my parents.*

5.8 PROMPT #7. PERCEPTIONS ABOUT HEARING AND DEAF PEOPLE. A common perception by the Deaf adolescents was that hearing people think lowly of Deaf people and believe that Deaf people cannot achieve at high levels. They reported having friendships with hearing people who attempted to learn about them, their culture, and language.

> *Deaf can do it no matter what hearing people say.*
>
> *Hearing people do not understand Deaf culture. Deaf people struggle and try interact but it does not work out with hearing people. Some hearing will understand. Deaf people can speak-up, stand up.*

5.9 PROMPT #8- FUTURE. I encouraged the students to chat about their expectations for their lives after high school by saying, *"Tell me about your future. Where do you see yourself in five years?"*

Ten subjects were certain that they will attend college or technical school after high school but two subjects were worried about the financial costs involved. They discussed typical life experiences like high school graduation, attending college, getting jobs, getting married, and having a family. They all want to continue their involvement in the Deaf world after high school. The majority of the subjects want to move away from their hometown and have more life experiences.

When considering their future the main culprit of stress for subjects was the pressure they felt to pass the current state required Math and English high school exit exam. Several students said they were worried about passing the test because it may hinder their acceptance to college. They saw the test as their first hurdle to a successful life after high school and moving on to further education. Overall, students were positive, upbeat, and hopeful about their future and, once again, credit their teachers for helping them see limitless opportunities.

TABLE 5.3."Tell me about your future."

Informant	*Future Aspirations*
B1	Go to college, play football, make parents happy come home live close to family
B2	Go to Gallaudet or Rochester Institute of Technology (RIT) Do not necessarily want to move back to hometown.
B3	College or job depending on money- come back to hometown or move away- it doesn't matter
B4	Go to Gallaudet, RIT, or move away to South West Collegiate Institute for the Deaf.
B5	Technical school. Work for Nascar. Prefer to move away.
B6	No information
B7	Attend Gallaudet and learn more ASL. Family wants me to go college
G1	Attend Gallaudet or community college. Undecided.
G2	Participate in Deaf Olympics. Attend college and be independent.
G3	Graduate high school. Go home and make money then to go to RIT not Gallaudet. I like socializing with hearing and deaf both.
G4	Become a model. Go RIT
G5	Undecided

5.10 SUMMARY. The demographic information turned out to be an expanded presentation on the disposition of my participant group. The informants, typical Deaf adolescents, attend high school at a residential site and fall between the ages of 15-21 for purposes of this study. Their narratives are intricate and layered. Their stories express sociocultural biases called 'audism' (Humphries 1975) that discriminates against those that cannot hear

under the premise that all things 'hearing' are superior. Sociocultural influences manifest in many areas but their education and home life appear to be the focal points. The sociocultural impact led these participants to a residential Deaf school in the first place because mainstream education was not as inclusive for these students as it claimed to be. A lack of communication, lack of friends, and limited access to academics and activities created an inferior educational experience in the mainstream milieu. Sociocultural issues are also evident at home, as they reported that most parents do not sign. This is one of the chief causes of anxiety among the participants. Communication in the home largely takes place through texting or writing and the participants themselves are required to adapt and to take the primary responsibility for negotiating communication at home**.** Their flexibility towards adapting to the hearing world with no mutuality demonstrates their emotional resilience.

In opposition to the influences of the sociocultural climate is the impact of the localized Deaf world (Lane, Hoffmeister & Bahan 1996) into which these participants have become acculturated through the Deaf school. Here they find access through American Sign Language as a "symbol of identity, a medium of social interaction, and a store of cultural knowledge" (Lane, Hoffmeister and Bahan 1996; 67).

This description shows awareness of the various language profiles and backgrounds that exist among my participants and acknowledges that now they have come to identify with Deaf world. Consequently, they use ASL and fingerspelling as their primary language, which is the motivation for my study and the focus of the next two chapters.

CHAPTER 6

HOW DO ADOLESCENTS USE FINGERSPELLING?:

A QUANTITATIVE DESCRIPTION

Adolescents use fingerspelling not as the ABCs of English, but like Deaf adults, as an integral part of American Sign Language. The following discussion will explain the findings in relation to fingerspelling type, word class, and other patterns of variation.

6.1 RESEARCH QUESTION #1. How does this group of Deaf adolescents use fingerspelling when it comes to frequency of use, word-class, abbreviations, compounds, lexicalizations, and citation vs. non-citation forms?. The interviews varied in length due to all sorts of unexpected events that came up for the students during the typical school day. Nonetheless, I was able to collect twelve interviews that ranged from 7 minutes 41 seconds to 29 minutes 39 seconds in length. The average length of the boys' interviews in minutes and seconds was 21:09 and the girls' average was 19:12. Table 6.1 below, displays the total number of tokens of each participant and gives the total length of time for each interview.

TABLE 6.1. Total tokens & length of interview

Subject	*Total tokens*	*Interview length*
B1	25 tokens	11:34 minutes
B2	55 tokens	18:34 minutes
B3	128 tokens	28:17 minutes
B4	37 tokens	12:28 minutes
B5	183 tokens	29:29 minutes
B6	31 tokens	7:41 minutes
B7	87 tokens	18:53 minutes
G1	120 tokens	22:03 minutes
G2	102 tokens	21:11 minutes
G3	129 tokens	16:05 minutes
G4	81 tokens	18:51 minutes
G5	109 tokens	17:52 minutes

6.2 RAW DATA. The corpus of five female subjects was comprised of 6737 tokens with 541 of those being fingerspelled tokens. Conversely, the seven males totaled 7978 tokens with 546 of those being fingerspellings. The Tables 6.2 and 6.3 outline further by individual informant and by gender the total fingerspelled tokens out of the total tokens in the corpus. The chart also breaks down the number of careful, rapid, and lexicalized types of fingerspelling used by each informant. I examine the data by gender because the size of the participant pool restricts grouping in other ways.

6.3 SIGN TYPE. To reiterate, for sake of transparency, there are three types of fingerspelling that I coded in the data transcription. First, careful fingerspelling implies a

fairly slow and clear first presentation of a fingerspelling token in discourse. Rapid indicates a sign-like presentation with irregular cadence in contrast to lexicalized fingerspellings that are quick but rythmic and in the process of structural change on their way to becoming a sign. My data below suggests that females produced more rapid type fingerspellings and the boys group produced more lexicalized fingerspellings but the differences are so slight that they are insignificant. Digital annonations made it easier to compile and retreive fingerspelling data than soley counting and tallying by hand.. Table 6.4 shows a compilation of specific tokens for subject B3 and illustrates how fingerspellings were categorized by type. Careful articulations appear to be largely proper nouns but other nouns are scattered throughout the three various types. Rapid productions are a mix of word class. Lexicalized fingerspellings are weighted towards conjunctions and interjections with some verbs added in.

TABLE 6.2. Girls total fingerpelling tokens by type

Informant	*Careful*	*Rapid*	*Lexicalized*	*Total fingerspelled tokens*	*Total tokens in discourse*	*Percentage of fingerspelling in discourse*
G1	37	44	39	120	1489	8.0%
G2	24	42	36	102	1496	6.8%
G3	30	55	44	129	1209	10.6%
G4	34	28	19	81	1133	7.1%
G5	29	39	41	109	1410	7.7%
Total FS Tokens	154	208	179	541	6737	8.0%

TABLE 6.3. Boys total fingerpelling tokens by type

Informant	*Careful*	*Rapid*	*Lexicalized*	*Total fingerspelled tokens*	*Total tokens in discourse*	*Percentage of fingerspelling in discourse*
B1	11	3	11	25	262	9.5%
B2	10	21	24	55	1048	5.2%
B3	34	46	47	127	2395	5.3%
B4	8	9	20	37	696	5.3%
B5	65	31	87	183	1914	9.5%
B6	9	3	19	31	341	9.9%
B7	27	35	25	87	1322	6.5%
Total FS Tokens	164	148	234	545	7978	6.8%

TABLE 6.4. Individual token list by fingerspelling type: Individual B3

Careful	*Rapid*	*Lexicalized*
1. FAT	1. FLA	1. ALL
2. HIM	2. ASL	2. GO
3. TARGET	3. FLA	3. OF
4. CHRICK	4. FLA	4. ALL
5. S (unknown)	5. FLA	5. IF
6. INC	6. FLA	6. AK (back)
7. L (unknown)	7. U.S.	7. OK
8. AS	8. U.S.	8. ALL
9. ASL	9. U.S.	9. ALL
10. SC	10. ASL	10. OH
11. RED	11. ASL	11. OF
12. ROJO	12. U.S.	12. DO+
13. RED	13. U.S.	13. OR
14. JIVESE	14. U.S.	14. GO
15. CASS	15. ASL	15. DO+
16. CLINTINON	16. MA (unknown)	16. DO+
17. MAY	17. WFC	17. DO+
18. MAY	18. IEP	18. GO

19. PROM	19. MAY	19. GO
20. HER	20. NOV	20. GO
21. GED	21. MARCH	21. SO
22. JEN	22. MARCH	22. GO
23. WMJENNY	23. MAR	23. OR
24. D (unknown)	24. MAR	24. JOB
25. C (unknown)	25. HER	25. OR
26. C----	26. FLA	26. JOB
27. APA	27. GA	27. IF
28. GA	28. PS	28. OR
29. MAPER	29. PS	29. OR
30. MARVEL	30. CO	30. OR
31. MARVEL	31. SC	31. OR
32. TEKKEN	32. SC	32. IF
33. TEKKEN	33. FLA	33. GO
34. XBOX	34. FBFB	34. GO
	35. FB	35. BACK
	36. VP	36. OR
	37. COKE	37. OR
	38. CAKE	38. IF
	39. FBFBFB	39. OR
	40. WN	40. APT
	41. PINK	41. OR
	42. DH	42. OR
	43. IF	43. ALL
	44. GED	44. OFF-(campus)
	45. GED	45. GAS
	46. SC	46. OK
		47. ALL

6.4 MISSPELLED. Some tokens were clearly misspelled based on English spelling conventions. Table 6.5 is not an exhaustive list but shows several examples. We must remember however, that the fingerspelling phenomena is not centered on the spelling rules of English and incorrect spellings did not, for the most part, hinder comprehension of the message. In a spelling of ESPECIBLE the context gave way to meaning as it did for fingerspelling tokens in general.

TABLE 6.5. Incorrect spellings in data

Misspelling	*Intended meaning*
jivise	jueves (Thursday in Spanish)
especible	Eclipse (book title)
mismitphy	Miss Murphy (book title)
hilttohead Islan	Hilton Head Island
nacsar	Nascar
DNMV	DMV (Dept. of Motor Vehicles)
chrick	chick
ar	car
messa	message
chickflil	Chickfila
clintinon	Clinton
inc	inch
nerv	nervous
kecup	ketchup
gaxy	galaxy
luxucy	luxury
welker	walker
frise	frisbe
mytholoy	mythology

6.5 WORD CLASS. Examining fingerspelling by word class is a conventional way to inspect it. We want to know what people are fingerspelling because it may help us define more clearly what fingerspelling is.. In Table 6.6 we see that classifying fingerspelling tokens by word class of male subjects compared to female subjects the data shows nouns,

conjunctions, and verbs to be the top three categories but fingerspelling extends to all word classes. Overall, fingerspelled tokens were predominately nouns. The heavy use of fingerspelled nouns in the corpus by both girls and boys validates previous studies (Padden & LeMaster 1985) and matches previously reported frequencies of fingerspelling. Due to the small pool of subjects, no major generalizations can be made from the data concerning word class.

TABLE 6.6. Fingerspellings by word class and gender

Boys	*Girls*
Nouns 60%	Nouns 66%
Conjunctions 12%	Conjunctions 9%
Verbs 12%	Verbs8%
Adjectives 6%	Interjections 5%
Adverbs 4%	Prepositions 4%
Prepositions2%	Adjectives 3%
Interjections 2%	Pronouns 2%
Exclamations 1%	Adverbs2%
Pronouns 1%	Exclamations <1%

6.6 GENDER. The following discussion considers two individual examples. I have chosen to examine one subject from each gender group. Again, dividing by gender was based on the size of my participant group. Given a larger set of participants, the data could be divided by age, grade, or a number of other subsets. For this discussion, I chose B5 and G3 because they demonstrated the largest quantity of fingerspelling tokens as compared to others in their specific gender groups.

Subject B5 produced 183 tokens and a sketch of his individual fingerspelling is summarized in the graph found in Table 6.1. Tokens consisted of, as we would have predicted, 92 nouns, followed by 30 conjunctions, and 23 verbs. His specific fingerspellings are listed by type in Table 6.8. In a side-by-side comparison of participant B5 against the grouping of all other male participants his fingerspelling data was not out of the ordinary in that he exhibited patterns of sizeable noun production as did all of the males (Table 6.7). Both subject B5, as well as the boys' group, all displayed similar patterns and percentages for nouns, conjunctions, and verbs but idiosyncratic differences in the tokens of B5 are noticeable.

