

**Developing Students' First Language through a Second Language Writing Intervention:
A Simultaneous Approach**

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To my family and friends who supported me during this process...

my dad, Rick
for wiping my every tear and celebrating my every success

my mom, Maggie
for understanding the things I don't say

my grandparents & aunt, Ralph, Joan, Jerrald, Wilma & Mary
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ABSTRACT

Deaf and hard of hearing (d/hh) children often acquire an L1 after age 3, thus are arguably more diverse than that of the general bilingual population. A unique problem therefore exists among d/hh late language learners—they often do not have an L1 to later develop an L2. This study investigated the impact of an English writing intervention (Strategic and Interactive Writing Instruction, SIWI) that incorporates support for the development of American Sign Language in an effort to illustrate the necessity of explicitly addressing the proposed interdependence of language learning.

The research involved providing 23 upper elementary and middle school d/hh students with SIWI. SIWI has been shown to have a significant impact on student outcomes in language and literacy. The study was conducted in five classrooms—one fourth, two fifth, and two sixth grade classrooms—over a twelve-week period at a state residential school for the deaf. This allowed for two weeks of pre-test, mid-test and post-test administration, five weeks of regular instruction, and five weeks of intervention. The students received SIWI for four forty-five minute sessions and one thirty-minute session each week for a total of five weeks. The intervention replaced their regular 45 minutes of writing instruction.

In order to measure expressive language growth in ASL, language samples for each student participant were collected. These samples were analyzed to chart expressive language growth during the time period with no SIWI intervention and while engaged in SIWI by reviewing them for students' mean length of utterance (MLU), use of unintelligible utterances, and specific grammatical features of ASL, and individually for patterns of ASL expressive language growth. Repeated measures ANOVAs (within and between subjects) conducted for

students' MLU and unintelligible utterances revealed statistically significant growth after five weeks of SIWI.

This study demonstrates the reciprocity of language learning. The foregrounding of written English supported the development of a more nuanced understanding of the use and features of ASL.

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CHAPTER 1: INTRODUCTION

Just as hearing children who are struggling readers often begin to believe that good reading is a talent, and consequently think that effort in this area seems pointless (Stahl, 2003), deaf and hard of hearing (d/hh) students struggling with language experience similar frustrations when developing literacy skills. Not only are these students struggling with the task of reading English text, but also they are learning the written form of a language that does not coincide with their natural mental grammar (Goldin-Meadow, 2005)¹. D/hh students develop reading and writing skills in English while simultaneously attempting to develop an expressive language for communicative purposes. This makes acquisition of language a daunting task. Such students need quality instruction in the form of an intervention that refutes the developed learned helplessness and convinces them that they can succeed in language and literacy tasks (Stahl, 2003).

Rationale

The focus of the current study is d/hh students in the upper elementary and middle grades for three reasons. First, relatively little is known about effective language and literacy interventions for students in these grades since early grades have typically been the target of literacy intervention and research (e.g., Pressley, Allington, Wharton-McDonald, Collins Block, & Morrow, 2001). A second reason for focusing on the middle grades is that this is a time when thoughtful literacy needs to be developed and supported. According to Allington and Johnston, (2002) thoughtful literacy “is characterized by the ability to read, write and think in complex, critical ways needed in a postindustrial democratic society” (p. 14); therefore, thoughtful literacy, including

¹ Mental grammar refers to one’s innate capacity for organizing language.

thinking in complex, critical ways, must be a priority for teachers and students beyond the elementary grades. Indeed literacy or even biliteracy are insufficient as educational goals if they remain at the level of "functional literacy" and fail to promote "critical literacy." Students must learn not only to "read the word," but also to "read the world" (Freire and Macedo, 1987).

Finally, the middle grades are the focus for this study because d/hh students typically make little literacy progress during these years. Yoshinaga-Itano, Snyder, and Mayberry's (1996) research shows that d/hh students make a meager one year gain in reading comprehension and vocabulary development between the ages of twelve and twenty-two. At the age of twelve, d/hh students have also been shown to have substantial troubles with word- and sentence-level writing skills. In addition, Musselman and Szanto (1998) describe a writing plateau in the areas of semantics and syntax for adolescent d/hh writers.

According to Nelson, Loncke, and Camarata (1993) such plateaus in literacy progress and trends towards low achievement in literacy among d/hh students are often caused by late language acquisition as a result of limited exposure to a fully accessible language (American Sign Language, ASL) and/or limited access to spoken English. Since more than ninety-percent of d/hh students have hearing parents who are unfamiliar with sign language (Mitchell & Karchmer, 2004), it cannot be assumed that d/hh children have had accessible language models during their childhood and have naturally acquired a fully developed first language (L1). The lack of access to effective language models and a lack of full access to spoken language suggests that a large percentage of d/hh

students experience significant language delays, and may therefore struggle with language and literacy development.

In order to address the unique literacy needs of middle grades d/hh learners, instruction needs to be provided in an accessible language with which they can formulate and express complex and critical thoughts in a way that compliments their natural mental grammar (Goldin-Meadow, 2005). A focus on language must be linked with extensive input in the target language (e.g. through reading) and extensive opportunities for written and oral use of the language. When such instruction is not available, learners are at a disadvantage because they lack the language base for the complex ideas involved in thoughtful literacy. In response to the lack of substantial evidenced-based effective instructional practices in the field of deaf education (Luckner, Sebald, Cooney, & Muir, 2006), the current study will address the development of American Sign Language (ASL) while providing instruction to simultaneously increase writing abilities in English.

Purpose of the Study

Cummins' (1979) theory suggests a common underlying proficiency in cognitive and language abilities as a result of a developed L1, and that developing an L2 is easier once an L1 has been established. Similarly, according to Krashen (1991) a developed L1 is necessary for the acquisition of an L2. This study examines d/hh students' development of ASL during English writing instruction that supports the use of ASL through student and teacher interactions. The question of the influence of one language on another has been examined from different perspectives, which offer different assumptions about the possibility of developing an L2 without a fully developed L1. This study will investigate the impact of Strategic and Interactive Writing Instruction

(SIWI), an English writing intervention, on ASL growth in an effort to illustrate the benefits of explicitly addressing the interdependence of languages for d/hh students.

Significance of the Study

Prior research reveals that students who are d/hh make significant gains in word- and sentence-level and discourse-level written language skills such as, length, complexity, and grammatical accuracy, when Strategic and Interactive Writing Instruction (SIWI; Wolbers, 2008, 2010) is implemented. This study will investigate the relationship between SIWI and ASL growth that has already been implied by informal observations and teacher anecdotes in the context of SIWI workshops.

Research in literacy shows similar patterns of outcomes across sub-populations of d/hh students. Students are either very successful, or they show a consistent pattern of failure in both reading and writing. This is contrary to the popular misconception that achievement is linked with degree of hearing loss, with students who can hear more achieving at higher levels. Karchmer and Mitchell dispelled these misconceptions in their 2003 study by demonstrating that neither academic setting nor degree of hearing loss are significantly related to achievement in literacy. Rather, trends of high or low achievement in literacy are evident across academic placements (mainstream, self-contained classes, residential schools) as well as across students using different amplification devices (hearing aids, cochlear implants).

Antia, Reed, and Kreimeyer (2005) tried to explain success or failure in literacy among d/hh students by comparing outcomes while considering a range of variables including: socioeconomic status, hearing loss, grade, interpreter use, hours in class, preferred mode of communication and gender. They were only able to account for 18%

of the variance in achievement, and degree of hearing loss only explained 4% of the total variance. They neglected, however, to use the presence of a fully developed L1 either as a constant or a variable in their study. L1 development could therefore be a confounding factor that explains a large percentage of the variance Antia et al did not capture. The unifying factor among students who excel regardless of amplification choice or academic placement could be the full development of an L1, but no existing research examines this hypothesis (Trezek, Wang, & Paul, 2010).

Research questions. This study will specifically address the research questions below. The first four questions investigate the impact of SIWI on ASL development across subgroups. In the event that significant growth is identified in any subgroup, the final question will investigate the patterns of language growth. The first question reviews students' ASL expressive language growth during an English writing intervention (Strategic and Interactive Writing Instruction, SIWI). The second question distinguishes between ASL expressive language growth made by students with diverse language proficiencies. The third and fourth questions target the growth of specific ASL features during the intervention. The last question investigates patterns in students' expressive language growth.

1. Do deaf and hard of hearing students receiving Strategic and Interactive Writing Instruction demonstrate significant growth in ASL?
2. Do students with higher and lower language proficiencies exhibit significantly different growth in ASL?
3. Do students show significant growth in the use the location/space and movement?

4. Do students with higher and lower language proficiencies exhibit significantly different growth in the use of location/space and movement?
5. What patterns of ASL expressive language growth do deaf and hard of hearing students exposed to Strategic and Interactive Writing Instruction exhibit?

Definition of Terms

The following definitions are given to clarify the essential terms presented in the following chapters. Reagan (2010) identifies the difficulty of using argot typically associated with second language learners when discussing d/hh students by providing this reminder: “The case of deaf people presents an especially interesting example of the limitations of traditional discourse about ‘mother tongue’ and ‘native language’... What is important to note here is that in most cases the deaf child’s exposure to language (whether spoken or signed) is delayed” (p. 4). As briefly described in the introduction and expanded on in Chapter 2, this is due to the unique and diverse manner in which d/hh students are exposed to language.

1. *Deaf and Hard of Hearing Students*: students who have any degree of hearing loss, ranging from mild to profound.
2. *First Language*: the language a person has acquired from birth or within the critical period (Bloomfield, 1933).
3. *Native Language*: the language of one’s ethnic or cultural group, or the basis for one’s sociolinguistic identity (Davies, 2003).
4. *Natural Language*: a spoken, signed or written language that has evolved naturally and develops in an involuntary manner as a result of the innate facility for language.

5. *Manually Coded Language/ Manual Sign Codes/ Constructed Language*: an artificially created visual representation of a spoken language's syntax and vocabulary that did not evolve within a community (Reagan, 2010; Gopsill, 1990; Emmorey, 2001).
6. *American Sign Language*: A natural language, which developed in Deaf communities, that conveys meaning through a combination of hand movement and location, palm orientation, handshapes, and non-manual features (e.g., facial expressions, body position) (Valli, Lucas, Mulrooney, 2005).
7. *Mental Grammar*: innate capacity for organizing language (visual-spatial or auditory) (Goldin-Meadow, 2005).
8. *Strategic and Interactive Writing Instruction (SIWI)*: an instructional approach grounded in cognitive theories of composing, sociocultural theories of teaching and learning, and L2 theories (Wolbers, 2008).
9. *Total Communication (TC)*: a communication philosophy that supports the use of visual, auditory, and written, modes (Lowenbraun, Appleman, Callahan, 1980).
10. *Simultaneous Communication (sim-com)*: a communication system in which signs borrowed from ASL and manually coded English are placed in English word order so the signer can support spoken English with manual cues (Tevenal & Villanueva, 2009).
11. *Morphology*: the aspect of language concerned with the rules governing change in word meaning (Davis, 2010; Owens, 2001).

12. *Mean Length of Utterance (MLU)*: calculated by dividing the total number of morphemes by the total number of utterances (Adrian, 1995).

13. *T-Unit*: the shortest grammatically allowable sentence that contains an independent clause and any subordinate clauses that cannot survive on their own (Hunt, 1965).

Terms for students learning languages. These terms are not used consistently throughout the cited research. For the purposes of this dissertation the following definitions will be used:

14. *English Language Learners*: students who are learning English after acquiring a previous language(s).

15. *Second Language Learners*: students who are learning a second language after previously acquiring a first.

16. *Multi-Language Learners*: students who are simultaneously learning more than one language.

17. *Bilinguals*: students who have learned, or are learning, two languages.

Organization of this Dissertation

Four additional chapters follow this dissertation introduction. The second chapter presents a review of literature supporting this study by describing the complexities of language learning for d/hh students. Chapter 3 examines the methodology of this study, including a description of the participants and setting, the data collection procedures, and methods for examining the data. The fourth chapter explores the findings of this study. The dissertation is concluded in Chapter 5 with a discussion of the implications of the findings.

CHAPTER 2: REVIEW OF THE LITERATURE

Chapter Introduction

Luckner, Sebald, Cooney, Young & Muir (2006) found that that over the past 40 years there have been 964 articles published in peer-reviewed journals related to deafness and literacy; this means that, on average, approximately 24 articles per year are dedicated to this major issue in deaf education (Wolbers, 2007). Over 500 of the articles were immediately eliminated from the authors' intended meta-analysis because they were literature reviews, practitioner articles, or descriptive papers; 425 other articles were removed because they did not meet the authors' established methodological requirements (e.g., include a control group, description of the intervention, literacy as an independent variable). Only 22 of the remaining articles were evidence-based studies, and less than five related to writing. The intended meta-analysis was not conducted because no two studies addressed the same aspect of literacy (Luckner, et al, 2006). Luckner and Handley (2008) followed Luckner's previous article by reviewing a specific component of literacy: reading comprehension. They found that there have been 52 articles related to reading comprehension research and deafness published in the last 40 years. None of the studies presented findings related to first language (L1) acquisition with deaf and hard of hearing (d/hh) children.

The paucity of research related to the combination of literacy, deafness, and L1 acquisition (Trezek, Wang, Paul, 2010) led to the review of three bodies of research that support and influence this study: 1) language acquisition, 2) L1 development, and 3) dialogic inquiry. In this chapter, a review of language acquisition and the heterogeneous nature of deaf students as a subpopulation of bilinguals are presented. Then a review of

the possibility of developing an L1 with d/hh children will be discussed. Finally, the possibility of dialogic inquiry as a way to facilitate the simultaneous learning and development of first and second language (L2) acquisition is explored.

Language Acquisition

L2 acquisition. Research in second-language acquisition broadly falls into one of two perspectives, which adhere to different program implementations and are grounded in different philosophies. Bilingual programs are based on the notion that L1 knowledge supports L2 acquisition (Cummins, 1979; Krashen, 1991). In contrast, immersion programs posit that students will acquire a second (or target) language more efficiently if they are exposed to the target language more exclusively. In other words, languages are developed autonomously and independently (Paradis & Genesee, 1996). This is based on the maximum exposure hypothesis: though students may apply metalinguistic knowledge from their first language, there is no need to further develop an L1 when acquiring another because exposure to the target language takes precedence (Porter, 1990; Meisel, 2007). In contrast, Cummins (1999) points out that, “instructional time devoted to promoting bilingual students’ L1 literacy entails no adverse consequences for English language or literacy development” (p. 3). Even though these perspectives theoretically diverge, both engage in discussions about linguistic transfer, which establishes the following guiding question for this review: Do languages influence each other (Castilla, Restrepo, Perez-Leroux, 2009)?

Language interdependence. Cummins (1979) and Krashen (1991) hypothesize that the patterns learned in one language transfer to a second. They state that an L2 is acquired in a similar manner to which an L1 is acquired; therefore, it is necessary that an

L1 be established to promote the development of the L2. Their research supports the notion that the interdependence between languages has the potential to promote gains in both languages during language instruction. A threshold level of competence in a learner's L1 allows them to achieve his/her potential in L2 (Cummins, 1979). Cummins (2005) states that the interdependence hypothesis not only refers to language development but also to “a deeper conceptual and linguistic proficiency that is strongly related to the development of literacy in the majority language” (p. 4).

Cummins' interdependence hypothesis can be described as dual icebergs. Linguistic features of L1 and L2 surface above the water as separate icebergs, but the base of both icebergs is a common underlying proficiency of language (Figure 1).