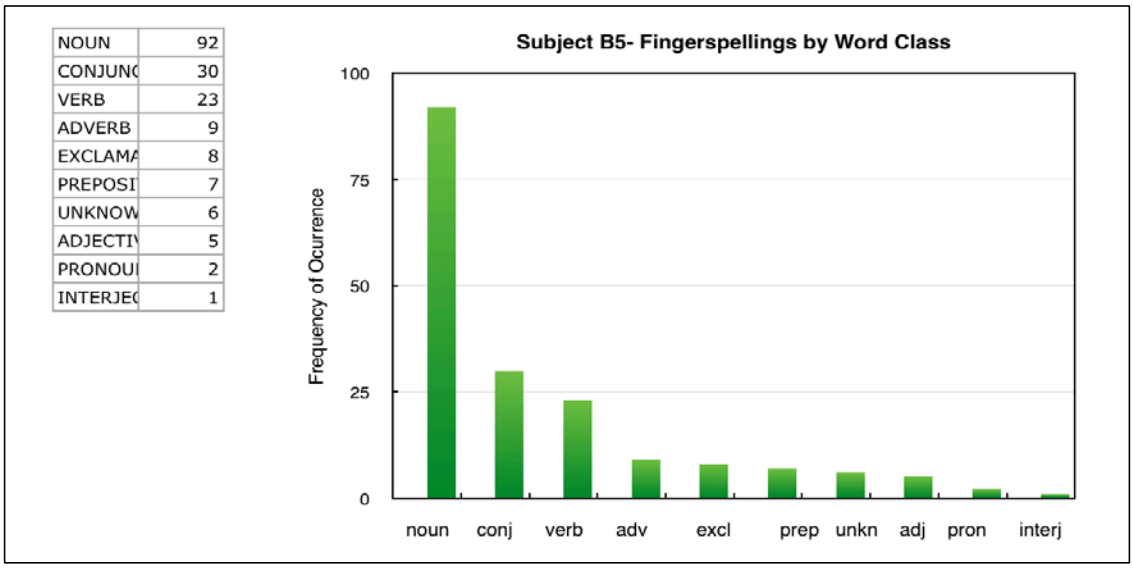

FIGURE 6.1. Subject B5: Fingerspelling tokens according to word class

TABLE 6.7. Fingerspellings by word class. Total boys compared to Subject B5

Boys' sum of fingerspellings by word class	*Subject B5 sum of fingerspellings by word class*
Nouns 60%	Nouns 50.2%
Conjunctions 12%	Conjunctions 16%
Verbs 12%	Verbs 12.5%
Adjectives 6%	Adverbs 4.9%
Adverbs 4%	Exclamations4%
Prepositions2%	Prepositions 3.8%
Interjections 2%	Adjectives2.7%
Exclamations 1%	Pronouns 1%
Pronouns 1%	Interjections.05%

TABLE 6.8. Subject B5: Token list

Careful	*Rapid*	*Lexicalized*
1. JAX- Noun	1. SC- Noun	1. DO-Verb
2. RIORDAN-Noun	2. DID- Verb	2. SO- Conj
3. MYTHOLOGY-Noun	3. SC- Noun	3. GO- Verb
4. SCC-Noun	4. IT- Pro	4. SO-Conj
5. BOCK- Noun	5. FLA- Noun	5. SO-Conj
6. FLA-Noun	6. TV- Noun	6. OR- Conj
7. BA(unknown) ?	7. FLA- Noun	7. AK- Verb (back)
8. GA- Noun	8. FLA- Noun	8. OR-Conj
9. BLACKBERRY-Noun	9. WVN-Noun	9. GO-Verb
10. RIT-Noun	10. FLA-Noun	10. OK
11. C (unknown) ?	11. VA-Noun	11. OH
12. LITERATURE-Noun	12. FLA-Noun	12. AK-Verb
13. C (unknown) ?	13. FLA-Noun	13. OR-Conj
14. TARGET- Noun	14. KECUP-Noun	14. GO-Verb
15. CELL- Noun	15. HS-Noun	15. DO-Verb
16. WMWMWM-Noun	16. SS- Noun	16. DO-Verb
17. VIDEOPHONE-Noun	17. HS-Noun	17. OF-Prep
18. VP- Noun	18. SC-Noun	18. OF-Prep
19. FB- Noun	19. DS-Noun	19. IT-Pro
20. ASL- Noun	20. NETFLIX-Noun	20. OR-Conj
21. AAC- Noun	21. MYTHOLOGY-Noun	21. OF-Prep
22. JAN- Noun	22. SCIFI-Noun	22. a BURN-Noun
23. AAC- Noun	23. ALIEN-Noun	23. PEN- Noun
24. URBAN- Adj	24. ABC- Noun	24. SO-Conj
25. TO- Prep	25. NEWS-Noun	25. (find)OUT-Verb
26. STRAWBERRY-Noun	26. NEWS-Noun	26. GO-Verb
27. UTI- Noun	27. ASL-Noun	27. SO-Conj
28. FL - Noun	28. FLA-Noun	28. GO-Verb
29. TECHNICAL- Adj	29. FLA-Noun	29. NO-Excl
30. DORMAN- Noun	30. NC-Noun	30. NO-
	31. FLA-Noun	31. YES
		32. SO-Conj
		33. SO-Conj
		34. WELL
		35. IF-Conj
		36. OF -Prep
		37. OR-Conj

31. INSTITUTION-Noun 32. OIL- Noun 33. NC- Noun 34. PART- Noun 35. MOORSVILLE -Noun 36. DNMV- Noun 37. ORLANDO- Noun 38. TLC- Noun 39. FLA-Noun 40. TRANSFERS-Verb 41. DAYTONA- Noun *42. P (unknown) ?* *43. Li (unknown) ?* 44. NACSAR- Noun 45. CENTER-Noun 46. MOTO- Noun 47. RALLY- Noun 48. BIR- *(unknown)* 49. PG- (*unknown)* 50. HOT (Noun/name) 51. WHEELS- Noun 52. ASHLEY-Noun 53. IFIOLEK-Noun 54. CAR-Noun 55. ADVENTURE-Noun 56. GEARS-Noun 57. ASHLEY-Noun 58. FIOLEK-Noun 59. RICK-Noun 60. XBOX-Noun 61. HS-Noun 62. DS-Noun *63. P (unknown) ?* 64. SCI- Noun 65. FI- Noun		38. IF-Conj 39. GO-Verb 40. OR-Conj 41. SO-Conj 42. SO-Conj 43. GO-Verb 44. GO-Verb 45. GO-Verb 46. GO-Verb 47. OR-Conj 48. GO-Verb 49. OF-Prep 50. OR- Prep 51. SO-Conj 52. ALL- Pro/det 53. GO-Verb 54. (Find)OUT-Verb 55. TV- Noun 56. TV-Noun 57. NO- 58. SO-Conj 59. ALL-Pro/det 60. WELL 61. NO+ 62. SO-Conj 63. SO-Conj 64. IF-Conj 65. SO-Conj 66. OF-Prep 67. NO 68. SO-CONJ. SO-Conj 69. FRESH-Adj 70. ICE-Noun 71. NO-Excl 72. TV-Noun 73. GO-Verb 74. GO-Verb 75. OWN-Adj 76. DO-Verb

		77. SO-Conj 78. OR-Conj 79. SO-Conj 80. GO-Verb 81. GO-Verb 82. NO-Excl 83. SO-Conj 84. ALL 85. SO-Conj 86. SO-Conj

Subject G3 produced a total of 129 fingerspelled tokens that are listed by type in the chart in Figure 6.2. Her topmost tokens by word class are summarized in Table 6.10 and consisted of 94 nouns and 10 interjections followed by 8 verbs. When comparing G3's fingerspelling by word class to the group of girls all total we see from Table 6.9 that her noun production was greater than the girls' average as was her production of interjections. When comparing the tokens of participant G3 to the grouping of all female subjects it is striking that G3 did not fingerspell adverbs or exclamations. She showed a good deal of idiosyncratic fingerspelling.

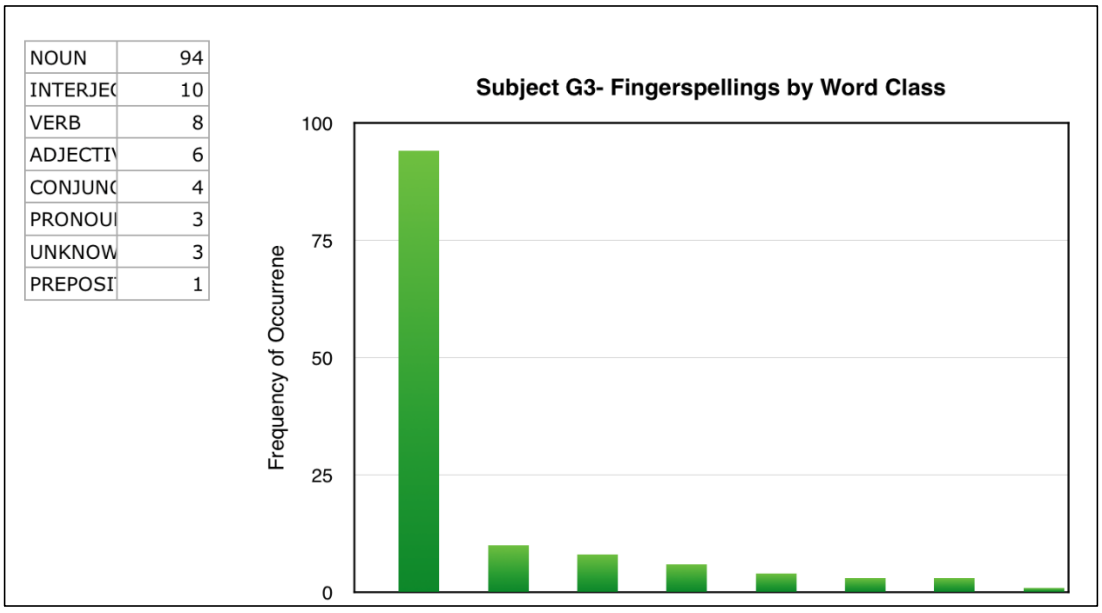

FIGURE 6.2 Subject G3: Fingerspelling tokens according to word class

TABLE 6.9. Fingerspellings by word class. Total girls compared to Subject G3

Girls' sum of fingerspelling by word class	*G3: sum of fingerspellings by word class*
Nouns 66%	Nouns 74%
Conjunctions 9%	Interjections7.8%
Verbs8%	Verbs 6.2%
Interjections 5%	Adjectives 4.7%
Prepositions 4%	Conjunctions 3%
Adjectives 3%	Pronouns2%
Pronouns 2%	Unknown 2%
Adverbs2%	Prepositions <1%
Exclamations <1%	

TABLE 6.10. Subject G3: Token list

Careful	*Rapid*	*Lexicalizations*
1. VICTORIA-Noun	1. RIT-Noun	1. ALL-Adj
2. BECKY-NOUN	2. RIT-Noun	2. OR-Conj
3. SS-Noun	3. RIT-Noun	3. DID-Verb
4. RIT-Noun	4. HER-Pronoun	4. DID-Verb
5. SMITH-Noun	5. RIT-Noun	5. OWN-Adj
6. TLC-Noun	6. RI-Noun	6. BURN-Noun
7. HH-Noun	7. GESTURE-Noun	7. ALL-Adj
8. DEBRA-Noun	8. TO-Prep	8. CAN-Noun
9. DUNN-Noun	9. HSAP-Noun	9. IF-Conj
10. HSAP-Noun	10. NC-Noun	10. APRIL-Noun
11. NC-Noun	11. NC-Noun	11. APRIL-Noun
12. NC-Noun	12. NC-Noun	12. IF-Conj
13. CHARLOTT-Noun	13. LAUREL-Noun	13. ALL-Adj
14. NC-Noun	14. CHARLOTTE-Noun	14. ALL-Adj
15. OUCH- Excl	15. NC-Noun	15. AK-Verb
16. OUCH-Excl	16. NC-Noun	16. OK-Int
17. OUCH-Excl	17. GAGA-Noun	17. OK-Int
18. OUCH-Excl	18. GAGAGAGA-Noun	18. GAS-NOUN
19. OUCH-Excl	19. GAGA-Noun	19. INCH-Noun
20. KIK-Noun	20. TARGET-Noun	20. INCH-Noun
21. KIK-Noun	21. TARGET-Noun	21. INCH-Noun
22. KIK-Noun	22. CHICKFIL-Noun	22. GAS-Noun
23. KIK-Noun	23. CHIC-Noun	23. GA-Noun
24. SN-Noun	24. FBFBFBFBFBFBFBFB-Noun	24. GAS-Noun
25. KIK-Noun	25. FBFB-Noun	25. GAS-Noun
26. APP-Noun	26. FBFBFBFBFBFB-Noun	26. OR-Conj
27. KIK-Noun	27. FBFB-Noun	27. ALL-Adj
28. KIK-Noun	28. FBFB-Noun	28. TEXT-Noun
29. KIK-Noun	29. IG-Noun	29. TEXT-Noun
30. GLIDE-Noun	30. IG-Noun	30. TEXT-Noun
	31. IG-Noun	31. TEXT-Noun
	32. IG-Noun	32. TEXT-Noun
	33. IG-Noun	33. TEXT-Noun
	34. SNAP-Noun	34. OH-Int
	35. KIK-Noun	35. OK-Int
	36. MESSA-Noun	36. TEXT-Noun
		37. OK-Int

	37. MESSENGER-Noun 38. IMESSAGE-Noun 39. KIK-Noun 40. MESSENGER-Noun 41. GLIDE-Noun 42. GLIDE-Noun 43. GLIDE-Noun 44. GLIDE-Noun 45. MESSENGER-Noun 46. SNAP-Noun *47. C-Unknown* 48. GLIDE-Noun 49. IG- Noun 50. IT-Pro 51. GLIDE-Noun 52. KIK-Noun 53. KIK-Noun 54. KIK-Noun 55. CONTACT-Verb	38. HI-Int 39. HI-Int 40. HI-Int 41. TEXT-Noun 42. DID-Verb 43. APP-Noun 44. TEXT-Noun

Fingerspelling data from both B5 and G3 follow patterns of what appears to be sizeable noun production, as does the data from all of the male and female participants. This is expected when based on previous research (Padden & Gunsauls 2003; Mulrooney 2002; Johnston 2007) but it is not the complete story. Awareness of nouns as the largest word class for fingerspelling is an important point, but it only views fingerspelling from one vantage point. The statement that fingerspelling exploits extensive use of nouns leads us to make assumptions, or to think that we know the way it is, yet we may overlook subtle realities about fingerspelling such as variation by individuals, variation by distinct tokens, or low frequency versus high-frequency tokens. This is where fingerspelling throws a curveball!

6.7 SUMMARY. This chapter has simply presented the raw data findings which are not out of the ordinary and follow conventional methods for examining fingerspelling patterns. The following chapter will analyze the raw data presented here and explain in detail the unexpected surprises about fingerspelling that is found in an A-curve. The following analysis will view fingerspelling as a complex system within the framework of Kretzschmar's (2009) *The Linguistics of Speech*.

CHAPTER 7

ANALYSIS: THE CURVEBALL

What do curveballs and fingerspelling have in common? Consider that a pitcher forcefully releases the ball along a trajectory that causes the ball to spin and plummet into a power curve as it approaches the plate. The sudden drop and spin of the ball leaves the batter surprised. Strike! Similarly, a signer releases handshapes of the ASL manual alphabet on a trajectory that spin through the co-articulatory processes. The result forms something quite different from the letters that are used in the orthography of spoken language. At the core of the curveball metaphor is that, at times, fingerspelling is not what we expect it to be.

My current study aimed on examining patterns and variations in adolescent fingerspelling points to something unexpected, as well. Three curveballs became visible during the analysis and I will discuss them in this chapter. I provide a description of observed trends then explain how the application of *The Linguistics of Speech* model (Kretzschmar 2009) demonstrates that fingerspelling, like speech, is a complex system.

7.1 TRENDS FOUND IN RESEARCH QUESTIONS #1 AND #2. In answering my research questions, *How do deaf adolescents use fingerspelling?* and *How does fingerspelling vary among adolescents at this community of practice?,* I was able to identify several trends

within the population of signers at this research site. Wide variation was also observed and three types of fingerspelling were documented that will be discussed in this chapter.

Frequency of Use. It is generally observed that Deaf adults use fingerspelling a great deal in signed conversations but what about adolescents. My first task was to identify the overall amount of fingerspelling present in adolescent discourse. Current research is inconclusive on exactly how often fingerspelling is used within signed conversations. Percentages range between 12-35% (Padden & Gunsauls 2003) and 6.4% (Morford & MacFarlane 2003) for ASL, 2.5% for New Zealand Sign Language (McKee and Kennedy 2006), and 10% for British Sign Language (Sutton-Spence 1994). The initial results of my study show adolescents use fingerspelling in discourse from 6.8% for boys to 8.0% for girls. This is from my corpus of 14,576 tokens with 1,086 being fingerspelling units of initializations, abbreviations, compounds, lexicalizations, and slow versus rapid types. My results align more closely with Morford and MacFarlane's (2003) conclusions in which fingerspelling comprised 6.4% of their database. However, a closer look shows that Morford and MacFarlane excluded what they call frozen signs and lexicalizations such as #ASL and #OK and limited their units of analysis to fingerspelling of proper nouns (2.7%) and fingerspelled English words (3.7%). My analysis included three types of fingerspelling, which included lexicalized forms explained in the following section. Thus far, trends in my research suggest that these adolescents fingerspell less than adults.

Types of Fingerspelling- Next, I looked for three types of fingerspelling; careful, rapid and lexicalized, and differentiated their patterns of use. The analysis of type, for purposes of my study, is not based on protocols for measuring sign duration or examining

images per second or millisecond (Patrie & Johnson 2011, Thumann 2012). Rather, observations were made and coded following the established definitions of type by Patrie and Johnson (2011) as careful, rapid, and lexicalized outlined in Chapter 3 and Chapter 4 of this paper and agreed on by the researcher together with the ELAN transcriptionist. During the transcription process, annotations were tagged as careful, rapid, or lexicalized and then the list of annotations were exported and counted. The evidence concludes that each of the three specified types of fingerspelling was present in adolescent fingerspelling. Token counts by type and gender are shown in Figure 7.1 and Table 7.1. Boys favor lexicalizations compared to girls' rapid productions but the differences are marginal.

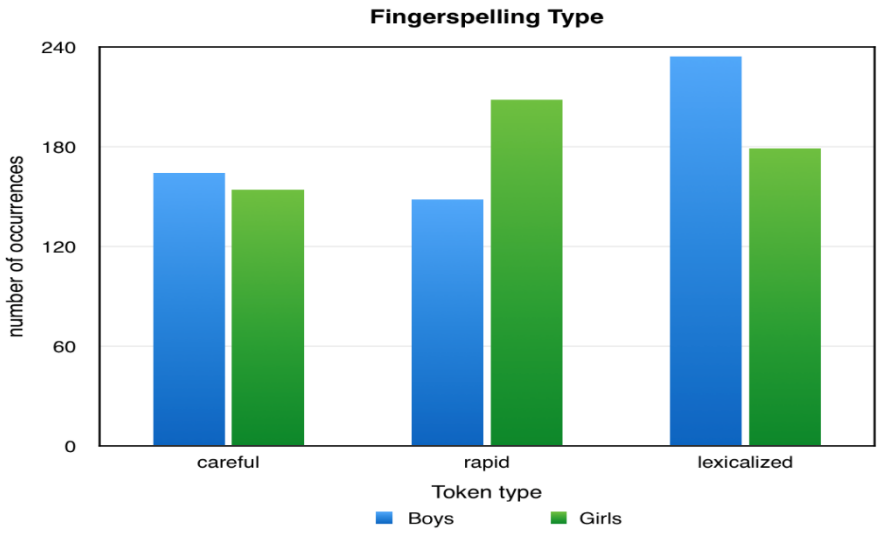

FIGURE 7.1. Fingerspelling by type

Table 7.1. Fingerspelling type

Type	*5 Boys N=546*	*7 Girls N=541*
Careful 29%	164	154
Rapid 32%	148	208
Lexicalized 38%	234	179

Careful Fingerspelling. The label *careful* does not mean a slow rate but represents priming for future repeats of the same token. This type sometimes presents each and every handshape clearly while at other times they may not all appear nonetheless, the receiver "perceives" each handshape as being present (Patrie & Johnson 2011). Figure 7.2 below shows a series of signs from my data as an example of careful fingerspelling, U-R-B-A-N, in which each handshape was present and identifiable. Both male and female adolescents produced roughly the same percentage of careful fingerspelling tokens and did not always use the careful type for repeated tokens.

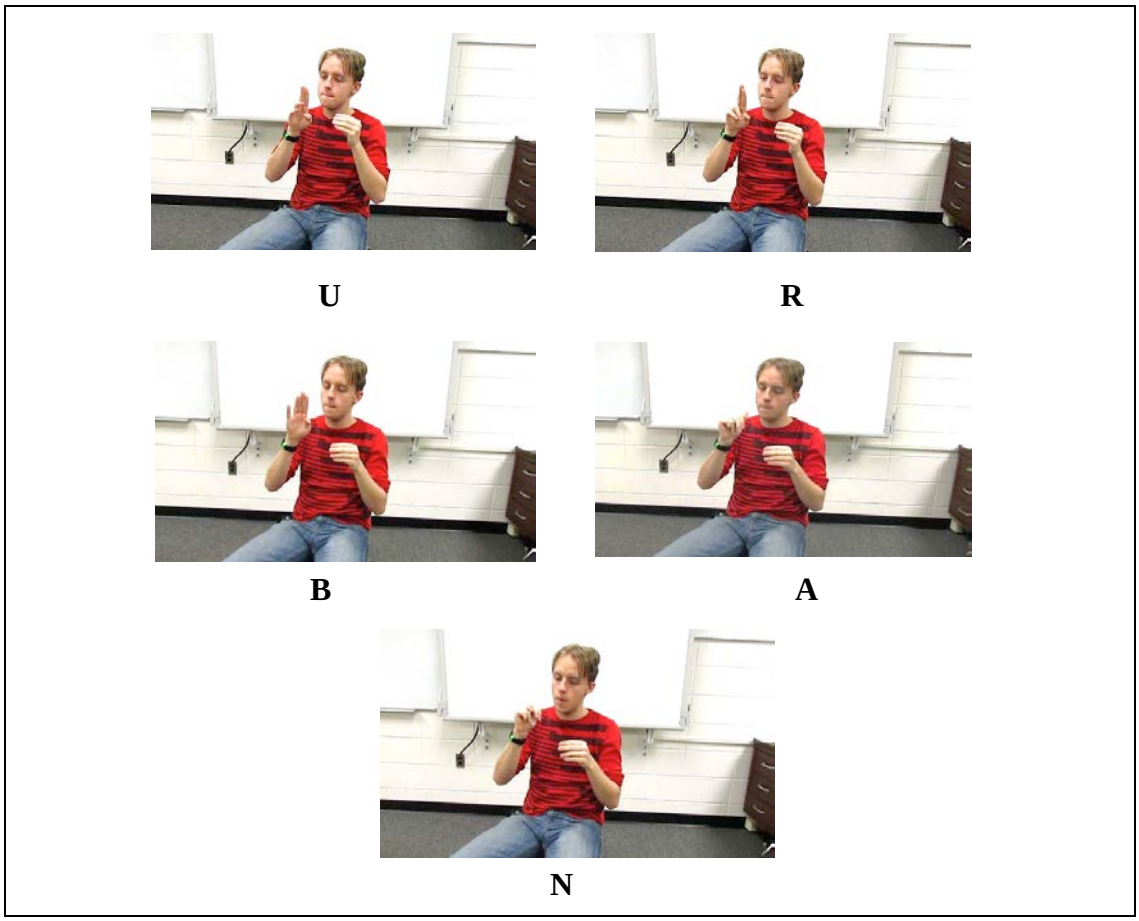

FIGURE 7.2. Sequence of signs for careful fingerspelling of U-R-B-A-N

Rapid Fingerspelling- Rapid fingerspelling is visually inconsistent and unpredictable when repeated in discourse (Patrie & Johnson 2011), but even with the quick movements and inconsistencies in handshape, the meaning is transparent. I found this type is common in adolescent language. By definition, rapid fingerspellings "eliminate some of the signs or blend some signs together." (Patrie & Johnson 2011: 127). Take for example the fingerspelling of K-N-E-E as shown in Figure 7.4. Here the signer initiates the first sign K clearly but quickly co-articulates the N and E signs. Frame B below captures how the signer merged the bent knuckles of the N handshape with the E handshape sufficiently but incompletely. "The signs that are eliminated and the way the signs blend

appears to be the result of performing a sequence of complex muscular activities very quickly, rather than the result of regular rules of change." (2011:127). The signer in Figure 7.3 demonstrates the exact muscle activity that Patrie and Johnson were describing.

A. 

B. 

FIGURE 7.3. Rapid fingerspelling of K-N-E-E with blended signs

Lexicalized Fingerspelling- This type of foreign vocabulary (Brentari & Padden, 2001) is used to add new signs to the lexicon. It is characterized by the restructuring of handshape, movement, location, and orientation (Battison 1978). Studies by Morford & MacFarlane 2006 and Johnston 2011 count lexicalizations as either *lexical signs, frozen*

signs, fully lexicalized, or partly lexicalized, but my coding did not get that specific. Overall, my intention for this study is to provide a basic description of adolescent fingerspelling and patterns. My rationale for coding lexicalized types is not based on how far along the process of lexicalization fingerspelling has come but that the token itself is quickly and rhythmically articulated. It also remains predictable in form with each occurrence, which differs from careful and rapid types Some of the tokens coded as lexicalized type include: #ALL, #GO, #SO, #OR, #ASL, #DO, #OK, #WELL, #OFF but these tokens have alternations. For example, #ALL could be expressed in fingerspelling, by use of spatial referencing, or by use of a lexical sign. For the purposes of my research, lexicalized type is a broad category. In sum, both male and female groups demonstrated an equally large amount of lexicalized types in discourse. Other categories kin to lexicalized types were abbreviations and acronyms.

Abbreviations and Acronyms. Due to the confines of my research, I was not looking for an in-depth study of fingerspelled abbreviations but rather observations of overall patterns. However, I was curious about adolescents' use of fingerspelled abbreviations and acronyms. The data confirms that abbreviations and acronyms are widely used and that they are largely proper nouns and were coded as such. Acronyms, SCI-FI, DMV, NASCAR, VP, and PS Three, were dependent on context and interests of the subjects as were other tokens. Similarly, Padden & Gunsauls report topic to have influenced the frequency of fingerspelled tokens in their 2003 study. Abbreviations played the role of naming:

a) states; GA, FLA, SC, NC, VA, WV
b) buildings around campus; TLC, WH

c) months of the year

d) Deaf schools; RIT SWCID, NTID,

e) Lexical abbreviations such as HS (high school) , TV, FB

f) new terms such as LOL and IG (Instagram), G at forehead for Google.

g) initializations for days of the week, initializations for name signs

Lexical items versus Fingerspelling. Evidence in the data indicates that adolescents use lexical items and fingerspelling interchangeably. This is not surprising because the same principle has been identified in adult fingerspelling patterns (Padden 2006; Lucas & Valli 1992). Figure 7.4 illustrates how the signer fluctuated between a lexical sign (7.5.A) and a rapid type fingerspelled abbreviation *F-B-F-B* (7.5.B) in discourse. She also produced a careful type, *F-B*, with two movements as a third form during our conversation. This is only one example of how fingerspelling coexists with lexical items in ASL discourse. Figure 7.5 also illustrates this point.