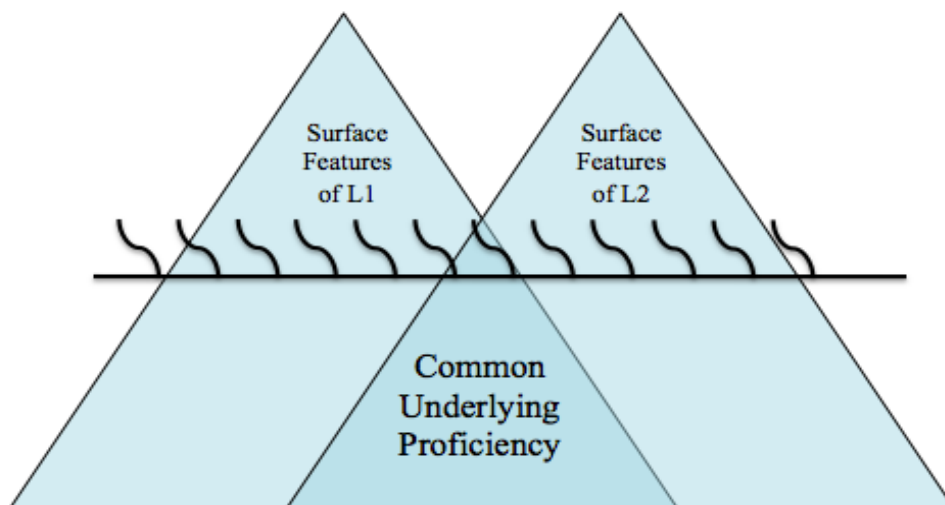


Figure 1. Cummins' Iceberg Model of Language Interdependence.

Though we cannot assume a d/hh student's first language is American Sign Language (ASL), according to Paul (1990) their native language *will be* a visually- and spatially-based language. Knowledge of, and access to, a visual and spatial mode of communication has the potential to support the development of a common underlying language proficiency. Cummins argues that a developed L1 is necessary for L2 acquisition, yet L2 instruction often supplants (or happens without concurrent) opportunities to develop an L1. His theory further states that instruction in a child's L1 "cultivates a deeper conceptual and linguistic competence strongly related to the development of general literacy and academic skills" (Prinz & Strong, 1998). One example of an intervention that considers the theory of language interdependence is Strategic and Interactive Writing Instruction (SIWI), which is an intervention designed for d/hh students that targets linguistic competence by making explicit connections and comparisons between English and ASL (Wolbers, 2008).

L1 acquisition for deaf and hard of hearing students. Even though there is considerable debate about how to classify bilingual children because of the heterogeneous nature of the population (Genesse, Paradis, and Crago, 2004; Castilla, 2009), there is agreement that two main types of bilingual children exist: simultaneous and sequential bilinguals. The first type refers to children who learn two languages from birth, also known as bilingual L1 acquisition (Castilla et al, 2009). After the age of three, all children learning an L2 are considered sequential bilinguals, which refers to children who learn their native language prior to being introduced to an L2 (Genesse et al., 2004).

This study examines a subpopulation of language learners, middle grades d/hh children, who are arguably more diverse than that of the general bilingual population due

to the unique manner in which an L1 is acquired. Deaf and hard of hearing children often acquire an L1 after age 3 and therefore do not fit neatly in either category of bilinguals. Additionally, d/hh children may develop English or ASL as their L1 depending on exposure. A unique problem therefore exists among d/hh late language learners—they often do not have an L1 to later develop an L2.

Considerations for ASL as deaf students' L1. Since approximately 95% of deaf children are born to hearing parents (Mitchell & Karchmer, 2004), we estimate that 5% of deaf children are born into environments that support the natural acquisition of ASL as an L1. Bialystok (2007) would argue, however, that even students who learn ASL as a first language lack the prerequisite skills for literacy because ASL does not have a written component. Bialystok (2007) states that there are three prerequisite skills for the acquisition of literacy and claims that bilingual children need to have developed all three in their L1 to be successful when learning an L2. The three skills are: 1) competence with the expressive language, 2) understanding of print, and 3) metalinguistic awareness. Since ASL has no print component, even when ASL has been fully developed deaf children do not have access to print in their L1, so they inherently must learn to read and write in a second language (English).

Considerations for English as deaf students' L1. Deaf children may learn English as an L1 by accessing it through methods that support English. Spoken English can be used to support the development of English as a child's L1 through lip-reading and residual hearing. Lip-reading provides children with access to approximately 40% of sounds (Schow & Nerbonne, 2002), and it must be considered that some sounds are phonetically similar (e.g., p and b, c and k) and it requires training to acquire lip-reading

skills. Manual communication modes like fingerspelling and English-based signing systems can also support the development of English as an L1. Fingerspelling complete English utterances and using signs to support spoken English help students access a more complex form of English. However, none of these methods provide *all* students with *full* access to English and its print system.

It must be considered that deaf children will have varying levels of English language input based on the amount of hearing they have and the manner in which the support methods were utilized. Therefore, they may not follow typical patterns of language acquisition. Even though d/hh children with English as their L1 can learn to read and write in their L1, they often struggle to do so because impoverished input has not allowed them to fully develop their understanding of English morphology, syntax, semantics and pragmatics.

Perpetuating the problem. Deaf and hard of hearing children experience more positive gains when they have early access to *comprehensible* communication, whether that is oral communication or ASL (Goppold, 1988; Musselman, Lindsay, & Wilson, 1988). Children who have received English input with limited accessibility through Manually-Coded English (MCE) or speech, may have developed some communication skills, but have not had the opportunity to acquire a fully developed language (Snodden, 2008). The problem of underdeveloped L1s is perpetuated when deaf children are provided with limited exposure to a full language. Even when combining approaches, such as: speech, cued speech, contrived signing systems, visual phonics, simultaneous-communication (sim-com), English, and ASL, there is no guarantee of full access. Even with a variety of approaches, lack of complete access to English or ASL does little to

promote language acquisition and development, and fosters confusion in both (Kuntze, 1998; Meier & Newport, 1990; Chamberlain, 2002).

Manually-Coded English (MCE). Even though delays in deaf children's L1 are prevalent, the most commonly used mode of communication in educational settings is an artificially constructed language, MCE (Singleton, Suppalla, Litchfield & Schley, 1998). MCE is not a natural language, it is a signed representation of English that is often combined with spoken English. The philosophical shift from oralism toward favoring manual communication in the 1970's led to the creation of the contrived MCE systems, such as signed English (Bornstein, 1990), Signing Exact English (Gustason, Pftzing, & Zawolkow, 1980), Seeing Essential English (Anthony, 1971), and Cued Speech (Fleetwood & Metzger, 1998). Even after thirty years of implementation of MCE "deaf children's academic achievement, and more specifically, their English proficiency outcomes, are still a disappointment" (Singleton et al, 1998, p. 17).

Simultaneous-Communication (Sim-Com). Sim-Com borrows signs from ASL and MCE and places them in English word order so the signer can support spoken English with manual cues (Tevenal & Villanueva, 2009); yet, "such signing has no independent linguistic status and therefore is not a kind of sign language" (Johnson, 1983, p. 49). A reoccurring theme in studies by Schiavetti and Whitehead (1995, 1998) is that inconsistencies with both languages, ASL and English, occur when trying to produce both simultaneously. Studies by Baker (1978) and Marmor and Petitto (1979) revealed that manual output was compromised when teachers employed sim-com. For example, in Johnson, Liddell, and Erting's 1989 study on implementation of sim-com, they found that teachers produced signs that did not reflect their intended purpose (e.g.,

teachers signed “devil” and “horse” when the spoken word was “bunny”). Wilber and Petersen (1998) further described the challenges of integrating ASL with English, “It would be as difficult to sign ASL and speak English at the same time as it would be to speak one language and write another at the same time” (p. 207). For these reasons, it is not uncommon to find children who are well into their school careers who do not have a full L1.

Aural-oral approach. A number of children attend programs that continue to adhere to an aural-oral approach (auditory-oral, auditory verbal) to teaching and learning even after children in these educational placements experience academic failure and a plateau in language learning (Snodden, 2008). In aural-oral programs, emphasis is placed on therapy designed to teach d/hh children to use their residual hearing to understand spoken language, while all academic instruction is provided in spoken English, regardless of students’ hearing loss and access to language. Snodden (2008) points out, “even children with a mild degree of hearing loss have been shown to be at risk for difficulties in language development” (p. 583).

The spoken message will often be reinforced with visual cues or prompts to increase speech perception abilities (Bergeron, et al., 2009). The fact that they have to do this indicates that some students do not have complete access to the language of instruction and are at risk for difficulties in language development (Bess, Dodd-Murphey, & Parker, 1998; Meadow-Orlans, Mertens, & Sasss-Lehrer, 2003; Spencer, 2004). Marschark, et al., (2007) reported that d/hh students who used ASL understood questions more readily than those who used English. Additionally, Heiling (1995) found that children who were taught sign language at the preschool or kindergarten level made

significantly greater academic gains, especially in the understanding and use of written language, by eighth grade when compared to students with oral training.

Addressing L1 Development

American Sign Language (ASL) is considered deaf students' natural language (Stokoe, 1979) because of the link between form and meaning provided by a visual-spatial language structure (e.g., Paul, 1990; Jamieson, 1995; Thompson, Vinson, Vigliocco, 2009). Linguistic studies have proven that ASL has a lexicon, components that are equivalent to phonemes, and an established grammatical structure (e.g., Stokoe, Casterline, & Croneberg, 1965). Goldin-Meadow (2005) describes the use of gesture as a natural means to communicate ideas. Even though it is true that not all d/hh students have had access to ASL during their primary years (Mitchell & Karchmer, 2004), ASL promotes the ability to communicate ideas and thoughts in a conceptual manner that allows d/hh students to access information and match it with their existing internal voice (Goldin-Meadow, 2005).

One possible outcome of an intervention that addresses the development of deaf children's L1 is greater literacy achievement in English (Baker & Baker, 1997). Drawing on several studies, Markowicz (1972) explained that several studies indicate children who learn ASL during the primary years maintain an advantage throughout their academic careers. Likewise, Daniels (1993) showed that preschoolers who learn ASL score significantly higher on the Peabody Picture Vocabulary Test—Revised (PPVT-R), indicating more extensively developed vocabularies. According to Baker and Baker (1997), programs that develop communicative competency should be implemented with

deaf children. Developing communicative competency, as shown through the cited literature, has a significant impact on d/hh students' achievement.

Finnegan (1992) synthesized several studies and wrote that, "...effective language has to be fast and clear. ASL is an efficient language for visual learning and is easier for deaf children to acquire as an L1 than any form of English" (p. 7). Based on the stance that ASL is easier to acquire than contrived signing systems (e.g., Signing Exact English, Seeing Essential English), ASL can provide students access to academic content and world knowledge (Johnson, Liddell, & Ertling, 1989). ASL has proven to have a fully intact grammar (Stokoe, 1979), therefore the opportunity to develop this language is imperative as it may be the only language they can fully develop. Additionally, greater ASL proficiency is positively linked with greater English proficiency (Singleton, Supalla, Litchfield, & Schley, 1998). An approach, such as SIWI, that integrates both English and ASL instruction has the possibility of promoting English proficiency as well as providing greater access to content knowledge by increasing linguistic competence.

Transition from ASL to written English. Another promising possibility of implementing an intervention that addresses the development of English and ASL is facilitation of the transition from comprehension of ASL and students' inner speech, or verbal thinking, (Vygotsky, 1987), to written language and comprehension of text in another language. Vygotsky claims that inner speech is the transition between communicative fluency and written abilities. The gap between inner speech and mastery of literacy skills is evident not only with deaf students, but also among hearing children who have exposure to an L1 that has a corresponding written form (Kress, 1982). By providing deaf students with a language that allows them to organize and categorize their

thoughts (e.g., Paul, 1990; Goldin-Meadow, 2005), there is a possibility that the instructor could reinforce the development of a visual-spatial inner speech (Mayer & Wells, 1996) while explicitly identifying how the transition of their more complex thoughts in ASL could be applied to English. Furth (1973) and Rodda and Grove (1987) found that the thinking and reasoning of deaf children are equivalent to those of hearing children if the use and modeling of sign language is present. It has also been found that deaf children effortlessly learn ASL even without instruction when exposed to it (e.g., Lillo-Martin, 1996; Meier, 1991), so the addition of explicit instruction in a language that “makes sense” will allow the instructor to demonstrate the transition between languages. This could be accomplished through the construction of English text while highlighting the similarities and differences between English and ASL’s grammar and non-manual features (e.g., facial expression, body placement, mouth movements).

Building L1 metalinguistic awareness. Also, implementing an intervention that incorporates deaf children’s L1 and L2 provides an opportunity to address the lack of one-to-one word-sign correspondence between English and ASL (Tevenal & Villanueva, 2009). Students who have not fully developed ASL as their L1, may not recognize the structure of the language, and in turn will not recognize how ASL is syntactically different from English. Without this metalinguistic awareness, difficulties in writing can emerge. One common source of difficulty is that free morphemes in ASL are typically easy to write in English because there is a relationship between signs and English words at the lexical level, yet, bound morphemes do not have a one-to-one correspondence between ASL and English (Mayer & Wells, 1996). For example, in ASL the English sentence “The dog is mean” can be signed “DOG-POINT-MEAN”. With no knowledge

of the difference in structures of the two languages it would make sense to write exactly what is signed; however, if d/hh students are provided with instruction that addresses their L1 and L2, these types of syntactical differences can be addressed and the students can begin to develop a repertoire of English skills based on their understanding of ASL.

Dialogic Inquiry: Creating a context where L1 development can happen

In the 2006 Executive Summary *Developing Literacy in Second Language Learners: Report of the National Literacy Panel on Language-Minority Children and Youth*, August and Shanahan present the following finding: “Oral proficiency and literacy in the L1 can be used to facilitate literacy development in English” (p. 5). This finding supports the use of dialogic inquiry with English language learners (ELL), since dialogic inquiry addresses the need for a fully developed language. The principles of dialogic inquiry would also suggest an intervention that addresses language learning by interweaving classroom conversations with instruction. This allows for the development of higher-level thinking and reasoning skills (Haneda & Wells, 2008).

Two fundamental principles of dialogic inquiry are: 1) creating a shared understanding to connect, build, and respond, and 2) improvising to allow for students to talk in order to construct knowledge and understanding. Engagement in higher order thinking through active verbal engagement, promotes language growth by supporting and developing language to express thoughts and ideas (Haneda & Wells, 2008; Wells, 2000).

Content. In all grades, teachers are facing quite a bit of pressure to teach standards-driven content objectives in order to prepare students for state-mandated standardized testing (Goodson & Foote, 2001). Coleman and Goldenberg (2010) claim that the pressures are compounded when teaching students who are learning English

because “the fundamental challenge ELLs in all-English instruction face is learning academic content while simultaneously becoming proficient in English” (p. 10). The primary objective of content-area instruction is acquiring knowledge of academic disciplines, but to achieve this proficiency, facility with academic language is essential (Coleman & Goldenberg, 2010). In order to acquire content vocabulary and the critical-thinking-skills that are required for success in content-area classes, ELLs must learn how to use conversational language to apply to the discussion of academic content.

Similarly, teachers of the deaf encounter students who need additional support in developing language and are thus faced with an additional dilemma—focus on content objectives or provide opportunities to foster L1 growth. They are in need of an intervention that has the power to simultaneously develop language while helping students develop content knowledge. Teachers’ ability to use language as a tool to mediate learning of content objectives is severely impaired. An intervention that promotes the development of ASL with deaf and hard of hearing students while covering content could thus potentially have double the impact and tie language and content learning together.

Summary of this Chapter

In this chapter a review of the literature about language acquisition, L1 development and dialogic inquiry were presented. Also, a presentation of literature that addresses specific language considerations of deaf and hard of hearing language learners was synthesized.