FACEBOOK- (1) lexical sign and (2) fingerspelling

(A) This signer's lexical sign for Facebook

(B) F B F B

FIGURE 7.4. Lexical sign for Facebook and a rapid fingerspelled abbreviation

In Figure 7.5, note the variation in palm orientation and location. The signers on the left are using two variant lexical signs in front of the face to represent Facebook while the signers on the right utilize fingerspelling. Roughly 66% of the time, the fingerspelling of Facebook was preferred over lexical signs for Facebook but the point to be acknowledges that the speaker as agent determines which will be used.

FIGURE 7.5. *FACEBOOK* - Lexical sign and variants.

7.2 OTHER VARIANTS. We make assumptions about right ways and wrong ways to fingerspell, sign, or say something. We generalize that everyone should use the same variant because it is normal. The generalizations about the expected variant, what we consider "normal" is an *observational artifact* "based upon our perception of the speech around us" (Kretzschmar 2009:35). In other words, we all have in mind a prototype of how speech or, in this case, fingerspelling should work but "it may not exist in an actual exemplar" (2009:243). Kretzschmar reminds us that, "The speaker will always be in the position of choosing the variant for any feature, normal or different, that they judge to be best for any given linguistic event and set of interlocutors" (2009:33). Personal observations of Deaf adults protesting that teenagers use incorrect lexical signs in place of proper fingerspelling motivated me to examine two lexical items often mentioned. I

investigated the proper noun, *TARGET* (department store) and the adverb/adjective, *OFF-CAMPUS,* to look for patterns of coexisting variants.

TARGET- The images below in (Figure 7.6) demonstrate the coexistence of fingerspelling and lexical items for *TARGET*. Five out of nine occurrences of *TARGET* in the data were fingerspelled forms and the remaining four tokens were each uniquely different lexical signs. All total there were five separate token types for this particular proper noun. The female signer on the left in Figure 7.6 shows how fingerspelling represents *TARGET* while the snapshots of the female and male signers on the right show articulations of lexical variants.

FIGURE 7.6. *TARGET*: Fingerspelling plus two lexical variants.

OFF-CAMPUS- In the same manner, when discussing what they liked to do away from the school environment there emerged five variants to express *OFF-CAMPUS*. Five

students used the lexical sign for *OFF-CAMPUS,* which is produced with the pinky fingers of both hands and shown in the pictures of the female signers in Figure 7.7 below. Additional variants were expressed through fingerspelling and included:

1. fingerspelled *O-F-F-C-A-M-P-U-S*
2. fingerspelled *#G-O* and *#O-F-F* plus the lexical sign *CAMP*
3. fingerspelled *#O-F-F* plus lexical sign *CAMPUS*
4. fingerspelled *#O-F-F* plus the lexical sign for *CAMP*.

FIGURE 7.7. *OFF-CAMPUS:* Females producing lexical sign, Male producing a fingerspelled variant

The point of showing these examples is that they provide evidence of how variation works. At times, we see 'normal' or predictable forms of signs and fingerspelling. At other times, we see forms that are correct but may not be in our

personal 'normal' range or 'perception of normal'. This is expected in the *linguistics of speech* model "that there will be a few realizations that occur very frequently, and a great many realizations that occur only infrequently" (2009: 95).

In answer to my first two research questions, the analysis suggests that this group of adolescents use fingerspelling in similar ways as Deaf adults in that they:

a) use lexical items and fingerspelling interchangeably
b) use abbreviations and acronyms most commonly for naming proper nouns
c) use careful, rapid, and lexicalized types of fingerspelling much like adults
d) demonstrate variation in fingerspelling

The analysis also suggests that these adolescents' fingerspelling differs from that reported by adults in the following ways:

a) These adolescents use fingerspelling in discourse on average 7.5% of the time, which is less than previously suggested for adults.
b) These adolescents show minimal difference between boys and girls whereas differences between men and women have been noted.
c) These adolescents use fingerspelling for function words and lexicalizations whereas previous studies have identified adults primarily fingerspell a generous portion of nouns and use non-lexical ways such as pointing and spatial referencing for representing functors.

Now that we have a broad descriptive picture of fingerspelling trends, I will describe in even more detail the individual fingerspelling behavior of my subjects by

applying the principles from *The Linguistics of Speech* (2009) which will answer my third research question, *What patterns and variations appear in adolescent fingerspelling?"*

7.3 PATTERNS AND CURVEBALLS: RESEARCH QUESTION #3. Specifically, through a type/token analysis I was able to quantify patterns of frequently occurring fingerspelled tokens and answer my third research question about patterns and variations. To begin, I analyzed fingerspelling in the corpus followed by subsets of boys' and girls' corpora. Moving away from conventional methods in fingerspelling research, as Kretzschmar puts it, I will attempt to answer "who says what where?" (2009: 69).

A frequency distribution analysis allowed me to answer my third research question and identity pattern and variations. The corpus consisted of 14,576 tokens with 1,086 of those being fingerspelled: 541 for five female subjects and 545 for seven male subjects. After the transcriptions were digitally annotated into a machine-readable format through ELAN, I was able to export the data. I then examined the tokens, counted them, listed them in descending order of occurrence, and plotted the data on a graph. Upon plotting the token frequency, a non-linear distribution emerged as shown in Figure 7.8 This configuration is an asymptotic hyperbolic curve or an A-curve and visually displays an aggregate of language data consistent with the *Linguistics of Speech* model (Kretzschmar 2009). The y-axis of the A-curve displays the frequently reoccurring tokens and the x-axis contains tokens that occurred only once or twice in the corpus. Kretzschmar points out, "We can use this stable underlying A-curve distribution to address what has been one of our biggest problems; defining the relationship between

what people actually say or write and the generalizations that we want to make from that behavior. The key aspect of the A-curve is that it gives us, the users of speech, a perceptual aid so that we can make sense of the speech interactions around us." (2015:32).

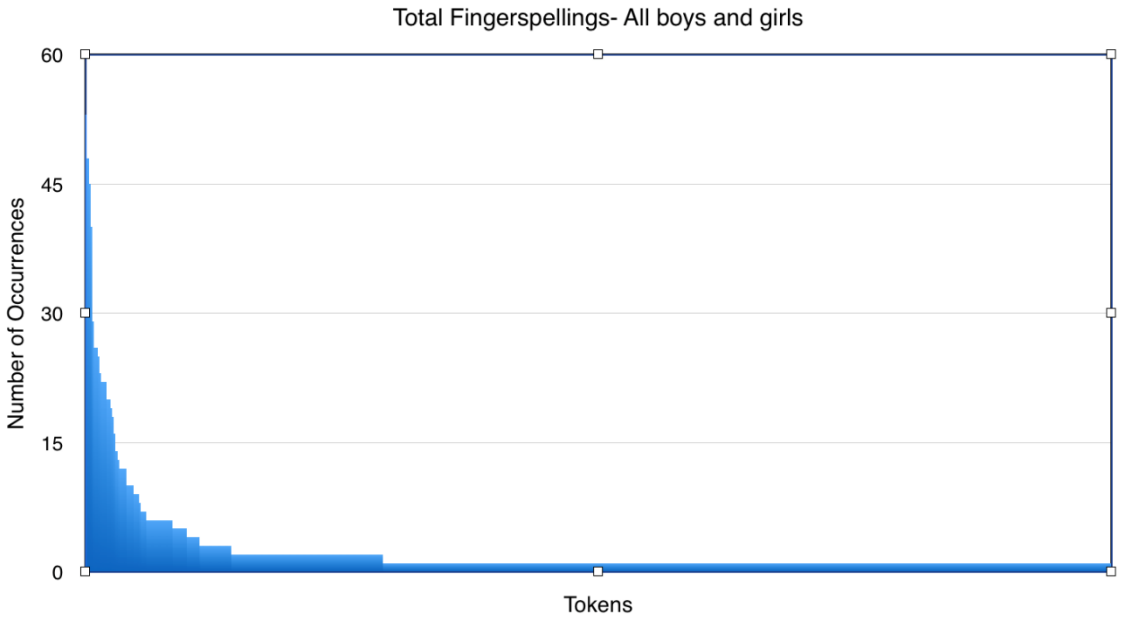

FIGURE 7.8. Frequency distribution of tokens in corpus

Now that the curve has emerged, I can further analyze specific tokens in order to verify or refute our current notions about what is 'normal' for fingerspelling. We might presuppose that the highest points on the y-axis of the curve in Figure 7.8 represent nouns for two reasons. First, fingerspelling is commonly used for name signs and other nominals. Second, prior research states that nouns are fingerspelled 75% of the time (Padden, Lucas, Valli, & Mulrooney 2005, Shembri & Johnston 2007) and fingerspelled verbs are rare (Padden 1991). With the impression that fingerspelling is synonymous with

nouns it stands to reason that we may look to the y-axis to flaunt a large quantity of nouns but the largest quantity will not be located there. A deeper look reveals that nouns are indeed common but are not the most frequently recurring. The majority of nouns, approximately 19.5% of the current corpus, resides along the trailing x-axis with one-time occurrence each. The plot shows 212 nouns occurring with low frequency in comparison to roughly 700 other tokens from a variety of other grammatical classes that reoccurred with high frequency. To check out the claims about fingerspelled nouns I narrowed my focus to the top most frequently repeated tokens and arranged them in a chart organized by frequency and percentage of occurrence.

The Table below (Table 7.2), similar to the one used in the BSL corpus project (Shembri, et al 2011), displays my data with regards to rank and frequency of occurrence for specific fingerspelled items. Tokens are ranked by frequency of occurrence in column A and listed in descending order of occurrence in column B. Column C notes the word class. Occurrences are itemized in column D. Column E gives percentages showing the frequency of occurrence out of 1,086 tokens and column F gives the cumulative frequency. We see that individual tokens comprising the top ten list occurred between 53 and 22 times each in the corpus.

TABLE 7.2. Top fingerspelled tokens

A.) Rank	*B) Fingerspelled token*	*C.) Word class*	*D.) Number of occurrences*	*E.) Percentage*	*F.) % cumulative*
1	DO	verb	61	5.6%	5.6%
2	OR	conj	53	4.8%	10.4%
3	ALL	det	48	4.4%	14.8%
4	SO	conj	45	4.1%	18.9%
5	GO	verb	40	3.7%	22.6%
6	FB	noun	34	3.1%	25.7%
7	TLC	noun	29	2.7%	28.5%
8	ASL	noun	26	2.4%	30.8%
9	IF	conj	25	2.3%	33.1%
10	OK	expl	24	2.2%	35.3%
Add:					
11	SC	noun	23	2.1%	37.4%
12	NC	noun	20	1.8%	39.2%
13	OF	prep	20	1.8%	41%
14	FLA	noun	19	1.7%	42.7%
15	HS	noun	18	1.6%	44.3%

As shown in Table 7.1, the most frequently occurring fingerspelling is the verb D-O, which occurred 61 times. The second most occurring was O-R and occurred 53 times in the data. The third most frequent token was A-L-L with 48 occurrences. Three recurring nouns found in the top ten list were fully context driven. Thirty-four occurrences of F-B were arguably conditioned by the interview question about technology and social media. Morford and MacFarlane (2003: 213) remind us that the

topic of conversation influences lexical items more than grammatical ones and was evident throughout my corpus. The abbreviated token T-L-C represents the name of a building on the school grounds and the token A-S-L was frequent due to the context of my interview prompts about family and communication. The final analysis of the top fingerspelled tokens points toward the unexpected and three curveballs appear. Curveball #1. Only a few tokens constitute the greater part.

The results show:

TABLE 7.3. Tokens distribution

Tokens	*Total*	*Function*	*Verbs*	*Nouns*
DO, OR, ALL, SO, GO, FB, TLC, ASL, IF, OK	35.3% (of the current corpus)	17.8%	9.3%	8.2%

The first curveball from the data presented in Table 7.3 is that a small number of tokens represents a large percentage of the corpus. In 2003, Padden & Gunsauls recognized that a small set of tokens occurred repeatedly in their data but the purpose of their study was not to attend to a frequency distribution of those recurring tokens. Nonetheless, it is interesting that the singular occurrence of a large variety of nouns calls attention to itself. They state, “Fingerspelled nouns, on the other hand, are made up of more different tokens, not just repetitions of a small set” (2003; 23). In the same manner, sign language lexical frequency studies reviewed by Shembri et al ( ) show that a small group of lexical signs represent the largest percentage of the corpus. Kretzschmar (2009), too, reported similar findings in his LAMSAS data,

> "If we count the frequency of occurrence of each realization for a survey question (whether lexical or phonetic), we find that there will be few realizations that occur very frequently, and a great many realizations that occur only infrequently. In fact the most common frequency observed in all of our lexical data sets is the single occurrence." (2009; 95).

My study likewise found that a small group of fingerspellings make up the greater part of the fingerspelling corpus. In the data at hand, just as few as ten tokens make up 35.3% of the total fingerspelling corpus. Broken down even further, five of the top ten tokens are function words and represent 17.8 % of the corpus, two verbs make up 9.3% and three nouns at 8.2% round out the top ten list. Solely out of curiosity, I added the next five most frequently occurring tokens to my analysis, bringing the list to the Top 15. The calculations revealed that a small group of fifteen tokens makes up 44.3% of fingerspellings of the entire corpus. While small sets of recurring tokens have been identified in previous literature it did appear unexpected when it comes to fingerspelling because we rarely focus on the most frequently occurring but default to describing fingerspelling categorically.

Curveball #2. Function words constitute the greater part.

Studies on lexical frequency in English, demonstrate that function words are the most frequently used words. Likewise, the second curveball is the indication that function words are the most frequently occurring class of fingerspellings in this data set. Function signs in my corpus included conjunctions, determiners, pronouns, and auxiliary verbs, conjunctions, and prepositions. They are considered a closed set of words used to join

sentences together in grammatical ways and represented by lexicalized fingerspellings in my data. There are a handful of studies on lexical frequency in signed languages but none on fingerspelling alone with which to compare my data. The lexical frequency research on signed languages shows a lexical gap with function signs. In a review of those studies Cormier, Fenlon, Rentelis, and Shembri state that "all three studies report a low number of functional signs amongst the most frequent items in the language" (2011:8) owing to the fact that ASL is a "lexically dense language". They restate and I can agree that the use of space and non-manual markers are specified for the role of functors. Nevertheless, again, applying the lens of the linguistics of speech instead of the linguistics of structure I am confident that the expression of functors is not limited to the use of space and non-manual markers in sign language. Fingerspelling is an open and dynamic system with variation and the mediator of the system is the signer himself. His own agency spurs on the system and provides momentum for variation and change. The analysis of my data set gives evidence that my subject group has made choices about using fingerspelling for function words instead of using only space.

My research suggests that there may be a paucity in function lexical signs because fingerspelling satisfies that role for this group of adolescents. The subjects in my study indeed used space and non-manual markers inherent to ASL but in conjunction with fingerspelling or interchangeably with fingerspelling for frequently occurring function words. The resulting A-curves in this research provide a description of adolescent use and verify visually that fingerspelling tokens represent function words recurrently with high frequency. This puts a spin on our assumptions about fingerspelling.

Curveball #3. Fingerspelling is a complex system that predicts variation.

In his 2009 book, *The Linguistic of Speech* Kretzschmar says that 'language is ever so much more variable than any individual could predict from personal experience' (100). The LAMSAS survey data showed that regardless of studying variation in lexical items such as *cloudburst* or phonetic units as vowels in *fog* the same distributional pattern occurred. Furthermore, my finding show the same distributional patterns for fingerspelling. In all domains, there were a large set of one time occurring tokens and a few frequently occurring. Fingerspelling, like speech, and meets all of the benchmarks set forth for a complex system.

A foundational point in *The Linguistics of Speech* is that "for speech to be a complex system… speech is open and dynamic, thus not at equilibrium." (2009; 184). Both speech and signing are high-energy systems where numerous components interact in random ways that stimulate change. The coming and going of signers, like speakers, contributes to variation in sign language because the context of the Deaf world is not confined to geography. "New speakers continuously enter and continuously leave any speaking population, at minimum through birth and death but also commonly through movement across geographical and social space, and this exchange of speakers can only stimulate additional change in speech" (2009 185). Likewise, the ebb and flow of language users in and out of communication situations is present in the Deaf world. There is a good deal of exchange and feedback between the Deaf world and the hearing world or native signers and non-native signers thereby creating fairly porous boundaries. The participants in my study, for instance, gained access to sign language at various ages and each brings with him or her their own unique language profile. My subjects acknowledge

their membership in Deaf culture at this particular school as well as their immersion in the larger world. This "permits exchange of information, feedback, and emergence of patterns within the group" (Kretzschmar 2015; 166), which is important for complex systems.

The most distinguishing characteristic for a complex system is non-linear distribution and scaling expressed by the A-curve. An aggregate of my fingerspelling data, when graphed (Figure 7.9) reveals the relationship between frequency and rank and made visible through the A-curve. Because scaling is obligatory in complex systems, I further investigated subsets of data to see if scaling could be documented. I graphed data for the domains of the boys' group, girls' group, and subsequently for each individual. Not only did one A-curve appear, but there were many. In fact, A-curves emerged for every subset that I reviewed. This confirms that the scaling property exists in my data and satisfies the condition of non-linear distribution in a complex system. Figures 7.9 and 7.10 display the A-curves for the boys' and girls' groups in respect to rank and frequency of occurrence for specific fingerspelled items.

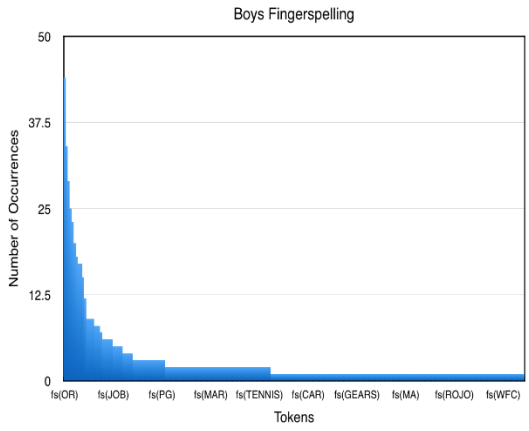

FIGURE 7.9. A-curve of boys' data

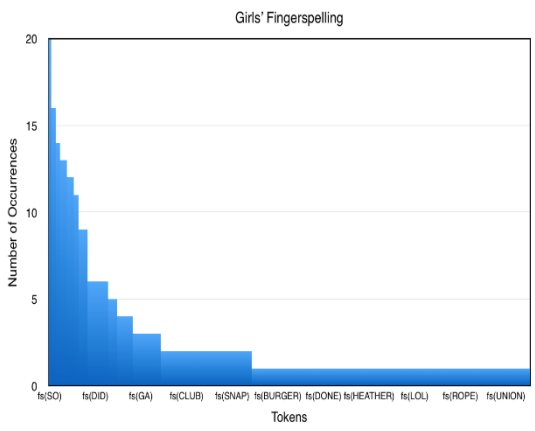

FIGURE 7.10. A-curve of girls' data

The following charts in Figures 7.11 and 7.12 show that comparable curves emerge on an even smaller individual scale. The curves that appeared are not archetypal due to the small size of the data set. Instead, the dimensions of each curve look different, with some being chunky and jagged, and others being smaller. The important point is the indication of a non-linear distribution in the curves and the presence of scaling that can be seen in all subsets of the data.

> "We can perceive the top-ranked variants of any linguistic feature for groups at any level of scale, and the fact that different variants for a given feature will be ranked more highly in different groups helps us to distinguish the language behavior of the group At the same time, speakers are not bound to use only the top-ranked variant for a group since many other variants will be in use." (Kreztschmar 2009; 32).

The following curves like all the others show that a few tokens make up the largest percentage of the most frequent fingerspellings in the corpora.

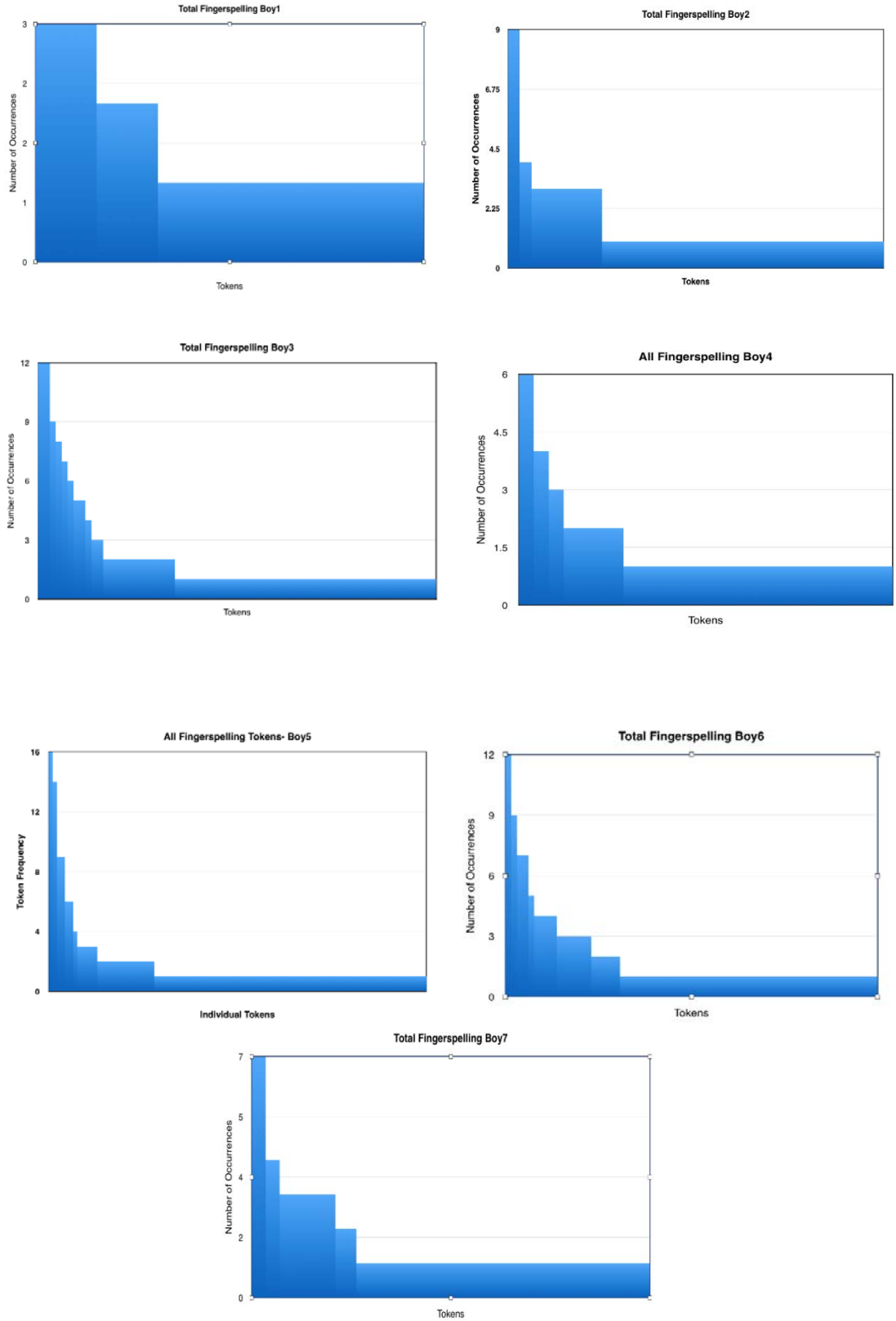

FIGURE 7.11. Participants B1-B7: Individual frequency distribution of fingerspelling showing evidence of scaling.

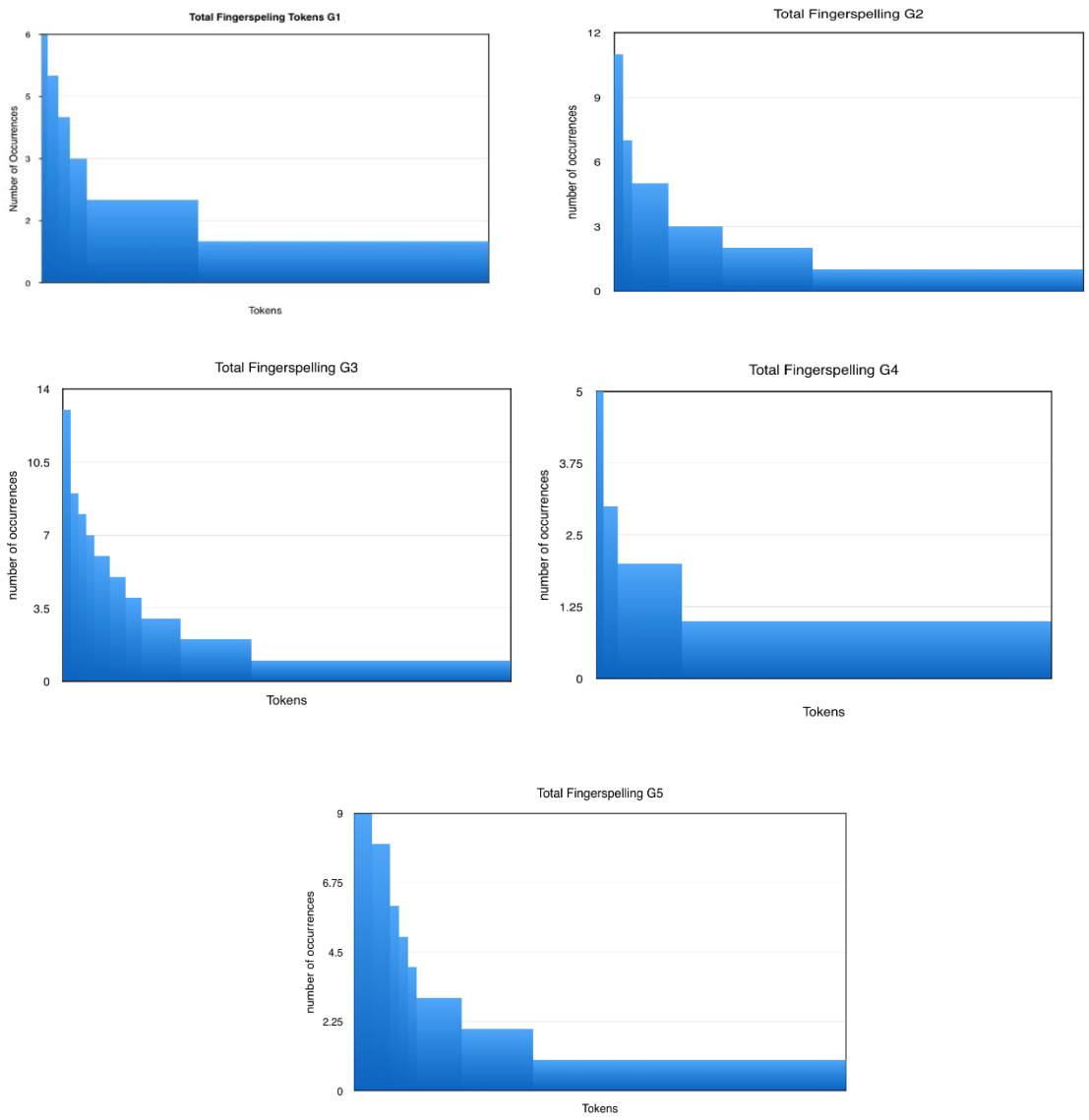

FIGURE. 7.12. Participants G1-G5: Individual frequency distribution of fingerspelling showing evidence of scaling.