Chapter 3 will examine the methodology of this study, including a description of the participants and setting, the data collection procedures, and methods for examining the data.

CHAPTER THREE: METHODOLOGY

Chapter Overview

This study examines the relationship between Strategic and Interactive Writing Instruction (SIWI) and deaf and hard of hearing (d/hh) students' growth in American Sign Language (ASL). The research questions for this study were in part inspired by teacher anecdotes as well as Cummins' theory of interdependence and Krashen's theory of language acquisition. Below are quotes from teachers that reflect their experiences following exposure to SIWI methodology:

"...at the beginning of the year I had students who were quiet and uninvolved in classroom discussions. As the year progressed, they began to challenge their peers' ideas and offer suggestions."

"...when they were misunderstood or didn't understand others, they remained silent; later in the year, they attempted to clarify and asked others for clarification."

"Some students 'shut-down' and refused to participate in class—they would close their eyes, leave the room. After a few months these same students wanted to become the lead author and share their ideas with their classmates."

The nature of the research questions, in turn, determined the methodology of this study. A mixed methods research design allowed for comparisons of students' expressive language prior to intervention and post intervention.

This chapter will begin with a review of the research questions that guided the study, and a description of the research site and participants. Next, the data collection process will be described, and an explanation of the data analysis procedures, including

an overview of SIWI, will be provided. The chapter is concluded with a description of how these research methods addressed the research questions.

Research Questions

1) Do deaf and hard of hearing students receiving Strategic and Interactive Writing Instruction demonstrate significant growth in ASL? 2) Do students with higher and lower language proficiencies exhibit significantly different growth in ASL? 3) Do students show significant growth in the use of two ASL grammatical features, location/space and movement? 4) Do students with higher and lower language proficiencies exhibit significantly different growth in the use of location/space and movement? 5) What patterns of ASL expressive language growth do deaf and hard of hearing students exposed to SIWI exhibit?

School Context and Participants

Description of research site. The research was conducted at a southeastern residential state school for the deaf (SFD) in one fourth grade classroom, two fifth grade classrooms, and two sixth grade classrooms. Data were collected from one site, SFD, which houses an elementary, middle, and high school. SFD is the only residential school for the deaf in the state; having one residential school for the deaf per state is typical for most states. Since this study targeted language growth in upper-elementary grades, the intervention was implemented in the elementary and middle school at SFD. SFD provides preschool through post-graduation instruction for approximately 160 d/hh students from across the state. The school's official communication philosophy is total communication (TC); however, it is applied as simultaneous-communication (sim-com).

In order to simultaneously adhere to principles of sim-com and SIWI instructional principles, the teacher/researcher used the following techniques: 1) repeat and use students' ASL expressions; 2) use sim-com to introduce ASL concepts; 3) introduce students to other signers through classroom visitations and videos, and discuss ASL usage; 4) incorporate ASL features in sim-com; 5) utilize a conceptually accurate version of manually coded English; 6) repeat sign expressions using ASL (for emphasis and clarity) and then sim-com the same message.

Description of teacher participant. The intervention was implemented by the researcher to ensure that all student participants received similar instruction and that the delivery of instruction was consistent. The researcher is a hearing female who has taught middle school language arts at a residential school for the deaf for five years. She has also worked as an educational interpreter in public elementary, middle, and high schools, and as a residential counselor with middle school students at a state school for the deaf for six years. She holds a bachelor's degree in educational interpreting, master's degree in education, and is a certified reading specialist.

Description of student participants. There were a total of 23 student participants—seven students in grade four, eight in grade five, and eight in grade six. The following demographics were obtained from all student participants: age, gender, race, hearing loss (dB), cochlear implant, parental hearing status, reading level based on results from the Stanford Achievement Test for the hearing impaired (SAT-HI), and primary communication method. Table 1 displays demographics of student participants. Table 2 provides descriptive statistics of student participants by attending grade level for all numerical data including age, hearing loss and reading level. 35-70 decibels (dB) is a

commonly accepted loss for a child classified as hard of hearing, and a child with a loss of 70 dB or greater is classified as deaf (Northern & Downs, 1984). Rhea Paul (2001) states, “of, course, these designations of degree of loss say nothing about the language of a child with hearing impairment” (p. 123).

Language proficiency groups. There was great variability in students’ proficiency in, and exposure to, ASL. According to teachers’ ratings, the student participants ranged from having extremely impoverished language proficiency to near age-appropriate language proficiency. This study explored whether language growth happens consistently across levels of language proficiency. For one portion of the quantitative analysis, students were divided into language groups (low and high) based on initial language proficiency to determine whether both language proficiency groups exhibited statistically significant expressive language growth. Students’ SAT-HI reading comprehension scores and teacher rating forms were considered when placing them into language groups. The rating form asked their typical classroom teacher to score each student’s ability to express their thoughts and feelings based on a scale of 1 (weak/rarely ever) to 5 (strong/almost always). Students who scored a 1 or 2 on the teacher rating form and scored a 1.6 or lower on the reading comprehension section of the SAT-HI were placed in the lower language proficiency group for the purpose of analysis. Students who scored a 4 or 5 on the teacher rating form and scored a 1.7 or higher on the reading comprehension section of the SAT-HI were placed in the higher language proficiency group. Table 3 shows descriptive statistics of student participants by language proficiency groups.

Table 1

Demographics of Student Participants

Student	Grade	Month/ Year of Birth	Gender	Race/ Ethnicity	Hearing Loss (dB)	Cochlear Implant	Parental Hearing Status	Reading Level	Language Proficiency	Comm. Method
4.1	4	9/99	M	C/W	72	No	D	2	H	MCE/V
4.2	4	12/99	M	C/W	87	No	-	1.3	L	MCE
4.3	4	12/99	M	C/W	113	Yes	-	2.1	H	V
4.4	4	5/98	M	C/W	65	Yes	-	1.3	L	MLS/ MCE
4.5	4	7/99	F	C/W	90	No	-	1.3	L	MLS/ ASL
4.6	4	3/99	M	C/W	115	No	-	1.2	L	MLS/ MCE
4.7	4	3/99	F	AA	62	No	D	2.2	H	ASL/V
5.1	5	8/97	F	LA	47	Yes	-	1.5	L	MCE/V/ MLS
5.2	5	9/97	F	AA	110	No	-	1.4	L	MCE/ MLS
5.3	5	5/99	F	C/W	93	No	-	3.1	H	MCE/V
5.4	5	2/98	M	AA	112	No	-	1.6	L	MLS/ MCE
5.5	5	2/98	M	AA	63	No	-	1.3	L	MLS/ MCE
5.6	5	10/98	M	C/W	100	No	-	1.6	L	MLS/ ASL
5.7	5	1/99	M	C/W	45	No	-	1.7	H	MCE
5.8	5	1/99	M	C/W	72	No	-	2.2	H	MCE/V
6.1	6	5/97	F	C/W	110	No	-	2.6	H	MCE/ ASL
6.2	6	8/97	M	C/W	100	No	-	1.4	L	ASL
6.3	6	2/97	M	C/W	108	Yes	-	1.4	L	MCE/V
6.4	6	12/97	M	C/W	97	No	-	1.4	L	MLS/ V/MCE
6.5	6	2/98	M	LA	98	No	-	1.7	H	MCE/ ASL
6.6	6	5/97	M	C/W	98	No	-	2.1	H	ASL
6.7	6	8/96	M	AA	87	No	D	1.9	H	ASL
6.8	6	3/97	F	C/W	113	No	D	2.1	H	ASL

AA=African American; C/W=Caucasian/White; LA=Latino; D=Deaf; H=Hearing;
 ASL=American Sign Language; MCE=Manually Coded English; V=Voice; MLS=Minimal Language Skills

Table 2

Descriptive Statistics of Students' Age, Hearing Loss, and Reading Level by Grade Level

	Grade 4		Grade 5		Grade 6	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	10.14	0.38	10.88	0.83	12.00	0.53
Hearing Loss (dB)	86.29	21.60	80.25	27.15	101.38	8.48
Reading Level	1.63	0.45	1.81	0.59	1.83	0.43

Table 3

Descriptive Statistics of Students' Age, Hearing Loss, and Reading Level by Language

Proficiency

	Low Language Proficiency Group		High Language Proficiency Group	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	11.18	0.09	10.83	1.14
Hearing Loss (dB)	91.17	21.90	87.55	22.35
Reading Level	1.39	0.12	2.15	0.40

Student self-perceptions of language ability. To account for students' perceptions of their own language skills, each participant was given a language questionnaire adapted from Wolbers' (2007) Student Questionnaire given before SIWI instruction. To ensure accessibility, the printed questions were delivered one by one via a powerpoint to draw students' attention to each question. Pictures, use of space, body language, and accessible vocabulary supplemented the signed delivery of the questions (questionnaire in Appendix A). The students then rated each question (listed in Table 4 and Table 5) on a scale of 5 (strong/high) to 1 (weak/low) based on their perceptions of their own language skills. Table 4 reports descriptive statistics of responses on the language questionnaire by attending grade level. Table 5 reports descriptive statistics of student responses on the questionnaire by language proficiency. There was a slight difference between language proficiency groups regarding the means of question 1 through 5, with the higher language proficiency group reporting slightly higher perceptions of language proficiency.

Table 4

Descriptive Statistics of Responses on the Student Questionnaire by Grade Level

	Grade 4		Grade 5		Grade 6	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
How do you rate your fluency with ASL?	3.71	1.45	3.89	1.36	4.25	0.89
How do you rate your fluency with English?	4.57	0.79	3.00	0.76	2.88	1.36
How often do your family members sign with you at home?	2.71	1.89	3.12	1.46	3.00	1.86
How do you rate your family members' fluency with ASL?	3.71	1.89	3.25	1.04	3.25	1.04
How do you rate your family members' fluency with English?	4.33	1.63	3.63	1.51	3.62	1.51

Table 5

*Descriptive Statistics of Responses on the Student Questionnaire by Language**Proficiency*

	Low		High	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
How do you rate your fluency with ASL?	4	1.23	3.91	1.22
How do you rate your fluency with English?	3.42	1.38	3.45	1.13
How often do your family members sign with you at home?	2.67	1.72	3.27	1.62
How do you rate your family members' fluency with ASL?	2.75	1.60	3.91	1.14
How do you rate your family members' fluency with English?	3.58	1.68	3.73	1.42

Informed consent procedures. Informed consent was obtained from The University of Tennessee's Institutional Review Board (IRB). Consent forms were obtained from the school principals, the participating teachers, and the students' parents. Assent forms were obtained from students. The consent letter for participating in the research was available to the participants in English print but was also interpreted into sign language for better clarification. Consent was provided when the participant signed the consent forms. All data collected was kept in a locked cabinet and saved on a password-protected computer to ensure the participants' identities remained anonymous.

Procedures

The research involved providing upper elementary and middle school deaf and hard of hearing students with Strategic and Interactive Writing Instruction (SIWI). SIWI has been shown to have a significant impact on student outcomes in language and literacy (Wolbers, 2008). The study was conducted in five classrooms: one fourth, two fifth, and two sixth grade classrooms over a twelve-week period. This allowed for two weeks of pre-test, mid-test and post-test administration, five weeks of regular instruction, and five weeks of intervention. The students received SIWI for four forty-five minute sessions and one thirty-minute session each week for a total of five weeks. The intervention replaced their regular 45 minutes of writing instruction.

Writing instruction. During the initial five weeks of the study, after the first set of language samples were collected and prior to SIWI intervention, the researcher observed the students' regular writing instruction five times, once per week. The intention of this section is to provide an overview of what a typical writing period included; it is not intended to give a detailed description of each day's activities. Writing

instruction varied between classrooms and over time, and was included in a literacy block in which most of the time was devoted to reading instruction. The literacy block was loosely guided by McGraw-Hill's *Breakthrough to Literacy* curriculum in grades 4 and 5 and McGraw-Hill's *Glencoe Literature: Reading with Purpose* in grade 6. Sim-com was the mode of communication used during instruction and interactions with the students. The fourth, fifth, and sixth grade language arts teachers have been signing and communicating using sim-com for over 25 years, the other sixth grade teacher is the researcher.

Breakthrough to Literacy is designed as a language arts curriculum for students in prekindergarten through grade 3 that addresses writing instruction by incorporating grammar practice through worksheets, opportunities to write in response to the featured book, and time to engage in "writing workshops" (student-teacher conferences structured by the program's rubric). During the observations, the students participated in these literacy activities while using a computer software program that corresponds to the *Breakthrough to Literacy* series, working one-on-one with the teacher to read the featured book or review assignments, and working independently to write a response and complete grammar practice worksheets. Student-teacher interactions were common, while peer interactions were less prevalent.

McGraw-Hill identifies *Glencoe Literature: Reading with a Purpose* as "the first research-based middle school language arts program" that includes opportunities for students to write in response to selected stories and provides model texts in various genres (McGraw-Hill, 2011). This curriculum series is accompanied by "white papers" authored by researchers such as Douglas Fisher and Nancy Frey attesting to the benefits

of using graphic novels and think alouds during literacy instruction. However, in this series' Qualitative Program Evaluation/Executive Summary these techniques are identified simply as “reading and writing exercises”, this leaves the teacher responsible for locating the white papers or additional supports to then transform the “exercises” into beneficial learning experiences. The sixth grade teachers modified and supplemented this curriculum with readers' theaters, independent reading time, and small-group guided reading instruction. Typically the students worked on these projects and assignments independently or with the teacher.

Strategic and Interactive Writing Instruction (SIWI). SIWI is comprised of seven driving principles (presented in Figure 2), with two overarching, theoretical-based principles—*strategy* instruction and *interactive* instruction—rooted in cognitive theories of composing (Applebee, 2000; Flower & Hayes, 1980; Scardamalia & Bereiter, 1986) and sociocultural theories of teaching and learning (Bruner, 1996; Lave & Wenger, 1991; Rogoff, 1990; Vygotsky, 1978, 1994; Wertsch, 1991).

Driving principles. SIWI provides a *balanced* approach to writing for deaf and hard of hearing students by considering the linguistic complexities faced by this population of writers. Instruction incorporates a focus on word- and sentence-level writing skills (e.g., grammar) while simultaneously emphasizing discourse-level writing skills (e.g., genre-specific techniques, considering the intended audience, planning, organizing, etc.) through the construction of text for *authentic* purposes. As the teacher and students work together to co-construct text, the students provide ideas for the piece and the teacher documents the students' exact expressions in words and pictures. Then, the teacher facilitates discussion about the students' expression while always allowing the

students to change between writing, editing, and revising. This is done with the goal of students internalizing skills used during the writing process by working within the students' zone of proximal development (ZPD) to scaffold knowledge (Vygotsky, 1978). With gradual transfer of knowledge and as skills are internalized, the teacher moves from *guided to independent* writing—whole-group text construction then supports students' writing in small groups and independently (pictures of this process are included in Appendix B). *Visual scaffolds* support the students in the writing process by providing them with support as they apply strategies and skills while constructing text (Fung, Chow, & McBride-Chang, 2005). See Appendix C for examples of visual scaffolds used in this study. Prior research on the use of SIWI has shown gains in word- and sentence-level writing skills (e.g., length, complexity, grammatical accuracy) and discourse-level writing skills (e.g., audience, focus on purpose, etc.) (Wolbers, Dostal, H., & DeLozier, L., under review).

Driving principle: Metalinguistic knowledge and linguistic competence. SIWI encourages students to develop English and ASL by acquiring implicitly and learning explicitly (Wolbers, 2010). The implicit acquisition of English through the writing process is accomplished by repeatedly rereading the student-generated English text. This process provides the students with multiple exposures to accessible and meaningful English while reinforcing the complex nature of the English language. Multiple experiences with text have a powerful influence on language gains and proficiency (McGill-Franzen, Lanford & Adams, 2002; Neuman, Celano, 2001).

SIWI also provides an opportunity for students to learn English and ASL explicitly by spatially separating the two languages in separate “zones”, an ASL holding

zone and an English board, so connections and comparisons can be made (see Appendix D for examples of ASL holding zones). If the student provides a statement that is close to English, it is written in English within the collaboratively constructed piece. However, if the statement is produced conceptually or in ASL, it is documented separately in pictures, video, or symbols in the ASL holding zone. This allows the student and teacher to work together to translate the students' ideas into English text while providing the teacher with an opportunity to highlight the differences and similarities between English and ASL (pictures from the introductory lesson about the similarities and differences between ASL are included in Appendix E).

NIP-it lessons (Notice, Instruct, Practice) are another feature within SIWI that allows the teacher to provide explicit instruction about specific grammar features. First the teacher *notices* the need for instruction, provides the students with *instruction* that addresses the feature, and then recontextualizes the concept into the authentic student-led writings for *practice*. For example, the teacher may “notice” students are inverting their adjectives and nouns in writing because, in this case, ASL uses the opposite word order than English. The teacher would then “instruct” by explicitly explaining the difference and “practice” by directing students to recontextualize that concept in their own writing. In this study emphasis was placed on comparing and contrasting grammatical features of both English and ASL as they surfaced in students' writing during NIP-it lessons.

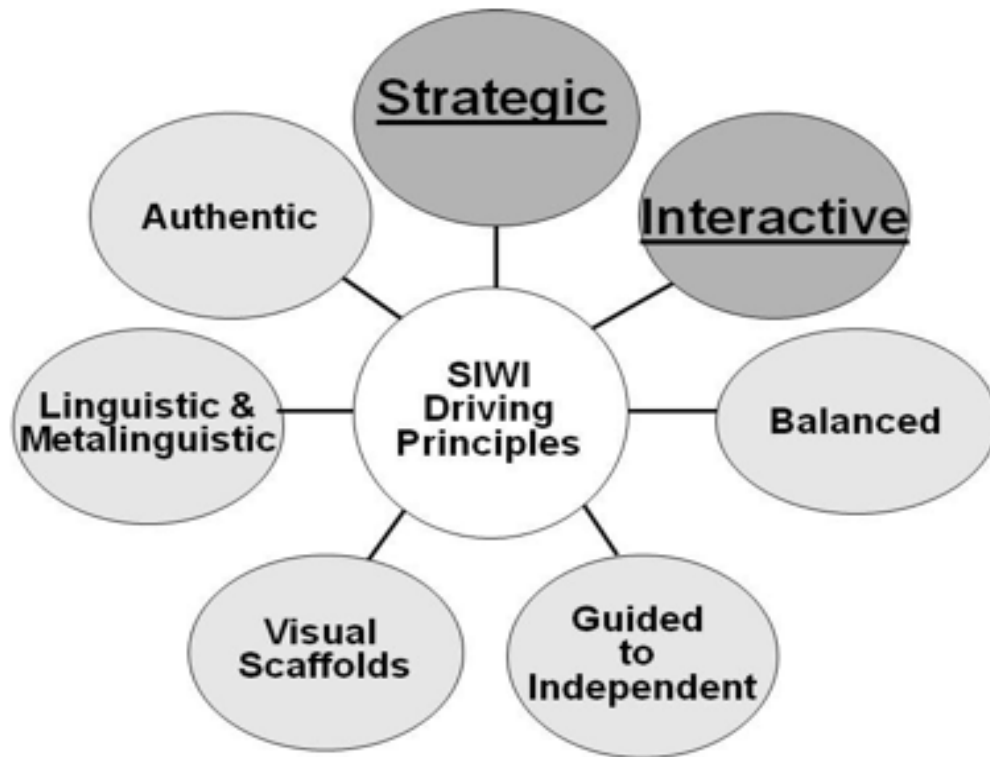


Figure 2. Driving Principles of SIWI. Reprinted from “Born Full Deaf,” by K. Wolbers, H. Dostal, and L. Delozier, under review, *Journal of Deaf Studies and Deaf Education*. Reprinted with permission.

Instructional fidelity. To ensure instructional fidelity, Wolbers' SIWI observation and fidelity instrument (2007) was revised and used ten times during the first week of implementation of the intervention (the complete fidelity instrument is available in Appendix F). The researcher videotaped herself teaching five classes two times the first week, and then self-rated her teaching based on six subcategories: 1) strategic writing instruction and procedural facilitators, 2) interactive writing instruction and apprenticeship, 3) building metalinguistic knowledge, 4) curriculum and content, 5) instructional procedures, and 6) audience. Wolbers also collaborated with the researcher early during the intervention phase and provided feedback based on the SIWI checklist. After averaging the researcher's scores on the fidelity instrument (1=strongly disagree and 4=strongly agree), her scores ranged from 3.74 to 4.0 per observation, which shows consistency in demonstrating the instructional principles associated with SIWI. See Table 6.

Table 6

Reporting of Instructional Fidelity

Observation #	Grade Level	Rating
1	4	$M = 3.93$
2	4	$M = 3.85$
3	5, class 1	$M = 3.85$
4	5, class 1	$M = 3.89$
5	5, class 2	$M = 3.77$
6	5, class 2	$M = 3.96$
7	6, class 1	$M = 4.00$
8	6, class 1	$M = 3.74$
9	6, class 2	$M = 3.81$
10	6, class 2	$M = 3.85$

Data Collection Procedures

Expressive language samples were obtained during individual interviews conducted five weeks prior to implementation of SIWI, immediately before the intervention was implemented at week 6, and at the conclusion of the study at week 12. These data were analyzed to chart expressive language growth during the time period with no SIWI intervention and while engaged in SIWI. To establish rapport with each student, the researcher volunteered and/or taught in every participating student's class prior to the collection of language samples.

Language sample collection process. In order to measure expressive language growth in ASL, language samples for each student participant were collected. The samples were used to answer all five research questions by reviewing them for MLU and specific features of ASL (i.e., location/space and movement), and individually for patterns of ASL expressive language growth.

The researcher collected the language samples during the academic day by scheduling individual 15-minute sessions with each student. This study adhered to Owens' (1995) recommendation to vary subject matter (e.g., expository, narrative) by providing the students with two types of video clips that had fictional and non-fictional content. All of the videos were silent and wordless, and therefore did not limit students' expressive language to a predetermined set of vocabulary (Loban, 1976). The students were presented with 12 one-minute video clips of animals and asked to select three to view. Then, they selected one of three five-minute silent comedies (i.e., two Charlie Chaplin films and one Popeye film). To eliminate the possibility of a decrease in

motivation by removing video selections, all choices remained and the students were allowed to self-select any video from each genre at pre-, mid-, and post-assessment.

After viewing the video-stimuli, the researcher used the following prompts to elicit language: (1) Describe the animal videos you watched (expository) and describe an experience you have had with an animal (personal narrative); (2) Tell me about the comedy you watched and predict what happens at the end of the movie (narrative); (3) Explain how to make popcorn (expository). Very few follow-up questions were asked to avoid constrained utterances in which students provide language in response to questions presented. Instead, the conversation remained open in prompting (e.g., tell me more), and provided non-verbal feedback (Owens, 1995).

Data Analysis Procedures

Language samples. After all the language samples were collected, the video files were imported to Eudico Linguistic Annotator (ELAN). ELAN is a language archiving software program that was designed by Birgit Hellwig (2002) at the Max Planck Institute for Psycholinguistics for the analysis and documentation of signed languages. ELAN was used in this study to: 1) segment utterances into t-units and count morphemes, 2) code for four ASL grammatical features (i.e., indicating verbs, pronouns, plural nouns, and verb reduplication), and 3) document language growth patterns. Figure 3 is a screen shot that shows each layer of analysis described below.

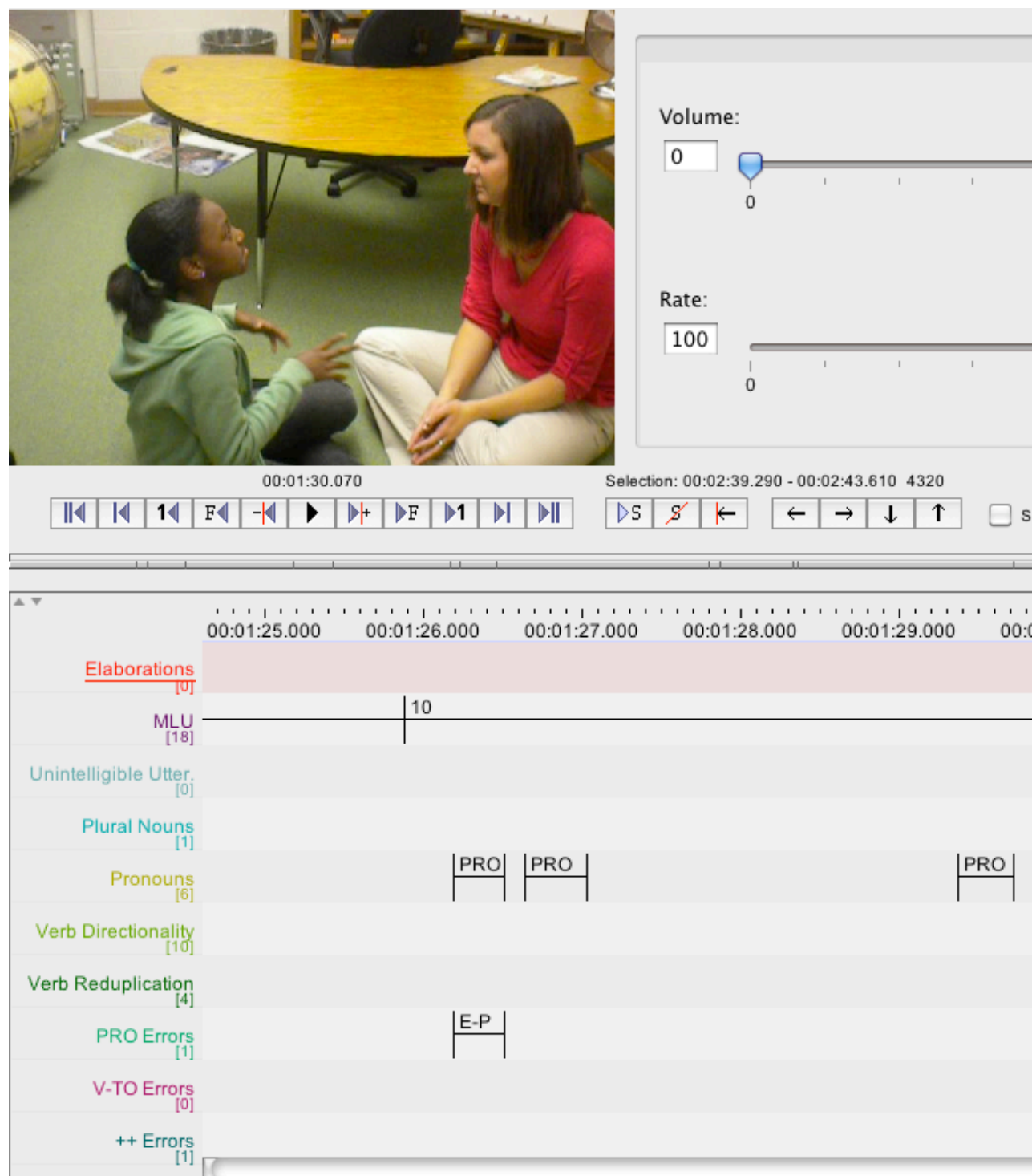


Figure 3. Screenshot of ELAN.

MLU. One tier of transcription was used to code each language sample for MLU. This was done by dividing the language samples into t-units (Hunt, 1965) and then determining the number of morphemes per t-unit. Davis (2010) emphasizes Mithun's (1999/2001) suggestion that "consulting native speakers about their judgments and intuitions is the main criterion used to determine that... morphemic combinations are functioning as single words" (p. 142). This study adhered to this suggestion by having 100% of the language samples coded for morphemes by a native user of ASL. The total morpheme count was divided by the total t-unit count in order to determine MLU. Guidelines for counting ASL morphemes can be found in Appendix G.

Each t-unit was also reviewed for ASL expansions and unintelligible utterances (tiers one and three). The embedded ASL expansions were extracted from t-units, and the morphemes in the interjected expansion were not counted to prevent skewed morpheme counts. For example, given this utterance: *The man's wife, you know, the woman with black hair, she's really skinny, has blue eyes, will shut the window.* The t-unit within this utterance is "The man's wife will shut the window" and included morphemes would be counted. The expansion, "you know, the woman with black hair, she's really skinny, has blue eyes", and its respective morphemes were extracted from the utterance and were coded on a separate ELAN tier in order to document when expansions were removed. Since expansions are typical ASL constructions (Valli, Lucas & Mulrooney, 2005), the expansion remained in its original t-unit *if* it directly referenced an object or a person. A t-unit was identified as unintelligible if more than half of the signs were unrecognizable or if those signs did not carry meaning together. If the student only produced one sign in a t-unit that was unrecognizable, that t-unit was also defined as

unintelligible. Unintelligible utterances were documented on a separate tier in order to track reductions or increases over time (pre, mid, post). Unintelligible utterances speak to a lack of holistic meaning. The documentation of the number of these utterances records change in intelligibility over time.

ASL grammatical features. In order to answer questions about ASL grammatical features, four features of ASL were selected to be analyzed—indicating verbs, pronouns, plural nouns and verb reduplication. The four ASL features are detailed briefly below. A table listing the sequence of lessons by topic can be found at the end of this section (see Table 7).

Indicating verbs. Verbs in ASL not only describe an action, but can also include information about the subject(s) involved by moving the sign from the doer (trajectory) to the receiver (landmark). Changing the direction of the movement changes the meaning of the sign. Examples of verbs that can show directionality are give, show, tell, pay, inform. Based on the directionality of the sign, one can communicate that “I pay him” or “He pays me” or “She pays him”. Valli, Lucas, and Mulrooney (2005) provide an example in which the direction of the verb TELL changes to show that the signer (PRO.1) is directing the verb to his/her mother:

“In [PRO.1 TELL MOTHER], the sign TELL begins with the index finger in contact with the chin. The hand then moves outward toward the actual mother and ends with the index finger pointing at the mother. The directionality of the sign TELL in this example is crucial. Without it, signers would judge the signing to be incorrect. Clearly, then, the directionality of indicating verbs is highly significant” (p. 372).

Pronouns. Pronouns in ASL are similar to English in that there are established ways to refer to first, second and third persons. The first person pronouns *I* and *me* are represented by using the index finger to point to self, while the first person possessive pronouns *my* and *mine* are shown by placing an open palm on the signer's body. There is not a clear distinction between second and third person pronouns in ASL (Liddell and Johnson, 1987), nor do the signs indicate gender; however, there is a distinction between third person subject/object cases and possessive pronouns. The index finger pointing away from the signer represents the English equivalent of *she*, *he*, *him*, or *her*, and an open palm facing away from the signer shows the possessive pronouns *yours*, *his*, or *hers*. Reflexive pronouns are represented with a “thumbs-up” handshape in the direction of the person referenced, while plural pronouns combine a pointed index finger or “thumbs-up” handshape with a sweeping motion to indicate plurality.

Plural nouns. In English the bound morpheme, *-s*, can be added to most nouns to create the plural form, but in ASL there are no bound morphemes that simply attach to the noun to modify it. However, there are three primary ways to indicate that a noun is plural: using determiners or signed numbers with the noun, or by reduplication (Valli, Lucas & Mulrooney, 2005). Most nouns require the use of determiners (e.g., *few*, *many*, *some*) or the assignment of a numerical value. For example, the ASL translation of the English word *papers* could be MANY PAPER, and the translation of *five papers* would be PAPER #5. Some nouns can be signed multiple times to indicate plurality (e.g., SISTER, SISTER, SISTER to show the English word *sisters*), but the reduplication of nouns is rare.