7.4 SUMMARY. This chapter describes adolescent fingerspelling in a way that no studies up until now have attempted. While nouns are the most plentiful grammatical class in my data, and for researchers before me, they generally are fingerspelled just once and tend to not reoccur, like Padden & Gunsauls (2003) noticed. The frequency analysis in this

research indicated that a small set of tokens make up the majority of the adolescent fingerspelling corpus and that surprisingly function words make up the larger portion. Despite the fact that function words are generally identified as lexicalized fingerspelled types, which some may consider too sign-like, it is evident that they are the most commonly occurring tokens and that they are legitimate tokens based on my definitions of type from Patrie and Johnson (2011). It is also clear from a linguistic of speech framework that the signer himself negotiates his own use of fingerspelling, even in using a lexically dense language like ASL. The signer's agency facilitates variants within the system. The presence of A-curves at every level of scale substantiates that fingerspelling is a complex system made up of a set of essential components that interact to bring variation and change. It also shows the randomness of variation by predictably displaying distributional patterns on the A-curve at any scale. In the following chapter, I will revisit my questions and answers, explain the importance of this research, and mention some possibilities for future study.

CHAPTER 8

CONCLUSION

My investigation was motivated by the need to explore the use of fingerspelling across the lifespan and specifically designed to explore adolescent fingerspelling in use. Interest in fingerspelling led me to answer the following questions:

1. How do deaf adolescents use fingerspelling when it comes to frequency of use, word-class, abbreviations, compounds, lexicalizations, and citation vs. non-citation forms?
2. How does fingerspelling vary among adolescents within communities of practice?
3. What patterns and variations appear in adolescent fingerspelling?

8.1 QUALITATIVE SYNOPSIS. The study itself was rather broad, encompassing both qualitative and quantitative components. Qualitatively, the students in my informant group are characterized as typical teenagers. They are members of a minority Deaf Culture group yet proficient in knowledge of pop culture, social media, and cultural behaviors of the larger hearing world. The qualitative data set forth three themes in Chapter 4 that agree with the effects of audism and the epistemology of the Deaf community. First, the subjects hold Deaf Culture in high esteem where the ease of ASL, a common language, brings simplicity to daily life and access to opportunity In the school setting, especially, ASL allows for integration into all aspects of school life and provides Deaf teachers as role models. The second theme, the need for increased Deaf literacy in

families with deaf children, is not new and through this paper, my participants' individual stories will be added to the anthology. Third is the trait of resilience. Deaf adolescents in my subject group are required to navigate two worlds: hearing and Deaf. Every day, they deal with inconsistencies between the two worlds and there is no reciprocity (Sheridan 2002). Nonetheless, these Deaf teenagers appear to adapt to the demands that they encounter holding to an optimistic attitude and an emotional resilience. The qualitative profile is important for giving my subjects a space where reflections of their own experience can be expressed and in turn providing the reader a more complete and well-rounded view of the subjects from a Deaf-Culture perspective.

8.2 QUANTITATIVE SYNOPSIS. Quantitative evidence suggests that adolescents use fingerspelling in some of the same ways as adults as prior research outlines in Chapter 2 but they have their own innovative ways to use it differently from adults. In vernacular language, anything can be fingerspelled. In similar ways, adults and adolescents use it to represent proper nouns, technical terms, context dependent nouns, abbreviations, and initializations. Both groups employ a variety of careful, rapid, and lexicalized types. Evidence confirms that both younger and older signers use a broad range of lexical items interchangeably with fingerspelling and at times they go back and forth between them within the same conversation. Some differences between young people and adults are also noted in my study. One difference is that teens may not use fingerspelling in ASL discourse as often as research hypothesizes for adults. I found that young people in my subject group are fingerspelling closer to 7.5% of the time in conversation instead of 10%-30% (Padden & Gunsauls 2003). Another difference exposed is the common

fingerspelling of function words among teenagers whereas previous research has shown non-lexical ways used in sign language to express grammatical words through use of space, pointing, and other non-manual markers. Other tendencies observed were that adolescents did not limit their fingerspelling to the dominant hand but often alternated between both hands. They also use fingerspelling to add new tokens to the vernacular such as L-O-L for a sarcastic laugh and abbreviations like I-G for Instagram. Data indicate fingerspelling of teenagers in this community of practice displays variation at all levels.

8.3 Complex systems. The highlight of this research was looking at fingerspelling from a complex systems model and watching three unexpected outcomes emerge. First, the findings that a small set of ten tokens make up 32% of the overall corpus is unexpected but it brings to light quantitatively what adolescents are fingerspelling in natural conversations. Secondly, uncovering that the most frequently occurring fingerspellings are function words is significant. First, because we have more evidence that nouns are common but not the most recurrent. Secondly, because we the finding shows that signer are not required to follow the rules but can use fingerspelling in tandem with space or other parameters of ASL.

Fingerspelling conforms to the five provisions of speech as a *complex system* methodology (Kretzschmar 2009). The explanation of this theoretical framework was provided in Chapter 3 and recognizes signers as agents that drive the components of fingerspelling, thereby creating variation in fingerspelling through random interactions. This particular methodology offers linguists a new way to study language in use instead

of defaulting to traditional approaches that follow the 'axiom of categoricity" dedicated to language structure (Kretzschmar 2015). The premise to remember though is that the linguistics of speech method serves as a counterpart to the linguistics of structure methods for presenting a large-scale picture of language. As researchers, we can use either perspective or both depending on our objectives. As seen in Chapter 6, *the linguistics of speech approach* offers a predictable way to deal with the messiness of variation by displaying its non-linear distribution on an A-curve, which emerged repeatedly in this research.

The 'curveballs' in the aggregate of my data answered my research question about patterns and variation. We can predict that fingerspelled tokens are dynamic in nature and open to change based on interlocutors and other variables. Again, this was indicated by the A-curves in my data and seen on all levels of scale. Empirical evidence showed that the majority of nouns in the corpus occurred less frequently in discourse as compared to a small set of lexicalizations that included function words and verbs that occurred most frequently. Surprisingly, this identified set of 10-15 reoccurring tokens made up between 30-40% of the overall corpus.

8.4 SIGNIFICANCE. Applying *"The Linguistics of Speech"* (2009) principles to fingerspelling, explained in Chapter 3, is one of the most important contributions of my research and currently no other studies on fingerspelling or signed language have used this approach. Its potential will expand our ability to examine details of variation present in naturalistic data and will allow us to get at the frequency distribution of specific tokens so that we can uncover more about fingerspelling and signed languages. It further will

help to clarify the ambiguities and speculations that we make about sign language because we will be able to quantify actual language in use.

Innovative methodologies such as complex systems used in this study are possible because new technologies are opening the way. As a strength, ELAN (Max Planck Institute for Psycholinguistics) has the capacity to handle video data, transcriptions, and annotations and it broadens the ways we are able to document and study language. The use of ELAN is on the rise due to considerable interest among scholars in building a sign language corpus for the purposes of researching the various signed languages of the world.[2] Sharable language data in digital format may provide outcomes that could inform our understanding of language variation and change, language processing, and language acquisition. Now, data from my study archived in a machine-readable format through ELAN could potentially become part of a larger sign language corpus.

Learning that a small set of tokens typically make up the majority of fingerspelling in discourse most importantly informs our previous understanding about fingerspelling. Findings could extend understanding for the L2 learner of ASL who struggles with processing the transitions between handshapes (Wilcox 1992). If frequent lexicalizations and reoccurring shape patterns can be recognized more rapidly the L2 learner will experience less anxiety in receptive fingerspelling. More knowledge of fingerspelling could inform the curriculum development and overall education of ASL teachers, ASL students, and interpreter training programs. Additionally, digital documentation and research on fingerspelling provides information that could affect the

[2] Crasborn, Netherlands; Schembri, UK; Johnston, Australia; Leeson, Ireland; Pilcher, Lilo-Martin, USA; Hochgesang-USA.

education of Deaf children as well as inform reading and language pedagogy throughout the high school years.

A final contribution of this study is that it will provide a venue in which Deaf adolescents can be heard, quite the opposite from the lack of voice given them in traditional texts (Sheridan 2001). My research provides insight into how deaf adolescents use language to express who they are and how they see themselves fitting into their local communities of practice, the hearing world, and the broader Deaf-World.

8.5 LIMITATIONS OF THIS STUDY. There are several limitations to this study. First, my study was constrained by the small sample size of twelve participants. Generalizations are specific to this corpus and only applicable to other deaf teenagers at similar residential schools who might produce a similar corpus.

Second, the complexities of the school environment restricted the sample size. School days are busy and it was quite challenging to access participants. Furthermore, on more than one occasion I was required to shorten the interview protocol due to the routine of the school day, a test, or other conflict, which is understandable but nonetheless challenging. Afternoons and evenings at this residential site were also busy with a variety of student commitments, after school activities, off-site jobs, and homework.

Although I use ASL daily in my personal life as a result of having raised two Deaf children and having many Deaf friends the fact remains that I am hearing. A Deaf interviewer would have been a tremendous advantage in this research and may have

likely provided a more representative data set of ASL and fingerspelling among Deaf interlocutors.

ELAN is a strength as previously mentioned yet it brings with it a challenge of being very labor intensive and time-consuming. It is extremely important that researchers become skilled working with tools such as ELAN but there is also a steep learning curve.

8.6 DIRECTIONS FOR FUTURE RESEARCH. The ideas presented in this work lay the foundation for more research yet to be done. Many directions could be imagined. From a theoretical perspective, there is huge potential for applying *the linguistics of speech* methodology to the study of fingerspelling as well as to the lexicon of signed languages. With the increased use of ELAN and modern technology larger samples of video data can be collected, preserved, shared, and made accessible for researchers to be studied now or later or revisited at other times.

Reflecting on the limitations of this project as a springboard a similar study could be done aimed at gathering a much larger data set in a more controlled environment. Additionally, employing a Deaf interviewer would give more naturalistic data, as mentioned previously. Similar studies could be carried out in order to substantiate the findings found here as well as the methodology. Expanding the study to gather datasets from different communities of practice: residential, mainstream, and day school, would provide more comprehensive data, not to mention the potential of studying children of deaf adults, interpreters, or L2 learners in high school and post-secondary classrooms.

Further, there is a need for increased research on adolescents in their own right and not as an aggregate with other groups. Examination of a larger quantity of adolescent

corpus data will reveal ways young people use their language in real life and will supply greater evidence for all the possible ways that sign language and fingerspelling is used and how it changes. Another possibility is to set in place a longitudinal study to follow adolescent fingerspelling as it develops into adult fingerspelling.

8.7 CLOSING. Previous research has shown that the manual alphabet expands the rich lexicon of ASL by fingerspelling nouns and new terms but it is clear that fingerspelling can be used interchangeably with lexical items. We know that there is considerable variation in fingerspelling and that teens and adults use it in both similar and different ways. We theorize and teach the nominal function of fingerspelling expressed in initializations, abbreviations, name signs, compounds, and loan signs. However, as this research shows there are sets of words from a closed class that also employ fingerspelling so it functions to express determiners, conjunctions, prepositions and other grammatical words. more frequently than nouns. My study applied a new methodology of *complex systems* for investigating the linguistics of fingerspelling. This methodology allowed me to scrutinize the tokens in detail and discover something unexpected in adolescent vernacular. The curveball is that lexicalized forms of grammatical words and verbs more frequently reoccur as compared to a large set of nouns that occur only once. Additionally, a small set of tokens make up the majority of the corpus. The phenomena has on the whole gone unnoticed in prior research so this finding, coupled with the use of a complex systems research framework, gives us new information to consider. According to former Major League baseball player, Doug Glanville:

> "No curveball is easy to handle not even when it is expected. We can practice all we want, but there will inevitably be times when it will shock us by its mere arrival. The curveball becomes that rude awakening that often derails us from our tried and true plan to go from A to B." (New York Times, May 9, 2008).

Unexpectedly, *The Linguistics of Speech* methodology may wake us up to a different way of examining fingerspelling and accounting for the variations and patterns it expresses. Through it, we may discover all sorts of curveballs that fingerspelling throws at us.

REFERENCES

Akamatsu, C.T. & D. Stewart. 1989. The role of fingerspelling in simultaneous communication. *Sign Language Studies*, 65, 361-73.

Ann, J. 2006. *Frequency of occurrence and ease of articulation of Sign Language handshapes: The Taiwanese Example*. Gallaudet University Press. Washington, DC.

Aristotle. (350 B.C.E.)"On sense and sensible: Section 1" *Internet classic archive*. J. I. Beare (trans.). http://classics.mit.edu/Aristotle/sense.html (October 2015).

Balis, Sylvia Chapin. A visit to Rochester and Mr. Airy (1895; 41). Internet Archives. Retrieved, May 10, 2014. *Annals* 40 (January 1985): 41.

Battison, Robbin. 1978 Revised, 2003. *Lexical borrowing in American Sign Language*. Maryland: Linstok Press, Inc.

Blumenthal-Kelly, A. 1995. Fingerspelling interaction: A set of deaf parents and their deaf daughter. In C. Lucas (ed.), Sociolinguistics in Deaf Communities (1).62-73.Washington, DC: Gallaudet University Press.

Brentari, D. 1998. *A prosodic model of Sign Language phonology*. MIT Press. Cambridge, MA.

Brentari, D. & Carol Padden. 2001. Native and foreign vocabulary in American Sign Language: A lexicon with multiple origins. In D. Brentari (ed.), *Foreign vocabulary in Sign Language: A cross-linguistic investigation of word formation.* 86-119.

Bruce, S.G. 2007. *Silence and Sign Language in medieval monasticism*. Cambridge University Press, New York.

Caldas, S.J. (2006) *Raising bilingual biliterate children in monolingual cultures*. UK: Multilingual Matters.

Carmel, S.J. 1982. *International hand alphabet charts*. Studio Printing, Rockville, Maryland.

Chambers. J.K. 2003. *Sociolinguistic theory*. Blackwell Publishers, Ltd.

Chen Pilcher, D. 2011.Sources of handshape error in first-time signers of ASL, in Napoli and Mathur (eds.) *Deaf around the world*. Oxford University Press, 96-121.

Cormier, Kearsy, Jordan Fenlon, Ramas Rentelis, & Adam Shembri. 2011. *Lexical frequency in British Sign Language conversation: A corpus-based approach BSL corpus project*. website retrieval. October 2015.

Crume, Peter K. 2011."Teachers' perceptions of the use of ASL phonological instruction to develop ASL and English literacy in an ASL/English bilingual preschool." Doctoral Dissertation, University of Illinois at Urbana- Champagne. Urbana, Illinois.

Daniels, Marilyn. 1997. *Benedictine Roots in the Development of Deaf Education: Listening with the Heart*. Greenwood Publishing Co. Westport, CT.

Davis, Jeffrey. 1989. Distinguishing language contact phenomena in ASL interpretation in Lucas, Ceil (ed.), *The sociolinguistics of the deaf community*. (85- 102). New York: Academic Press.

Eckert, P. 2000. *Linguistic practice as social practice*. Oxford: Blackwell.

ELAN. Max Planck Institute for Psycholinguistics. The Language Archive. Nijmegen, The Netherlands. http://tla.mpi.nl/tools/tla-tools/elan/

Emmorey, Karen. 2002. *Language, cognition, and the brain: Insights from Sign Language research*. Mahwah, Lawrence Erlbaum Associates, Inc.

Emmorey, Karen., A. Bassett, & J. Petrich Processing orthographic structure: Associations between print and fingerspelling. Poster at 10th theoretical issues in Sign Language research conference, West Lafayette, Indiana. (2010).

Emmorey, Karen. & J. Petrich. 2011. Processing orthographic structure: Associations between print and fingerspelling. *Journal of Deaf Studies and Deaf Education*.

Erting, C.J., Thumann-Prezioso, C. & B. Benedict. 2000. Bilingualism in a Deaf family. In P. Spencer, C.J. Erting, & M. Marschark (Eds.), *The deaf child in the family and at school* . 41-54. (2000) Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Glanville, Doug. Hitting Curves (of All Sorts). *The New York Times*. 9 May,2008. www.nytimes.com/2008/05/09/.../09glanville.htm retrieved 9/15/2015.

Gregory, Susan, Juliet Bishop & Lesley Sheldon.1995. *Deaf young people and their families: Developing understanding*. Cambridge University Press.

Gruskin, D. 1998. Lexidactylophobia: The irrational fear of fingerspelling. *American Annals of the Deaf*, 142, 404-415.

Hanson, Vicki L. 1981. When a word is not the sum of its letters: Fingerspelling and spelling. *Haskins Laboratories Status Report on Speech Research* 65 145-155.

Hanson, Vicki. 1982. Use of orthographic structure by Deaf adults: Recognition of fingerspelled words. *Applied Psycholinguistics*. 3. 343-356.

Haptonstall-Nykaza, T.S. & B. Schick. 2007. The transition from fingerspelling to English print: Facilitating English decoding. *Journal of Deaf Studies and Deaf Education*.(12). 172-183.

Hile, Amy. 2008. *The development of fingerspelling among Deaf and Hard of Hearing ASL-signing children*

Hirsh-Pasek, K. 1987. The metalinguistics of fingerspelling: An alternate way to increase reading vocabulary in congenitally deaf readers. *Reading Research Quarterly*. 22 (4). 455-474.

Holcomb, Thomas. 1996. Chapter 12. In Ila Parasnis (ed.), *Culture and language diversity and the Deaf experience*. Cambridge University Press.

Hochgesang, Julie A. 2013. Is that a Y or a...? Representation of hand configuration data in different notation systems for child acquisition of ASL. Dissertation. Washington, DC. Gallaudet University.

Humphries, Tom. 1975. The making of a word: Audism. *Unpublished manuscript* Retrieved web, September, 2012.

Johnston, Trevor. & Crasborn, Onno. (2006), The use of ELAN annotation software in the creation of signed language corpora, *in 'Proceedings of the EMELD'06 workshop on digital language documentation: Tools and standards: The state of the art'*. Lansing, MI. June 20-22, 2006. http://emeld.org/workshop/2006papers/johnston-crasborn.pdf. Retrieved web, March 4, 2015.

Johnston, Trevor. 2012. Lexical frequency in Sign Languages. *Deaf Studies and Deaf Education* 17(2). 163-93.

Klima, E.S., & U. Bellugi. 1979.*The Signs of language*. Cambridge University Press. Harvard, MA

Kluwin, Thomas, & Michael Stinson. 1993. *Deaf students in local public schools; backgrounds, experiences, and outcomes*. Charles Thomas Publisher. Springfield, Illinois.

Kretzschmar, William A. Jr. 2009. *The linguistics of speech*. New York:Cambridge University Press.

Kretzschmar, William A., Jr. 2010. Language variation and complex systems. *American Speech* 85(3). 263-286.

Kretzschmar, William A. Jr. 2015. *Language and complex systems*. New York. Cambridge University Press.

Lane, H., R. Hoffmeister, & B. Bahan. 1996. *A Journey into the Deaf world*. San Diego, California. Dawn Sign Press.

Liddell, S. &, R. Johnson. 1989. American Sign Language compound formation processes, lexicalization and phonological remnants. *Natural Language and Linguistics Theory* 8:445-513.

Loew, Ruth C, C.Tane Akamatsu, & Mara Lanaville. 2000. A two-handed manual alphabet in the United States. (215- 228). *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Lucas, Ceil, Gene Mirus, Jeffrey Levi Palmer, Nicholas James Roessler, & Adam Frost. The effect of new technologies on Sign Language research. *Sign Language Studies*. 13.4.

Lucas, Ceil. 2002. *Turn-taking, fingerspelling and contact in signed languages*. Washington, D.C.: Gallaudet University Press.

Lucas, Ceil, R. Bayley, & C. Valli. 2001. Sociolinguistic variation in American Sign Language. Washington, DC: Gallaudet University Press.

Lucas. Ceil & Clayton Valli. 1992.*Language contact and the American Deaf Community*.

Lucas, Ceil. Clayton Valli & Kristen Mulrooney. 2000. *The linguistics of American Sign Language*. Gallaudet University Press. Washington, DC.

Maxwell, M. M. 1988. The alphabetic principle and fingerspelling. *Sign Language Studies*, 61.377-404.

Mayberry, R., & Waters, G. 1991. Children's memory for sign and fingerspelling in relation to production rate and sign language input. In P. Siple & D. Fischer (eds.), *Theoretical issues in sign language research*. University of Chicago Press. Chicago. 211-229.

Marentette, P., & Mayberry, R. 2000. Principles for an emerging phonological system: A case study of language acquisition by eye. In C. Chamberlain, J. Morford & R. Mayberry (eds.), *Language acquisition by eye*. Mahwah, NJ: Lawrence Erlbaum.

Mendoza-Denton, Norma. 2008. Homegirls: Language and cultural practices among Latina youth gangs. Blackwell Publishing.

McKee, David & Graeme Kennedy. 2006. The distribution of signs in New Zealand Sign Language. *Sign Language Studies* 6(4). 373-90.

Michaels, J.W. *A handbook of the Sign Language of the Deaf*. Home mission board Southern Baptist Convention. Atlanta, Georgia.1923. https://archive.org/details/gu_handbooksignl00mich

Meier, Richard. 2004. *Why different? Why same? Explaining effects and non-effects of modality upon linguistic structure in sign and speech.* In Richard Meier, Kearsy Cormier, & David Quinto-Pozos (eds.), Modality and structure in signed and spoken language. Cambridge University Press.

Morford, Jill P. & James MacFarlane. 2003. Frequency characteristics of American Sign Language. *Sign Language Studies* 3(2). 213-25.

Mulrooney, Kristen. 2002. Variation in ASL fingerspelling. In C. Lucas (ed.), *Turn taking fingerspelling and contact in signed language*. Washington DC: Gallaudet Press.

Padden, Carol 1991.The acquisition of Fingerspelling by Deaf children. In P. Siple, S. Fischer (eds.), *Theoretical issues in Sign Language research*, 191-10. The University of Chicago Press.

Padden, Carol 1998. Early bilingual lives of Deaf Children. In Ila Paranis (ed.), *Cultural and language diversity and the Deaf experience*. Cambridge University Press.

Padden, Carol. 2004. Translating veditz. *Sign Language Studies*. 4(3).

Padden, Carol. 2006. Learning to fingerspell twice young signing children's acquisition of fingerspelling. In B. Schick, M. Marschark,&. P. Spencer (eds.), *Advances in Sign Language development for Deaf children*. New York: Oxford University Press. 189-201.

Padden, Carol & B. Le Master. 1985. An alphabet on hand: The acquisition of fingerspelling in Deaf children. *Sign Language Studies* 47; 161-72.

Padden, Carol & C. Ramsey. 2000. American Sign Language and reading ability in deaf children. In C. Chamberlain, J. P. Morford & R. I. Mayberry (eds.), *Language acquisition by eye* (165-89). Mahwah, NJ: Lawrence Erlbaum.

Padden, Carol & Vicki L. Hanson. 2000. Search for the missing link: The development of skilled reading in Deaf children. In K. Emmorey & H. Lane (eds.), *The signs of language revisited: An anthology to honor Ursula Bellugi and Edward Klima*. (371-381). Mahwah, NJ: Lawrence Erlbaum.

Padden, Carol & D. C. Gunsauls. 2003.How the alphabet came to be used in America Sign Language. *Sign Language Studies* 4, 10-33.

Patrie, Carol J. & Robert Johnson. 2011. *Fingerspelled word recognition through rapid serial visual presentation.* Dawn Sign Press.

Paul, Bob. 2005. .20th Century Chicago Stories: Deaf Lives and Experiences.DVD. Chicago.

Puente, A., J. Alvarado, & V. Herrera. 2006. Fingerspelling and sign language as alternative codes for reading and writing words for Chilean Deaf signers. *American Annals of the Deaf*. 151(3) 299-310.

Quinto-Pozos, D. (2010, September). Rates of fingerspelling in American Sign Language. Poster at 10th Theoretical issues in Sign Language research conference, West Lafayette, Indiana.

Sandler, Wendy and Diane Lillo-Martin. 1989. *Sign Language and linguistic universals.* Cambridge University Press, New York

Shembri, Adam & Trevor Johnston. 2007. Sociolinguistic variation in the use of fingerspelling in Australian Sign Language: A pilot study. *Sign Language Studies* 7(3). 319-34.

Sheridan, Martha. 2001. *Inner lives of Deaf children: Interviews and analysis*. Washington, DC: Gallaudet University Press.

Sheridan, Martha. 2008. *Deaf adolescents: Inner lives and lifeworld development*. Gallaudet University Press. Washington, DC.

Sidelecki, Theodore. & John D. Bonvillian. 1997. Young children's acquisition of the handshape aspect of American Sign Language signs. Parental report findings. *Applied Psycholinguistics*. 18. 17-39.

Singleton, Jenny , Gabrielle Jones, & Shilpa Hanumantha. 2014. Toward ethical research practices with Deaf participants. *Journal of Empirical Research on Human Research Ethics*. 2014, Vol. 9(3) 59–66. Retrieved web, http://jre.sagepub.com/content/9/3/59.refs March 4, 2015.

Stokoe, William C. 1960. *Sign language structure: an outline of the visual communication system of the American Deaf*. Buffalo, NY. University of Buffalo department of Anthropology and Linguistics. (1960).

Stokoe, William C., Dorothy C. Casterline, & Carl G. Croneberg . 1965. *A dictionary of American Sign Language on linguistic principles*. Washington, D.C.: Gallaudet University Press.

Stokoe, William C., Dorothy C. Casterline, & Carl G. Croneberg. 1976. *A dictionary of American Sign Language on linguistic principles*. Linstok Press.

Sutton-Spence, Rachel. B. Woll. L. Allsop 1990. Variation and recent change in fingerspelling in British Sign Language. *Language Variation and Change*. *2*. (313-330).