Verb reduplication. When some verbs in ASL are repeated or reduplicated they become nouns. For example, if the free morpheme SIT is reduplicated, it becomes the ASL noun CHAIR. This process is similar to English nouns that were derived from verbs—drink (verb) a drink (noun), or plant (verb) a plant (noun).

Table 7 describes the sequences and topic of lessons that address ASL grammatical features.

Table 7

Class Lessons Addressing ASL Grammatical Features, with Student Absences

Lesson	Absent	Lesson Description
1	4.3, 6.3	Establish ASL and English as separate languages
2		Compare and contrast ASL and English; Discuss interrogative and declarative statements in ASL and English for the purpose of planning and selecting an authentic writing topic; Select writing topic
3	6.8	Introduce ASL indicating verbs using the verbs <i>show</i> and <i>help</i> (NIP it lesson); Plan writing using pictures of a common experience while noticing how indicating verbs are used to discuss the writing topic/experience; Begin writing
4		Explore and discuss the English equivalent for ASL verbs, including subject/object, recipient, verb to include in the students' writing; Continue writing
5		Continue working with ASL verbs; Continue writing
6		Introduce pronoun use in ASL while comparing it to English pronouns (NIP it lesson); Continue writing
7		Incorporate English pronouns into writing while making comparisons between English and ASL; Complete collaboratively-constructed piece; Email it to the identified audience for feedback
8		Review ASL indicating verbs and pronouns in the context of rereading text; Identified audience (native signer) attend class to discuss feedback; Publish piece
9		Identified how verbs are modified based on the pronoun (NIP it lesson); Select a new writing topic and begin writing
10	6.5, 5.7	Introduce ASL verb reduplication and English translations (NIP it lesson); Continue writing
11		Incorporate and discuss ASL noun/verb pairs in the retelling of the narrative while translating them into English; Continue writing
12		Explore and discuss English equivalents for ASL noun/verb pairs in order to revise and edit student writing; Publish personal narrative, deliver to it to audience
13		Introduce plural nouns and how they are used in ASL and English (NIP it lesson); Select a new writing topic and begin writing
14		Discuss translating determiners and numerical nouns into English text; Continue writing
15		Edit and revise plural nouns within text, while continuing to talk about ways to express plurality in ASL; Continue writing
16		Publish writing Celebration of three collaboratively constructed pieces published during intervention

Coding ASL grammatical features. Each ASL feature was assigned one tier of transcription in order to code the samples for location and space of signs. To represent the feature location/space, two tiers were used to code for indicating verbs and pronouns. Two additional tiers addressed movement of signs through two subcategories—plural nouns and verb reduplication. A correct count and an error count for each of the four ASL features were documented on separate tiers to ensure that coders were distinguishing between correct and incorrect use, and to aid in the final count of pronouns (ELAN provides a total count of codes for each tier). Then, the total count of incorrect feature use was subtracted from the total count of correct feature use in order to analyze for only correct use of features before and after the intervention. Table 8 provides the codes that were used in ELAN for ASL features, location/space and movement.

Coding language growth of students from language proficiency groups. The samples of selected students from each language proficiency group were reviewed for language growth patterns (e.g., focus and relevance; dialogue with a conversational partner while reducing repetitive or non-meaningful utterances; detail and explanation; and subject- and object-referents), and coders documented each pattern in an ELAN tier.

Table 8

ELAN Codes for Analysis of ASL Grammatical Features

ASL Morpheme	Morphological Feature	ELAN Code
Location/Space	Indicating verbs	[<i>verb</i> -TO]
	Pronouns	[PRO]
Movement	Plural Nouns	[PL]
	Verb Reduplication	[++]

Coding procedures. Students' language samples at pre-, mid-, and post-study were analyzed for MLU and ASL features. The researcher divided all of the samples into t-units and counted ASL morphemes for 20% of the language samples. Then a certified teacher of the deaf whose first language is ASL divided 20% of the language samples into t-units and coded 100% of the samples for ASL morphemes. The researcher also coded 20% of the language samples for ASL grammatical features, while an interpreter certified by the Registry of Interpreters for the Deaf (RID) in interpretation and transliteration coded all of the samples for correctly and incorrectly used ASL features. Interrater agreement for coding was calculated prior to coding the remaining language samples using Intraclass Correlation Coefficient (ICC). An ICC of .997 (morphemes), .993 (t-units), .990 (unintelligible utterances), and .999 (ASL features) indicates a very high level of agreement between both sets of coders. ICC is used to quantify the degree of conformity or consistency among coders.

The researcher ensured that the annotations were carried out with full integrity and impartiality to the message by determining a high inter-rater reliability agreement, and by providing training sessions prior to the coding of language samples. During the first two training sessions, one coder was presented with a review of ASL indicating verbs, pronouns, plural nouns, and verb reduplication (see Appendix H for the ASL features and coding information sheet), and three student video clips from the original language samples were selected for collaborative practice and discussion. During the second and third training sessions information and guidelines about counting morphemes was presented to the second coder (see Appendix G for a list of MLU guidelines). Then the researcher and second coder simultaneously coded t-units for training purposes from

three different student language samples before the researcher and coder independently coded 20% of the total language samples to ensure inter-rater reliability.

Analysis. A Repeated Measures Analysis of Variance (ANOVA) was completed to test the equality of means within student performance with and without intervention to determine if there is a significant difference between T1 and T2 (pre-test to mid-test) and between T2 and T3 (mid-test to post-test). The dependent variables included the average number of morphemes per t-unit (MLU), unintelligible utterances, and ASL grammatical features (e.g., location/space, movement). The between subjects variable included the language proficiency groups (high and low). A post hoc analysis was done to determine significance between time.

Descriptive data collection. Upon determining statistical significance, two students' language samples were selected from both language proficiency groups to determine the impact of SIWI from T2-T3. Language patterns that emerged were coded in order to discuss more complex language growth, such as focus and relevance; dialogue with a conversational partner while reducing repetitive or non-meaningful utterances; detail and explanation; and subject- and object-referents. Cummins (1999) supports this descriptive method of analysis of students who are learning multiple languages in an academic setting. He exposes the diversity of multi-lingual children and claims that a more accurate understanding of their language growth can be gained when patterns are reviewed individually.

Summary of this Chapter

The purpose of this mixed methods intervention study was to examine how Strategic and Interactive Writing Instruction impacts deaf and hard of hearing students'

expressive language. This study demonstrates language growth by analyzing student participants' MLUs, changes in the use of ASL features, and patterns of ASL growth. Additionally, the study reviews if students with higher and lower language proficiencies exhibit significantly different growth in expressive language.

In chapter 3 a review of the rationale for the research methodology, the participants and settings, the data collection process, and the data analysis procedures were presented.

CHAPTER 4: RESULTS

This chapter contains results of the study, and for clear presentation of the results, the five research questions (RQ) were conceptually divided into three categories (parts A, B, and C). Part A contains RQ 1 through RQ 2, which investigated the impact of SIWI on students' expressive language development, measured by mean length of utterance (MLU) and unintelligible utterances. Part B includes RQ 3 and RQ 4, which examined the growth of specific ASL linguistic features. Part C provides descriptive results of selected students' expressive language use in order to address RQ 5.

Presentation of Data

To address each research question, repeated measures ANOVAs within and between subjects were calculated. The data was analyzed using SPSS 19.0. For all statistical analyses the significance level was set at $p < .05$. The results are reported according to each question with a presentation of descriptive statistics followed by the results of the ANOVAs.

Part A, Research Questions 1 & 2

Research question 1 asked: Do deaf and hard of hearing students receiving Strategic and Interactive Writing Instruction demonstrate significant growth in ASL? Research question 2 asked: Do students with higher and lower language proficiencies exhibit significantly different growth in ASL?

Mean length of utterance (MLU). Data from pre-, mid-, and post-intervention language samples were analyzed using repeated measures ANOVA to answer research question 1. After five weeks of regular instruction (i.e., with no SIWI intervention), the students' MLU remained at similar levels—2.71 at pretest to 2.68 at posttest. The post-

intervention language samples reveal an increase from 2.68 to 5.28 in MLU after five weeks of SIWI. All participants made gains from mid to post. Descriptive statistics of the pre-, mid-, and post-intervention data for MLU are provided in Table 9.

Since sphericity—the assumption that data are uncorrelated—could not be assumed based on Mauchly’s Test of Sphericity (significance was below .05), a repeated measures ANOVA with a Greenhouse-Geisser correction determined there was a statistically significant difference in MLU between time points $F(1.306, 27.42) = 71.857$, $p < .001$. The effect size was large. The partial Eta squared was .789, which means that SIWI accounted for 78.9% of the overall variance. Post hoc tests using the Bonferroni correction revealed that SIWI had a statistically significant impact on MLU from pre-test (five weeks prior to intervention implementation) to post-test (five weeks after intervention implementation) ($p < .001$), and mid-test (immediately prior to intervention implementation) to post-test (five weeks after intervention implementation) ($p < .001$). However, pre-test MLU was not statistically significantly different from mid-test MLU ($p = 1.00$). Table 10 reports the results of the pairwise comparisons. Figure 4 reports the estimated marginal means. We can therefore conclude that five weeks of Strategic and Interactive Writing Instruction elicits a statistically significant increase in MLU compared to five weeks without SIWI.

Table 9

Descriptive Statistics for Mean Length of Utterance

	Pretest		Midtest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
MLU	2.71	0.60	2.68	0.70	5.28	1.54

Table 10

Pairwise Comparisons for MLU Over Time

Pairwise Comparisons						
(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
1	2	.029	.130	1.000	-.308	.366
	3	-2.572*	.291	.000	-3.328	-1.815
2	1	-.029	.130	1.000	-.366	.308
	3	-2.601*	.291	.000	-3.358	-1.843
3	1	2.572*	.291	.000	1.815	3.328
	2	2.601*	.291	.000	1.843	3.358

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

*. The mean difference is significant at the .05 level.

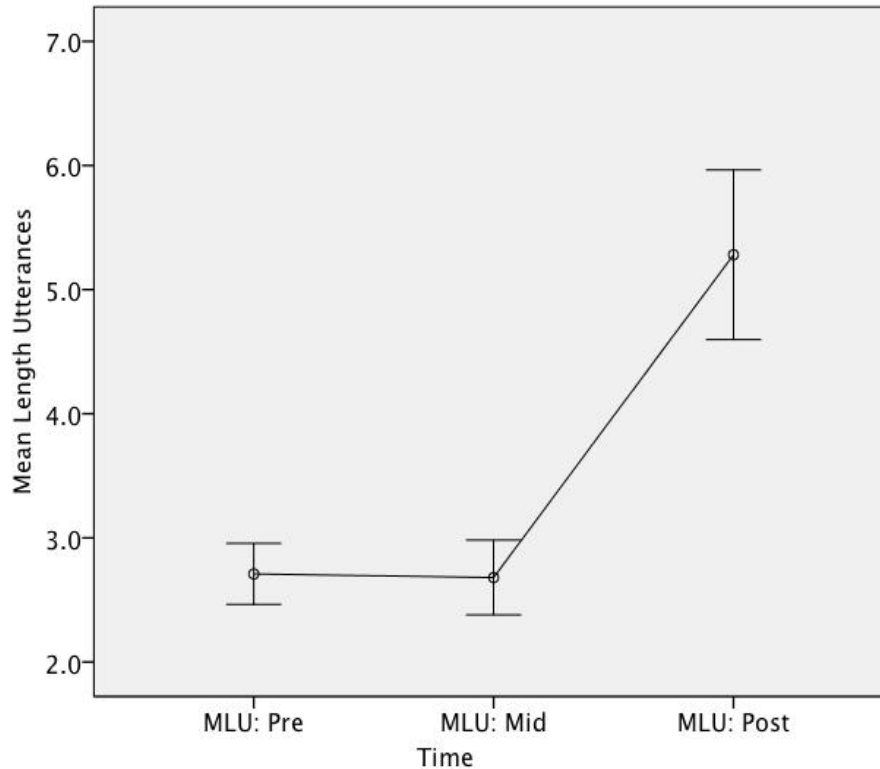


Figure 4. Display of estimated marginal means for MLU over time.

To address research question 2, MLU data from pre-, mid-, and post-intervention language samples were also analyzed using repeated measures ANOVA on two factors, language proficiency group and time. The higher language proficiency group's average MLU after five weeks of regular instruction with no intervention remained consistent—3.06 (pre) to 2.26 (mid). The average MLU for the lower language proficiency group prior to five weeks of regular instruction was 2.45 and remained the same (2.39) at mid-test. Both groups' MLU increased after five weeks of SIWI; the higher proficiency group's MLU was 5.39 at post and the lower proficiency group's MLU was 5.19 at post. Descriptive statistics of the pre-, mid-, and post-intervention data for each language proficiency group are provided in Table 11.

Table 11

Descriptive Statistics for MLU by Language Proficiency Groups

	Pretest		Midtest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Lower	2.45	0.40	2.39	0.70	5.19	1.49
Higher	3.06	9.22	3.04	13.10	5.39	4.33

Mauchly's Test of Sphericity indicated that sphericity could not be assumed (significance was below .05). A repeated measures ANOVA with a Greenhouse-Geisser correction determined that there was not a statistically significant difference in MLU by language group over time $F(1.314, 26.286) = .508, p = .53$). Figure 5 reports the estimated marginal means by language proficiency groups. Figures 6 and 7 report the estimated marginal means for the higher and lower language proficiency groups separately to clearly see the ranges of each. We can therefore conclude that language proficiency was not a significant factor in change in MLU between the pre, mid, and posttests.

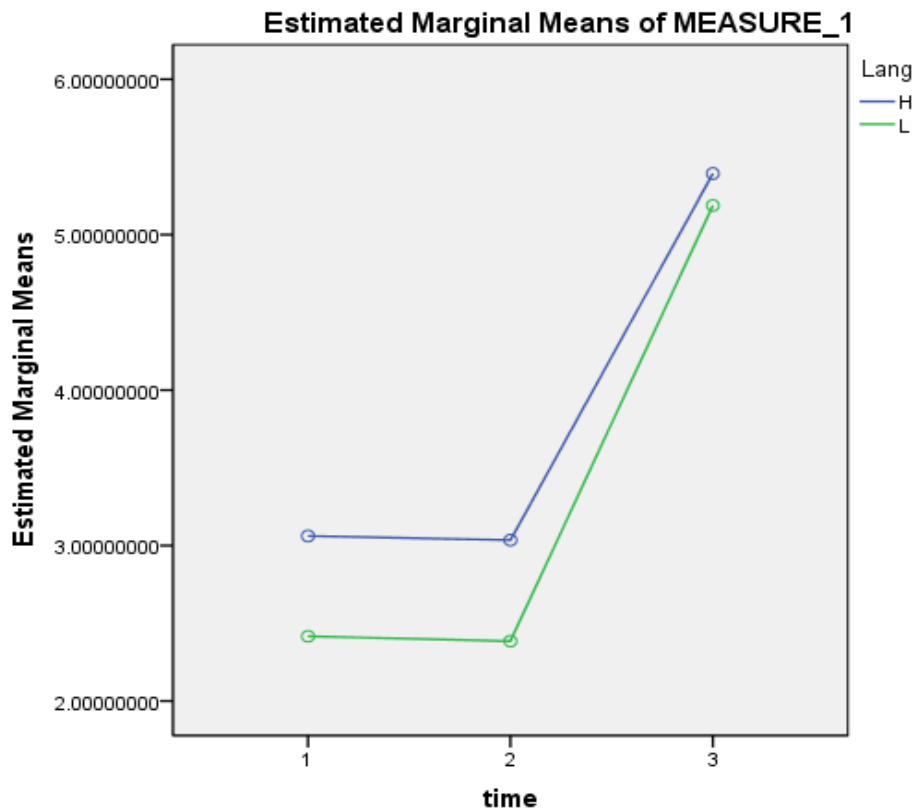


Figure 5. Display of estimated marginal means for MLU by language proficiency group over time.

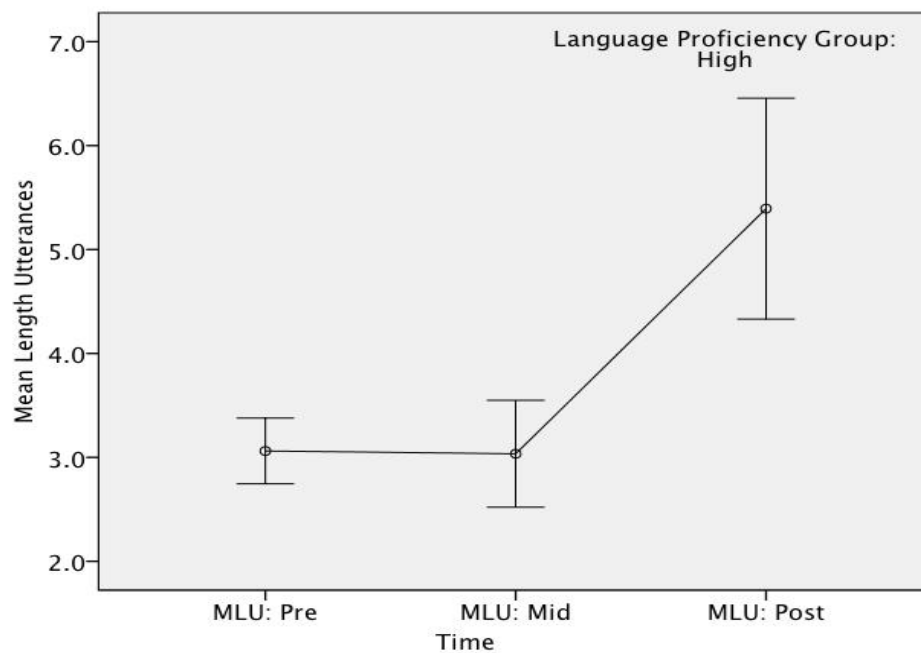


Figure 6. Display of estimated marginal means for MLU for the higher language proficiency group over time.

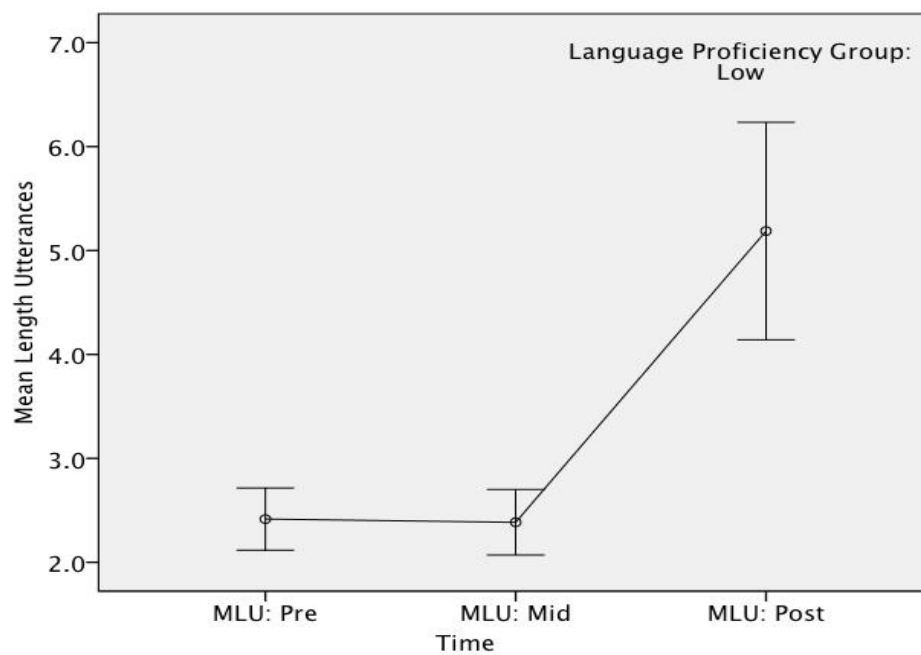


Figure 7. Display of estimated marginal means for MLU for the lower language proficiency group over time.

Unintelligible utterances. To answer research question 1, an analysis of unintelligible utterances at pre-, mid-, and post-assessment was conducted using repeated measures ANOVA. This analysis was added in order to further explore research question 1 by tracking reductions and/or increases of unintelligible utterances over time (pre, mid, post). The documentation of unintelligible utterances accounts for the lack in holistic meaning and numerically records change. Pretest data shows that the students used an average of 8.73 unintelligible utterances per language sample, and at posttest they used an average 2.68 unintelligible utterances. Descriptive statistics of the pre-, mid-, and post-intervention data for unintelligible utterances are provided below in Table 12.

Table 12

Descriptive Statistics for Unintelligible Utterances

	Pretest		Midtest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Utterances	8.73	9.61	7.82	9.97	2.68	3.52

Mauchly's Test of Sphericity indicated that sphericity could be assumed ($p > .05$), and a repeated measures ANOVA determined there was a statistically significant difference in the number of unintelligible utterances students produced between time points $F(2, 42) = 7.436, p = .002$. The effect size was medium. The partial Eta squared was .436, which means that SIWI accounted for 43.6% of the overall variance. Post hoc tests using the Bonferroni correction revealed that Strategic and Interactive Writing Instruction had a statistically significant impact on MLU from pre-test (five weeks prior to intervention implementation) to post-test (five weeks after intervention implementation) ($p = .003$), and mid-test (immediately prior to intervention implementation) to post-test (five weeks after intervention implementation) ($p = .027$). Pre-test MLU was not statistically significantly different to mid-test MLU ($p = 1.00$). Table 13 reports the results of the pairwise comparisons. Figure 8 reports the estimated marginal means. We can therefore conclude that five weeks of Strategic and Interactive Writing Instruction elicits a statistically significant decrease in unintelligible utterances compared to five weeks without Strategic and Interactive Writing Instruction.

Table 13

Pairwise Comparisons for Unintelligible Utterances Over Time

Pairwise Comparisons						
(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig. ^a	95% Confidence Interval for Difference ^a	
					Lower Bound	Upper Bound
1	2	.909	1.717	1.000	-3.557	5.375
	3	6.045*	1.567	.003	1.968	10.123
2	1	-.909	1.717	1.000	-5.375	3.557
	3	5.136*	1.780	.027	.505	9.768
3	1	-6.045*	1.567	.003	-10.123	-1.968
	2	-5.136*	1.780	.027	-9.768	-.505

Based on estimated marginal means

a. Adjustment for multiple comparisons: Bonferroni.

*. The mean difference is significant at the .05 level.

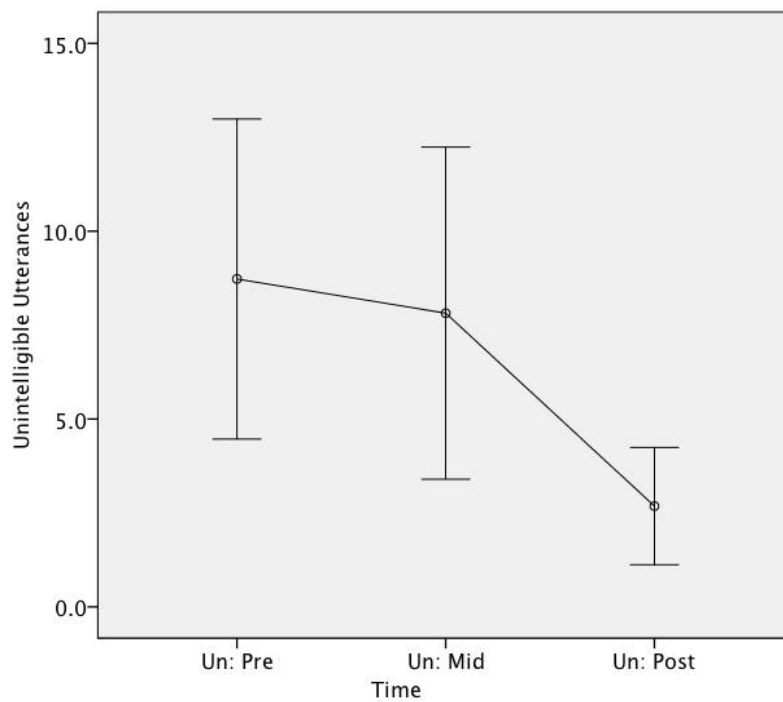


Figure 8. Display of estimated marginal means for unintelligible utterances over time.

To address research question 2, unintelligible utterances at pre-, mid-, and post-assessment were analyzed using repeated measures ANOVA on two factors, language proficiency group and time. Pretest data shows that, on average, the higher language proficiency group incorporated 6.60 unintelligible utterances into their language samples, while the lower language proficiency group incorporated 10.50 unintelligible utterances. After five weeks of regular instruction, the higher proficiency group showed an average increase of 3.9 unintelligible utterances (8.80 per language sample). The lower language proficiency group decreased to 7.00 unintelligible utterances at mid-test. Both groups decreased their amount of unintelligible utterances after five weeks of SIWI— to 2.40 (high language proficiency group) and 2.92 (lower language proficiency group). The lower language proficiency group’s standard deviation at pre was 9.96 and reduced to 2.88 by post. The higher language proficiency group showed the same pattern, reduced from 9.22 at pre to 5.39 at post. Descriptive statistics of the pre-, mid-, and post-intervention data for unintelligible utterances and for each language proficiency group are provided in Table 14.

Table 14

Descriptive Statistics for Unintelligible Utterances by Language Proficiency Groups

	Pretest		Midtest		Posttest	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Lower	6.60	9.96	7.00	6.93	2.92	2.88
Higher	10.50	9.22	8.80	13.10	2.40	4.33

Mauchly's Test of Sphericity indicated that sphericity could not be assumed (significance was below .05), a repeated measures ANOVA with a Greenhouse-Geisser correction determined that there was not a statistically significant difference in number of unintelligible utterances by language group over time $F(2,40) = 1.457, p = .245$). Figure 9 reports the estimated marginal means by language proficiency groups. Figures 10 and 11 report the estimated marginal means for the higher and lower language proficiency groups in order to more clearly show ranges. We can therefore conclude that language proficiency was not a significant factor in change in unintelligible utterances between the pre-, mid- and post-tests.

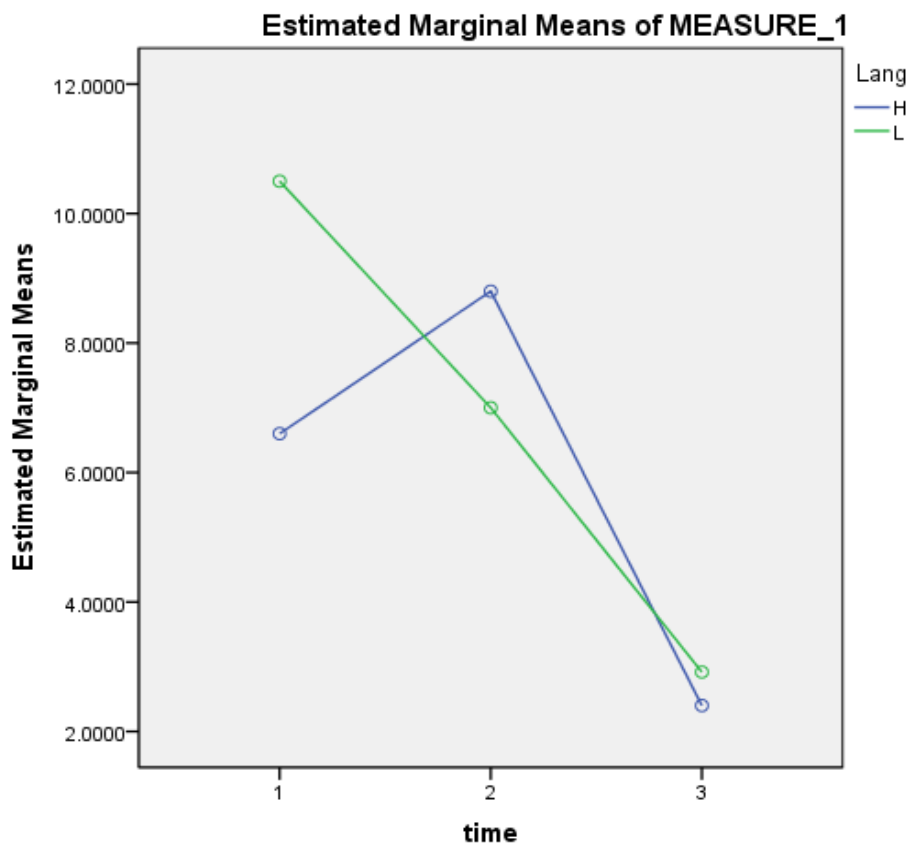


Figure 9. Display of estimated marginal means for unintelligible utterances by language proficiency group over time.

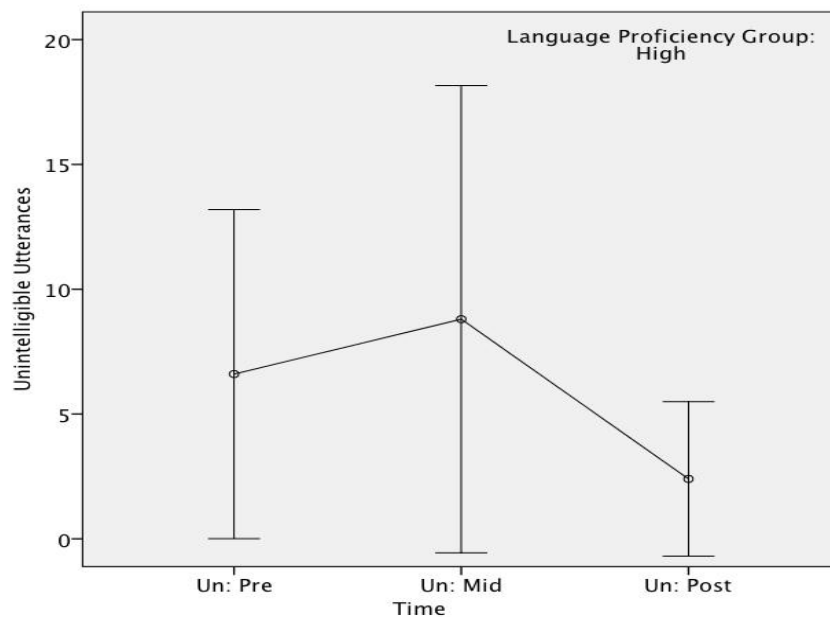


Figure 10. Display of estimated marginal means for unintelligible utterances for the higher language proficiency group over time.