Woodward, Jr., James C. 1973. Some observations on sociolinguistic variation and American Sign Language. *Kansas Journal of Sociology* 9.2. (193-200) Web retrieved

Wager, Deborah S., *Fingerspelling in American Sign Language: A case study of styles and reduction*. A thesis submitted to the faculty of The University of Utah. Department of Linguistics. The University of Utah. August, 2012. http://content.lib.utah.edu/utils/getfile/collection/etd3/id/1800/filename/1785.pdf retrieved web October, 2014.

Wilcox, Sherman. 1992. *The phonetics of fingerspelling*. Amsterdam: John Benjamins Publishing Company.

Van Cleve, John Vickrey & Barry A. Crouch. 2007. *A place of their own: Creating the Deaf community in America*. Washington, DC. Gallaudet University Press.

APPENDIX A

PARENTAL PERMISSION FORM

UNIVERSITY OF GEORGIA
PARENTAL PERMISSION FORM
FINGERSPELLING AND DEAF ADOLESCENTS

Researcher's Statement
I am asking your child to take part in a research study. Before you decide that they can participate in this study, it is important that you understand why the research is being done and what it will involve. This form is designed to give you the information about the study so you can decide whether your child should be in the study or not. Please take the time to read the following information carefully. Please ask the researcher if there is anything that is not clear or if you need more information. When all your questions have been answered, you can decide if your child can be in the study or not. This process is called "informed consent."

A copy of this form will be given to you.

Principal Investigator: William Kretzschmar, Jr.
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Purpose of the Study: This study will help us understand what it is like to be a Deaf teenager today and will help us learn more about how Deaf teens use ASL and fingerspelling as compared to older Deaf adults. We already know a lot about how very young Deaf children learn language and use it. We also know a good deal about how Deaf adults use ASL. However, we do not have much information about what happens to ASL as Deaf teenagers use it during the period of transition from childhood to adulthood. We hope that this research will help us find similarities and differences with how teenagers use ASL and fingerspelling. Based on what we find, we will be able to provide a description of Deaf adolescent ASL use. We also want to compare Deaf teenagers use of ASL with how Deaf adults use language in their daily lives. As a second part of our

study, we plan to compile our video footage into a short film about Deaf teen life, which will be used for educational purposes. I am asking your child to be in this study because he/she is a student in a Deaf school, he/she uses ASL as their first language on a daily basis, and he/she uses English as their second language. We are asking your child to be in this study because he/she has something to say that will help educate the hearing world about deafness.

Study Procedures

If you agree for your child to participate, he/she will meet with the researcher individually and answer questions about life as a Deaf teenager. This interview is done individually with the researcher at the end of the school day when all classes are done or at a convenient time set aside by school administrators. The interview will take around 45 minutes to 1 hour and includes the following questions:

If you could make a movie or write a book about deaf teenagers, what would you want to tell the hearing world?

1. What would you tell hearing people about school?
2. What would you tell them about your friends and your social life?
3. What would you tell them about social media?
4. What would you tell them about family life?
5. What would you tell them about interpreters?
6. What would you tell them about communication/language?
7. What would you tell them about perceptions about hearing people and deaf people (how we see each other)?
8. What would you tell them about your future?

We will also ask your child to look at 50 pictures and show us the signs that he/she uses for them. This will help us compare signs used by teenagers to those used by adults.

Risks and discomforts:

We do not anticipate any risks or any discomforts from participating in this interview style research.

Benefits: There are several benefits of participation in this research.

1. This research gives Deaf teenagers a way to express themselves. This research lets Deaf teens express who they are and lets them tell about their experiences in their own language. It allows them to explain how they see themselves fitting into their local communities, the hearing world, and the broader Deaf-World. It allows them to say things that need to be said in order to educate the hearing world about deafness.

2. Historical Preservation of Language: Preserving a record of how Deaf teenagers use ASL today will expand the study and understanding of ASL structure, variation, and change over time.

3. It is possible that information from this study will help improve training of Deaf Ed teachers, ASL students and ASL interpreters. It could also help to improve the education of our Deaf teens.

Incentives for participation
The participants will not receive any incentive for being in this study. All students involved are participating on a voluntary basis.

Audio/Video Recording
Because American Sign Language is a visual language the use of video recording to document students signing is required. It is important to capture the hands since they are forming the signs but equally important is the face, eyes, mouth, eyebrows, forehead, shoulders, and nose. All parts of the head and neck region provide the grammar and meaning to sign language. In ASL it is necessary to see more than the hands to understand the total meaning of a message. Therefore, No blurring of face or eyes on the video recording will be possible since the grammar of this language is expressed on the face.

At the end of the research, we will compile some of the video footage into a short film to share in different schools and classrooms to give a voice to the teens working on our project. A copy of our short film on Deaf Teen Life will be presented at the school for students and teachers to view and a copy will remain in the school archives indefinitely. The short film will also be archived in the Linguistic Atlas Project Office, 317 Park Hall, Department of English, University of Georgia, Athens, GA which is used by linguists, educators, and others interested in how language is used in the United States.

Your child may still participate in this study even if they do not want their responses included in the Deaf Life short film. If you agree for clips of your child's video footage to be used in the short film please initial below:

_____My child's video footage may be used in the short film on Deaf Teen Life.

The use of photos and recorded information

Based on your agreement, the researchers may show images and video of your child in various settings. While the researchers will not post names of children in the video, it is possible that your child may be identified if someone recognizes your child's face and/or your child's name is signed in the video.

Please provide initials below to indicate how your child's photos and video may be used:

_____My child's photos and videos may be archived as part of the Linguistic Atlas Project and kept indefinitely.

_____My child's photos and videos may be used in educational presentations and writings to teach and train others. Images and videos used in educational presentations and publications will be kept indefinitely.

_____ My child's photos and videos may be used in research presentations and writing (publications) on topics such as, clearly explaining how signs are made or to show visual examples of how teen signs differ from adult signs. Images and videos analyzed and used in research presentations and publications will be kept indefinitely.

Privacy/Confidentiality

The researchers will collect data that can directly identify your child (i.e. images of your child's face.) When analyzing your child's data, the researchers will assign your child a code that can be used to link your child's name to the research data through use of a code key.

The key to the code linking your child's full name to the research data will be kept indefinitely. Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written permission unless required by law. When your child turns 18 years of age the researcher will obtain your child's contact information from the school so that they can get his/her consent as an adult to use any information gathered for further research analysis. Future use of the data may include a longitudinal study on language change of these adolescents as they become integrated into the Deaf adult world as well as further comparisons of fingerspelling at various ages.

Taking part is voluntary:

Your child's involvement in this study is voluntary which means you do not have to allow your child to be in this study if you do not want to. Your child may choose not to participate or may stop taking part at any time without giving any reason and without penalty or loss of benefits to which he/she is otherwise entitled.

Your child's grades in school will not be affected whether they choose to participate or not. If you decide to withdraw your child from the study, the information that can be identified as your child's will be kept as part of the study and may continue to be analyzed, unless you make a written request to remove, return, or destroy the information.

If you have questions

The main researcher conducting this study is Judi Oliver, a mom of a Deaf teenager herself, and a graduate student at the University of Georgia. Please ask any questions

you have now or later by contacting Judi Oliver at judiasl@uga.edu or at 706-614-3568. If you have any questions or concerns regarding your child's rights as a research participant in this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Consent to Participate in Research:
If you give permission for your child to voluntarily agree to take part in this study, you must sign on the line below. Your signature below indicates that you have read or had read to you this entire consent form, and have had all of your questions answered.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant's Parents Or Legal Guardian	Signature	Date

_____
Name of Participant

Please sign both copies, keep one and return one to the researcher.

APPENDIX B

PARTICIPANT CONSENT / ASSENT FORM

UNIVERSITY OF GEORGIA
ASSENT/CONSENT FORM
FINGERSPELLING AND DEAF ADOLESCENTS

Researcher's Statement
I am asking you to be in my research study. Since I am the mom of a Deaf kid this project is very important to me. Before you decide about joining my study, it is important that you understand why the research is being done and what you will do. This form is designed to give you the information about the study so you can decide whether you should be in the study or not. Please take the time to read the following information carefully. Please ask me if there is anything that you don't understand or if you need more information. When all your questions have been answered, you can decide if you can be in the study or not. This process is called "informed consent." A copy of this form will be given to you.

Principal Investigator: William Kretzschmar, Jr.
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Purpose of the Study: This study will help us understand what it is like to be a Deaf teenager today and will help us learn more about how Deaf teens use ASL and fingerspelling as compared to older Deaf adults. We hope that this research will help us find similarities and differences with how teenagers use ASL and fingerspelling. As a second part of our study, we will make a short film about Deaf teen life, which will be used for educational purposes. I am asking you to be in this study because you are a student in a Deaf school, you use ASL as your first language on a daily basis, and you have been in a Deaf school for most of your life. We are asking you to be in this study because you have something to say that will help educate the hearing world about deafness.

Study Procedures
If you agree to participate, you will meet with the researcher individually and answer questions about life as a Deaf teenager. The interview will take around 45 minutes. We will also ask you to look at 50 pictures and show us the signs that you use for them. This will help us compare signs used by teenagers to those used by adults.

Risks and discomforts:
We do not anticipate any risks or any discomforts from participating in this interview style research.

Benefits: There are several benefits of participation in this research.
1. This research gives Deaf teenagers a way to express themselves. This research lets you express who you are and lets you tell about your experiences in ASL. Through the film you can say things that need to be said to educate the hearing world about deafness.
2. Historical Preservation of Language: Preserving a record of how Deaf teenagers use ASL today will expand the study and understanding of ASL structure, variation, and change over time.
3. It is possible that information from this study will help improve training of Deaf Ed teachers, ASL students and ASL interpreters. It could also help to improve the education of our Deaf teens.

Audio/Video Recording
Because American Sign Language is a visual language the use of video recording to document your signing is required. No blurring of face or eyes on the video recording will be possible since the grammar of ASL is shown on the face. We want to protect your privacy. We will not use your name in any papers we write about this project.

At the end of the research, we will compile some of the video footage into a short film to share in different schools and classrooms to give a voice to students working on our project. A copy of our short film on Deaf Teen Life will be presented at your school for students and teachers to view and a copy will remain at the school. The short film will also be stored in the Linguistic Atlas Project Office, 317 Park Hall, Department of English, University of Georgia, Athens, GA which is used by linguists, researchers, educators, and others interested in how language is used in the United States.

The use of photos and recorded information

Based on your agreement, the researchers may show images and video of you in various settings. While the researchers will not post names of children in the video, it is possible that you may be identified if someone recognizes your face and/or your name is signed in the video.

Please provide initials below to indicate how your photos and video may be used:

_____My photos and videos may be archived as part of the Linguistic Atlas Project and kept indefinitely.

_____My photos and videos may be used in educational presentations and writings to teach and train others. Images and videos used in educational presentations and publications will be kept indefinitely.

_____ My photos and videos may be used in research presentations and writing (publications) on topics such as, clearly explaining how signs are made or to show visual examples of how teen signs differ from adult signs. Images and videos analyzed and used in research presentations and publications will be kept indefinitely.

Privacy/Confidentiality

The researchers will collect data that can directly identify your (i.e. images of your face.) When analyzing your data, the researchers will assign you a code that can be used to link your name to the research data through use of a code key. The key to the code linking your full name to the research data will be kept indefinitely.

Researchers will not release identifiable results of the study to anyone other than individuals working on the project without your written permission unless required by law. When a participant turns 18 years of age, the researcher will obtain his/her contact information from the school so that the research can get his/her consent as an adult to use any information gathered for further research analysis. Future use of the data may include a longitudinal study on language change of these adolescents as they become integrated into the Deaf adult world as well as further comparisons of fingerspelling at various ages.

Taking part is voluntary:

Your involvement in this study is voluntary which means you do not have to be in this study if you do not want to. You may choose not to participate or may stop taking part at any time without giving any reason and without penalty or loss of benefits to which he/she is otherwise entitled. Your grades in school will not be affected whether they choose to participate or not. If you decide to withdraw from the study, the information that can be identified as yours will be kept as part of the study and may continue to be analyzed, unless you make a written request to remove, return, or destroy the information.

If you have questions

The main researcher conducting this study is Judi Oliver, a mom of a Deaf teenager herself, and a graduate student at the University of Georgia. Please ask any questions you have now or later by contacting Judi Oliver at judiasl@uga.edu or at 706-614-3568. If you have any questions or concerns regarding your rights as a research participant in

this study, you may contact the Institutional Review Board (IRB) Chairperson at 706.542.3199 or irb@uga.edu.

Research Subject's Assent/Consent to Join in Research:
If you sign below it shows that you have read or had read to you this whole consent form, and have had all of your questions answered.

Assent:
If you are under 18 years old, this form serves as your agreement (or assent) to participate in the research. In order to participate in this research, your parent/guardian will need to agree to your participation and sign the parental permission form. If you sign below, it means that you understand what you will do in this research. If you sign below it means that you had all of your questions answered, and you agree to join in this research project. Please keep a copy of this form for your records.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Consent:
If you are 18 years old or older, this form serves as your consent to participate in the research. By your signature, you are indicating that you understand the above-described research procedures, have had all of your questions answered, and agree to participate in this research project. Please keep a copy of this form for my records.

_____	_____	_____
Name of Researcher	Signature	Date
_____	_____	_____
Name of Participant	Signature	Date

Please sign both copies, keep one and return one to the researcher.

APPENDIX C

ELICITATION PICTURE TASK

Tokens

1. Target
2. Chick-fil-A
3. Wal-mart
4. Cell phone
5. Off campus
6. Coke
7. Chips
8. Burger King
9. Wendy's
10. Inch
11. Birthday cake
12. Mailbox
13. Sunburn
14. Gasoline
15. Facebook