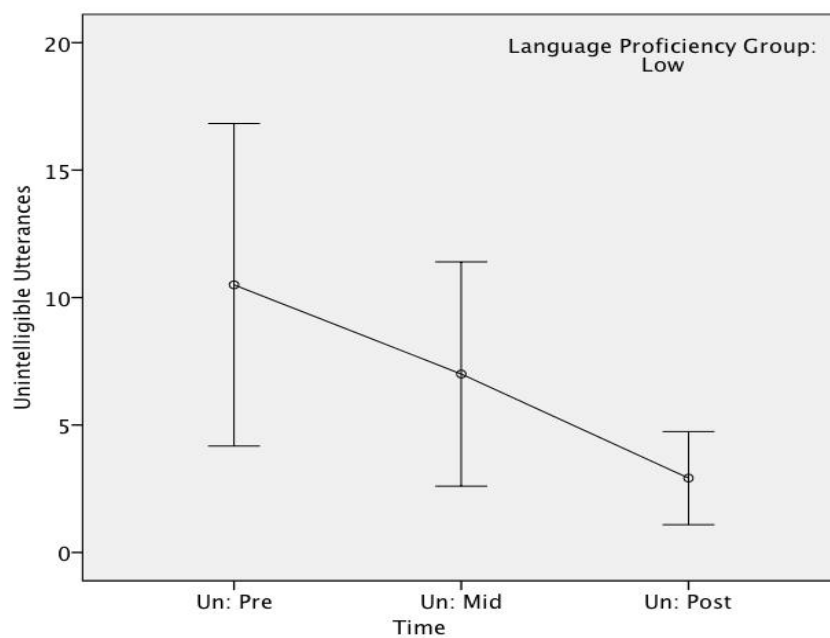


Figure 11. Display of estimated marginal means for unintelligible utterances for the lower language proficiency group over time.

Part B, Research Questions 3 & 4

Research question 3 asked: Do students show significant growth in the use the location/space and movement? Research question 4 asked: Do students with higher and lower language proficiencies exhibit significantly different growth in the use of location/space and movement?

Statistical analyses are reported for research questions 3 and 4; however, growth in the number of features used does not indicate appropriate use of the linguistic features. Feature use follows a pattern for the purpose of communication, not for quantity, therefore knowing more about language use does not mean that the number of features would increase. A descriptive use of features use is included in Part C of this chapter.

Total ASL feature counts. To explore research question 3, a total count of all four ASL location/space and movement grammatical features from the pre-, mid-, and post-assessments were analyzed using repeated measures ANOVA. After five weeks of regular instruction with no intervention the students' ASL feature use decreased from 46.18 to 32.96, and a slight increase to 48.10 after five weeks of intervention. Pre-test data shows that students used an average of 46.18 location/space and movement features per language sample, and at posttest they used an average of 48.10 features. Sample sizes were too small to conduct any statistical test with enough power to claim significance for research question 4.

Mauchly's Test of Sphericity indicated that sphericity could be assumed ($p > .05$), a repeated measures ANOVA determined there was not a statistically significant difference in the number of ASL features students produced between time points $F(2, 42) = 0.644, p = .061$. Figure 12 reports the estimated marginal means.

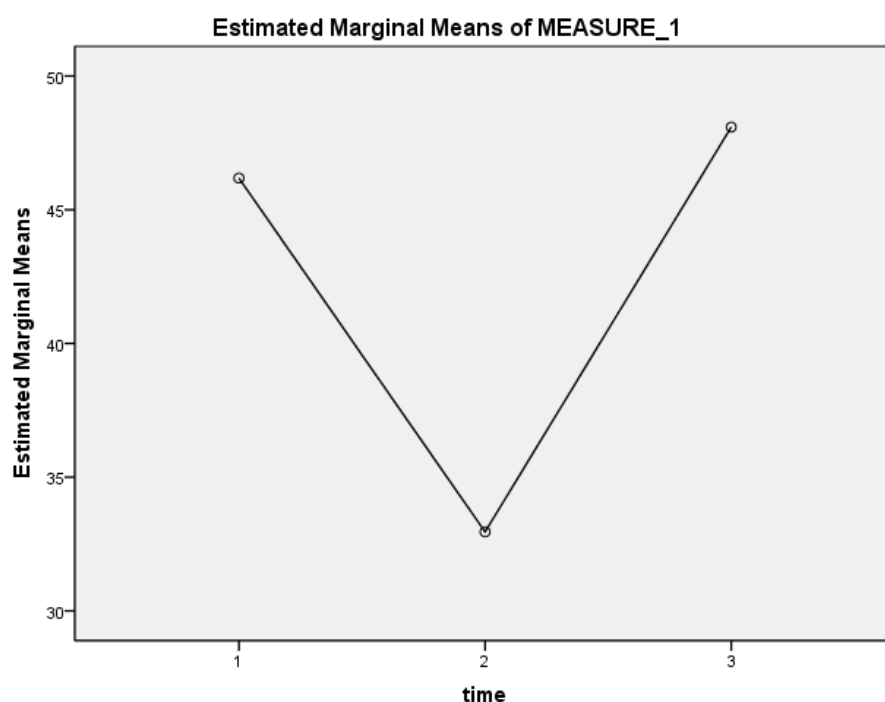


Figure 12. Display of estimated marginal means for ASL features over time.

Disseminated ASL features. To further explore research questions 3, the total count of ASL location/space and movement grammatical features was segregated by feature—indicating verbs, pronouns, plural nouns, and verb reduplication—and each were analyzed using repeated measures ANOVA.

Plural nouns. After five weeks of regular instruction with no intervention the students' use of plural nouns decreased from 46.18 to 32.96, and increased to 48.10 after five weeks of intervention. The post-intervention language samples reveal an approximate increase of 2 features from pre to post, and an approximate increase of 15 from mid to post. Mauchly's Test of Sphericity indicated that sphericity could be assumed ($p > .05$), a repeated measures ANOVA determined there was not a statistically

significant difference in the number of plural nouns students produced between time points $F(2, 42) = 2.448, p = .530$.

Pronouns. After five weeks of regular instruction with no intervention the students' use of pronouns decreased from 13.36 to 6.59 per language sample, and then to 11.14 per language sample after five weeks of intervention. Mauchly's Test of Sphericity indicated that sphericity could not be assumed (significance was below .05), a repeated measures ANOVA with a Greenhouse-Geisser correction determined that there was not a statistically significant difference in number of times students incorporated pronouns into their language samples over time $F(1.150, 42.153) = 1.743, p = .200$.

Indicating verbs. After five weeks of regular instruction with no intervention the students' use of indicating verbs slightly decreased from 24.86 to 20.05, and increased to 29.82 after five weeks of intervention. The post-intervention language samples reveal an approximate increase of 5 features from pre to post, and an approximate increase of 9 from mid to post. Mauchly's Test of Sphericity indicated that sphericity could be assumed ($p > .05$), and a repeated measures ANOVA determined there was not a statistically significant difference in the amount of times students correctly incorporated indicating verbs between time points $F(2, 42) = 2.562, p = .089$.

Verb reduplication. Pre-, mid-, and post-intervention data show that the students' uses of verb reduplication remained steady—3.32 at pre-test, 2.64 at mid-test, and 3.36 at post-test. Mauchly's Test of Sphericity indicated that sphericity could be assumed ($p > .05$), and a repeated measures ANOVA determined there was not a statistically significant difference in the number of times students correctly incorporated verb reduplication between time points $F(2, 42) = 1.022, p = .369$.

Part C, Research Question 5

Research question 5 asked: What patterns of ASL expressive language growth do deaf and hard of hearing students exposed to Strategic and Interactive Writing Instruction exhibit?

Descriptive review of four students' ASL growth. After determining that expressive language growth was statistically significant, two students from each language proficiency group were selected to review their ASL expressive language growth more closely in order to answer research question 5. The students were chosen, with the input of their teachers and the researcher's observations, to represent their respective language proficiency group and to provide a context in which to discuss specific expressive language patterns. Language patterns that emerged were coded in order to identify and discuss more complex language growth, such as focus and relevance; dialogue with a conversational partner while reducing repetitive or non-meaningful utterances (e.g., "I don't know"); detail and explanation; and subject- and object-referents. Each of the language patterns are described through one student's experience: Focus and relevance was the primary language pattern that emerged in Lee's samples; dialoging with a conversational partner was the emerging pattern in Daniel's samples; detail and explanation emerged as a language pattern in Dora's samples; and in Claude's samples the use of subject- and object-referents was identified as a prominent language pattern. Cummins (2009) supports this descriptive method of analysis of students who are learning multiple languages in an academic setting since a more accurate understanding of language growth can be gained when patterns are reviewed individually.

Student 1: Lee (lower language proficiency group). Lee's (pseudonym) pretest language sample was made up of almost half unintelligible utterances (35 out of 77) with average utterances (MLU) containing 1.9 morphemes per t-unit. He was constantly signing something, but the signs were disconnected, nonsensical and repetitive. At the mid-test, his pattern of continuous, repetitive and nonsensical signing was similar. Out of 26 utterances at mid-test, 7 were unintelligible and his MLU averaged 2.5 morphemes per t-unit. In class, Lee was eager to participate and frequently wanted to share his ideas. As instruction progressed he learned how to focus his comments and make them less repetitive by observing his peers' interactions, the teacher's think-alouds and responding to prompts that asked him to evaluate whether his comments were relevant. His thoughts were often first made visual through drawings or gestures. The teacher and his peers would ask for clarification while paring the visual representation of his thoughts with expressive language. For example, when talking about the Titanic he signed the equivalent of, "boat, big, boat, you know, boat." The teacher drew a big boat in the ASL holding zone, and he interacted with the initial drawing to clarify or provide additional details. In this case, he erased the water under the boat and drew a flat line underneath the boat to show it was on land. Then he added a picture of a ticket booth and stick figures of him and his father and siblings. He used the picture to act out paying, then walking in and looking around. After adding movement to his drawing, he drew an iceberg and signed, "broke, broke." His classmates asked him, "Where was the boat?" He did not know. They asked, "Did you get in the car? Did you drive there? Did it take a long time?" Another student used the internet to pull up pictures of the Titanic Museum. As soon as Lee saw it he pointed at his picture and signed, "That! That!" Once the

teacher and students arrived at a common understanding of Lee's experience they were able to discuss how to represent that experience in ASL.

At pre-test his mean length of utterance was 1.9 morphemes per t-unit and at mid-test it was 2.5; his responses included signed statements like, "BEAR, SEE, SAVE" and "WINDOW, NOISE, MOUSE". After the fifth week of SIWI and interactions like the ones described previously, Lee's awareness of language and expressive abilities had improved. At the post-test, out of 39 utterances, 7 were unintelligible, but the average length of utterance had almost doubled. With almost twice as many morphemes per utterance, Lee had begun to communicate his ideas more fully, and used signed phrases like, "MOM GO HOSPITAL SICK, HEAD HURT" and "MONKEY EAT GRASS, BUT NOT LIKE GRASS". With longer, more meaningful utterances, and fewer unintelligible utterances, Lee was able to communicate his ideas more completely after five weeks of SIWI.

Student 2: Daniel (lower language proficiency group). During the pre-test, Daniel (pseudonym) signed, "I don't know", "finished", and "I don't understand" in response to questions and prompts ten times. His mean length utterance was less than three morphemes per t-unit, 85% of his utterances included 1 or 2 morphemes, and 41% were comprised of only a single morpheme. He spent most of his eight-minute pre-test pausing and looking away before answering with "I don't know," or "finish" as if to say "that's all." During class, Daniel was quiet and passive, and had to be prompted to participate. Mid-way through the intervention, however, Daniel created and began to carry a question mark symbol around with him for the next three weeks. After talking about how to ask and answer questions in ASL, Daniel created a visual scaffold of his

own, in the form of a printed question mark mounted on construction paper, that he left on his desk during SIWI. He used it as a prompt to remind himself how to position his eyebrows when asking a question so that the person he was signing to would know an answer was needed. During his post-test, Daniel asked questions about things happening around him. He engaged in back-and-forth conversation and responded enthusiastically to questions and prompts for more information. His mean length of utterance only increased slightly from pre- to post-testing, but none of his utterances included the 3-morpheme utterance, “I don’t know” except for the time when he was explaining that he didn’t know how to make popcorn. In addition, 44% of Daniel’s utterances at posttest included 1 or 2 morphemes, while at pretest 85% of his utterances contained 1 or 2 morphemes. 30% of his total t-units were comprised of 1 morpheme, compared to 41% at pretest.

Student 3: Dora (higher language proficiency group). At pre-test Dora (pseudonym) could answer questions directly, but without detail or explanation. Her mean length of utterance was 3.3 morphemes per t-unit, which allowed her to respond clearly, but briefly, with answers like, “the dog ate sticks” or “the hunting dogs slept together”. In class she constantly had something to share and often had to be reminded to allow other students to have a turn to communicate in order to engage in a conversation. In class, the teacher expanded on Dora’s willingness to express herself by demonstrating, for example, how to add adverbs and adjectives in ASL. By the post-test, Dora’s mean length of utterance had nearly tripled, to 8.8 morphemes per t-unit, and all ASL grammatical features were incorporated more frequently. In all cases she either doubled or tripled the amount of ASL features used appropriately during the collection of her

language sample. Her appropriate use of ASL features often increased her MLU, which indicates the expression of more complex thoughts. Rather than “the dog ate sticks”, her utterances included phrases like, “The elf seal rolled and rested on the sand on the beach”, and, “The white robin flew and sat on a branch on the big tree.” The quantity of her expressive communication more than doubled in the five weeks of SIWI.

Student 4: Claude (higher language proficiency group). Claude (pseudonym) has always been very aware of norms of conversation and interaction, though his mean length of utterance was 3.2 morphemes per t-unit. He made appropriate eye contact throughout conversations, knew when it was his turn to speak, and that questions require an answer. He was, however, unsure of how to construct the responses he knew were expected. In class the teacher and Claude practiced interpreting what people mean based on what they say and how they sign, and discussed what was expected of a listener or conversation partner based on the speakers’ comments. Claude increased his mean length utterance to 5.2 and used many more ASL features to clarify his message. He included the subject of his utterance twice as often (pronoun use went from 3 to 17 at post-test). Claude used almost the same number of verbs at pre- and post-test, but by the post-test he had incorporated indicating verbs, thus making his utterances more intelligible and incorporating the referent of the verb in the path of the gesture (connecting the action and the object). Claude was able to build on his awareness of language in interactions by increasing his understanding of both expressive and receptive ASL.

Summary of this Chapter

This study examined the effect of Strategic and Interactive Writing Instruction on students' expressive language development. Repeated measures ANOVAs within and between subjects conducted for students' mean length of utterances (MLU) and unintelligible utterances revealed statistically significant growth after five weeks of SIWI. For MLU, the partial Eta squared was .789, which means that SIWI accounted for 78.9% of the overall variance. A separate count of each of the four ASL location/space and movement grammatical features (i.e., indicating verbs, pronouns, plural nouns, and verb reduplication) and a total count of all four features from the pre-, mid-, and post-assessments were analyzed using repeated measures ANOVA—these findings were not significant. To further explore the students' use of these features, one student from each language proficiency group was selected to review their ASL expressive language growth for an emerging pattern. The analysis revealed that these students' more frequently expressed complete and comprehensible utterances after five weeks of SIWI than prior to the implementation of Strategic and Interactive Writing Instruction.

CHAPTER 5: DISCUSSION AND CONCLUSION

This study was designed to investigate the impact of Strategic and Interactive Writing Instruction (SIWI) on deaf and hard of hearing students' (d/hh) expressive language growth in American Sign Language (ASL). More specifically, analyses of the growth of students' mean length of utterance (MLU), incorporation of unintelligible utterances, and use of ASL morphological features were performed.

This study was inspired in part by teacher anecdotes as they reflected on their experiences following exposure to and implementation of the guiding principles of SIWI. Teachers noticed that their students were expressing themselves more clearly, sharing complex thoughts, and communicating with others more fluently. Each of the seven driving principles of SIWI (i.e., strategic, interactive, balanced, guided to independent, visual scaffolds, authentic, and metalinguistic knowledge and linguistic competence) were incorporated in the five classes during the five-weeks of SIWI (Wolbers, 2010). The strategy component allowed for the incorporation of NIP it lessons that addressed the use of ASL morphological features to build metalinguistic knowledge and linguistic competence, while the interactive format provided a meaningful space to use the features during collaboration and discussion. Visual scaffolds that represented linguistic concepts taught during NIP it lessons supported the students during the creation of three co-constructed personal narrative pieces. An example of a collaboratively created piece can be found in Appendix I. These scaffolds were available to the students during all stages of the guided to independent writing cycle. An example of a visual scaffold is included in Appendix C and pictures from the writing cycle are included in Appendix B.

Following Cummins' (1979) recommendation, English writing instruction never happened without concurrent opportunities to develop ASL.

Summary of the Findings

SIWI was implemented to develop d/hh students' use of ASL. The development of ASL was measured through language samples by analyzing the students' MLU, incorporation of unintelligible utterances, and use of ASL grammatical features. To measure the students' language growth, language samples were collected five weeks prior to the intervention, immediately prior to the intervention, and after five weeks of intervention.

During the five-weeks of SIWI all students and each language proficiency group made significantly greater gains compared to the five-weeks with no intervention. At post-test the lower language proficiency group surpassed the higher language proficiency group's MLU at pre- and mid-test. Therefore, regardless of language proficiency, students made gains in MLU during SIWI. During pre- and mid-test, students' use of unintelligible utterances remained consistent, but after the implementation of the intervention, students significantly reduced the amount of unintelligible utterances used. Taken together, these findings suggest that SIWI positively impacted language development and expressive communication abilities for all students, regardless of beginning language proficiency.

This study also analyzed students' use of ASL features. As expected, there was not a significant difference between the number of features (indicating verbs, pronoun, plural noun, verb reduplication) present across language samples. Feature use is determined by the topic and purpose of communication. Therefore greater linguistic

competence and metalinguistic awareness does not mean the quantity of features would increase; however, it may mean features are used more appropriately. Increases in MLU with decreases in unintelligible utterances from pre- to post- tests suggest that students used ASL features more appropriately even if not more frequently.

The following sections discuss the three findings supported by the data collected during this study: ASL growth, language interdependence, and linguistic competence. The first finding, ASL growth, will be used to describe how SIWI impacts classroom instruction and student learning, and is used to discuss the elements of SIWI that have been identified as responsible for promoting language growth. The existence of language interdependence as evidenced in this study will be discussed in the second section. The last finding will be used to explore ways to support the development of students' underlying linguistic competence. Implications for each of these findings will be discussed.

ASL Growth

Theoretical discussion and implications. The results of the analyses are fairly straightforward—SIWI had a significant impact on increasing students' MLU and decreasing students' use of unintelligible utterances. What is less understandable, but not surprising, is the lack of language growth during the five weeks of regular instruction. Students showed little variation in MLU and the incorporation of unintelligible utterances at pre- and mid-assessments. The trend in little or no literacy growth in the middle grades is well documented (Musselman and Szanto, 1998; Yoshinaga-Itano & Downey, 1996; Yoshinaga-Itano, Snyder, and Mayberry's, 1996). Thus the lack of growth between the pre- and mid-test is not surprising, though it is concerning. Given the pattern

of little literacy growth over time for d/hh students, it is surprising that significant gains were made in only five weeks with SIWI. From a language planning perspective (Reagan, 2010) this supports Nover's 2005 hypothesis that there are three types of linguistic competence (Reagan, 2010) that must come in a certain order: signacy, literacy, oracy. Signacy is defined as, "the ability to use a sign language effectively; ... a kind of metalinguistic understanding of sign language in general and of the specific natural sign language at issue in particular" (Reagan, 2010, pg. 119). Nover explains that the traditional pattern of instruction has put oracy first, followed by literacy, and then signacy. For this reason, the pattern of no growth from the pre-to mid-test is not a reflection of the regular classroom teacher. It simply provides more evidence of plateaus in language progress and trends towards low achievement in literacy among d/hh students due to late language acquisition (Nelson, Loncke, & Camarata, 1993), and evidence that the use of SIWI even over a short period of time defies this trend.

The findings of this study show that when teachers incorporate the driving principles of SIWI, which includes metalinguistic knowledge building, students make gains. Students' growth during the SIWI intervention demonstrates that it is not only possible, but critical to develop their expressive language in order to support literacy achievement. This finding held regardless of the students' initial language proficiencies, which indicates that SIWI is effective at building language at multiple levels of proficiency and suggests that it could also be a powerful long-term intervention, or sustained instructional approach. The evidence of significant growth after such a short time, especially compared with no growth over the same period, suggests that SIWI could be an integral part of changing plateaus in lower literacy among middle grades deaf and

hard of hearing students. With literacy tightly linked to life opportunity as well as access to the hearing world, it is imperative to capitalize on interventions that provide a different narrative for d/hh students' literacy development.

Considering the many variables—teacher, students, school environment, curriculum—it is difficult to characterize “typical” classroom instruction (Croninger & Valli, 2009) in order to compare pre- to mid-test instruction with SIWI. However, it is possible to describe the stark contrast between SIWI and the kinds of instruction for d/hh students that historically have not been conducive to language development. The largest difference between SIWI and traditional instructional approaches used with d/hh students is the explicit emphasis on metalinguistic awareness and interaction. Although all of the driving principles of SIWI work together to create an approach that has shown to increase students' written language abilities (Wolbers, 2008; Wolbers, Dostal, DeLozier, under revision), it appears that the focus on developing *metalinguistic awareness* in an *interactive setting* through the *guided to independent process* are the main elements responsible for the increase in students' expressive language abilities.

The guided to independent process sets the expectation that students will master established learning objectives. These expectations for mastery are not a given in settings where teachers know the statistics about the average deaf and hard of hearing student's literacy outcomes. This process also provides a contrast to the traditional lecture and practice format, which minimizes instructional conversations, is less likely to promote dialogue, engagement or achievement (Cazden, 2001). Instructional conversations (Tharp, 1997; Tharp & Gallimore; 1991) which according to Cazden (1988) are "talk in which ideas are explored rather than answers to teachers' test questions provided and

evaluated" (p. 54). These are central to SIWI and not often found in traditional instructional models. Such teacher-student interaction is engaging, increases student participation, is relevant to students, has a focus that remains discernible throughout the discussion, and encourages extended conversations between the students (Cazden, 2001). This study demonstrates that instruction that incorporates instructional conversations, which have been shown to have an impact on engagement and achievement, also positively impact language development.

SIWI also encourages peer-to-peer interactions. The authenticity of the writing process creates an urgent need to understand one another. In order to ensure authenticity, students engage in creating text for an established purpose and audience. This constructs a situation in which it is important to the students to effectively communicate their ideas in order to accomplish their goal. Peer-to-peer interactions also challenge students to reinforce and communicate concepts by expressing or receiving peer critiques, suggestions, and contributions (Haneda & Wells, 2008; Wells, 2000). If either of these components, interactions/instructional conversations or authentic tasks, are compromised during instruction, student motivation and opportunity for language experiences will likewise be compromised. Furthermore, interactive environments that include instructional conversations and peer-to-peer interactions are not limited to writing instruction. Ongoing and future research will investigate the uses of these principles across content areas and disciplines both in terms of language development and cross-disciplinary achievement.

Implications for practice. Residential schools for the deaf and other programs designed for the instruction of deaf and hard of hearing students typically have a

communication philosophy that guides and limits the modes of communication that can be used for instruction. It is important to point out, however, that communication philosophies that privilege manually coded English do not preclude the use of SIWI or the development of ASL for greater linguistic competence. Even in contexts that philosophically focus on target languages and limit the use of ASL for instruction, an emphasis on developing metalinguistic awareness will allow students to develop ASL skills, and therefore express their ideas and receive instruction with more clarity. This study demonstrates the reciprocity of language learning since highlighting the differences and similarities between written English and ASL supported the development of a more nuanced understanding of the use and features of ASL.

Teachers can apply the findings of this study across contexts by incorporating the techniques used by the researcher to highlight ASL concepts within other manually coded English modes of communication. For example, a teacher can: 1) repeat and use students' ASL expressions; 2) use sim-com to introduce ASL concepts; 3) introduce students to other signers through classroom visitations and videos, and discuss ASL usage; 4) incorporate ASL features in sim-com; 5) utilize a conceptually accurate version of manually coded English; 6) repeat sign expressions using ASL (for emphasis and clarity) and then sim-com the same message.

Similarly, in settings where ASL is the language of instruction, highlighting the features of ASL, and the similarities and differences between ASL and English, will aid in developing students' metalinguistic awareness and support their language development. In order to build metalinguistic awareness and support the development of linguistic competence, teachers should emphasize and compare language features during

instructional time. This is not unlike the work English teachers may do in hearing classrooms by explicitly drawing attention to the morphological structure of English in order to support students' awareness and proficiency in English. Although, with L1 this practice has not proven to be effective (Graham & Perin, 2007; Hillocks, 1984), explicit instruction and metalinguistic awareness is beneficial to L2 (Wolbers, 2010).

Regardless of language philosophy the interdependence of language learning among deaf and hard of hearing students, demonstrated in this study, supports the ordering of language competence with signacy first, followed by literacy, and then oracy. Where this is not an option because traditional instruction has already placed oracy or literacy first, SIWI provides an opportunity to emphasize signacy in the context of a literacy intervention. As policy makers, curriculum developers, and administrators plan for language acquisition, SIWI's driving principles can be used in order to provide the needed emphasis on signacy for the development of literacy and oracy.

Language Interdependence

Theoretical discussion and implications. The findings of this study support the theory of interdependence (Cummins' 1979; Krashen, 1991) by demonstrating growth in ASL as a result of an English writing intervention that provided support in ASL. Since growth was statistically significant from mid- to post, but not from pre-to mid-tests, these findings refute the maximum exposure hypothesis and other theories which suggest that target languages are best learned in isolation (Porter, 1990; Meisel, 2007). They further demonstrate that instruction that does not incorporate support for ASL does nothing to mediate the trend of low literacy achievement in the middle grades. Support for ASL in

the context of English instruction is significantly more effective than English-only instruction.

Implications for practice. This study took place at a residential school, a place where the entire campus and all events are accessible, where deaf role models are present, and deaf students have peers to communicate with, but ultimately these students are not developing a first language.

According to Snodden (2008), “education for deaf students has often followed a monolingual philosophy...historically, this has meant a failure to support the use of the deaf community’s native signed languages in classrooms or educational programs for deaf students” (p. 583). It is obvious that an L1 English option is not working for a large number of d/hh students, which suggests that spoken English, signed English and sim-com should not be privileged over ASL in academic settings serving d/hh students. Neither the loss of hearing nor the degree of loss restricts language development (Spencer, 2004), it is “often a result of [students’] delayed exposure to a visual language that they can access and process effectively” (Snodden, 2008, p. 582). The incorporation of signacy in SIWI provides exposure and instruction in a visual language while simultaneously providing literacy instruction.

To promote the development of d/hh students’ linguistic competence, they must be provided with opportunities to acquire a fully developed language. The data from this study supports Finnegan’s (1992) claim that “ASL is easier to acquire as an L1 than any form of English” (p. 7); therefore administrators should evaluate their school communication philosophies and eliminate contrived signing systems and support the use of ASL with the goal of providing students access to academic content and world

knowledge (Johnson, Liddell, & Ertling, 1989). Aligning instructional practices to a communication philosophy that includes ASL enables teachers to support the development of students' expressive language.

As Marschark (2011) has pointed out, there is a paucity of research on bilingual education in d/hh settings. The findings of this study are a clear call for policies that support instructional approaches and research agendas for d/hh students that incorporate the signacy and consider students' access to instruction. For too long researchers have been divided over the issue of language interdependence without exploring the link between language interdependence, language competence and access to instruction. SIWI is not successful simply because it is a bilingual approach, but rather because it focuses on explicit knowledge about languages – thus building metalinguistic knowledge which increases access to instruction. For this reason the findings of this study do not simply represent a “win” for the bilingual side of a long-standing argument. Rather, the findings argue for researchers to reframe issues of language development in terms of the development of knowledge *about* language, rather than proficiency in one language over another.

SIWI evidenced growth in only 5 weeks of instruction for all students regardless of beginning language proficiency. To date, the longest study of SIWI is only a single school year (approximately 9 months) (Wolbers, Dostal, & DeLozier, under revision). Given the growth in ASL after 5 weeks and written English growth after a year, it is exciting to imagine what multiple years of exposure to SIWI instruction would mean for trends in the literacy achievement of d/hh students, and in the life opportunity of individuals who are d/hh.

Linguistic Competence

Theoretical discussion and implications. The increase in students' ASL abilities suggests the development of an underlying linguistic competence. Prince and Strong (1998) and Baker and Baker (1997) have suggested that there is a link between cultivating linguistic competence and the development of literacy skills. This link is further supported by Bialystok's (2007) hypothesis that language learners need to have competence with their L1 and metalinguistic awareness to become successful readers and writers in an L2. SIWI's impact on students' ASL abilities therefore has the potential to support deaf readers and writers' success in literacy tasks. A greater understanding of ASL can also provide students with access to academic content and world knowledge (Johnson, Liddell, & Ertling, 1989), which supports learning and communication in all academic areas (Goldin-Meadow, 2011). Krashen (1985) and Losey (1995) support this implication with their hypothesis that knowledge is gained while negotiating meaning and problem solving during interactions that use their L1. The findings of this study reinforce the underlying premise of many L2 theories (Prinz & Strong, 1998; Krashen, 1991; Cummins 1979): language is a tool through which to communicate and learn—thus the opportunity to fully develop language is imperative.

Implications for practice. In all grades, teachers are balancing curricular demands and preparation for state-mandated standardized testing. These pressures are compounded for teachers of the deaf who are faced with an additional dilemma—focus on content objectives or provide opportunities to foster L1 growth. The primary objective of content-area instruction is acquiring knowledge of academic disciplines, but to achieve this proficiency, facility with academic language is essential (Coleman &

Goldenberg, 2010). In order to acquire content vocabulary and the critical-thinking-skills that are required for success in content-area classes, d/hh students must learn how to use conversational language to apply to the discussion of academic content. Even though it takes time to arrive at a point of shared understanding in the classroom with students who are language delayed, developing communicative competency has a significant impact on d/hh students' academic achievement (Baker & Baker, 1997; Daniels, 1993; and Markowicz, 1972). Simply put, linguistic competence is a foundational need for all other learning and SIWI's driving principles provide a scaffold on which learning can occur.

In order to build students' metalinguistic awareness and linguistic competence, the teacher must be a fluent language model who has a linguistic-based understanding of ASL and English that can be made explicit to students (Enns, 2006). For example, the teacher will need to be able to describe features of ASL, such as how adverbs are incorporated into verbs. The phrase "walk slowly" in ASL would be represented in only one sign, and the signer would slow the movement of the sign "walk" to indicate the pace of the verb while also showing the pace through facial expressions. Teachers without a linguistic-based understanding of both languages will struggle to identify and describe similarities and differences between languages. Further, since students are developing both their ASL and English skills, SIWI requires teachers to be strong language models for both languages.

This study provides evidence that administrators can support the development of linguistic competence by encouraging teachers to explicitly compare and contrast languages to build their own metalinguistic awareness. Such encouragement may include opportunities for teachers to develop language competence and linguistic understanding

of both languages. The degree to which teachers are encouraged to make connections within and across languages will have an impact on students' opportunities to develop ASL, and therefore greater linguistic competence.

Limitations of the Study and Future Directions

As outlined in the first chapter, this study was limited by the school's communication philosophy, implementation at a residential school for the deaf, and implementation of the intervention by the researcher. The sample was limited to deaf and hard of hearing students in grades 4, 5, and 6 for the purpose of exploring language growth during the upper elementary and middle school years since relatively little is known about literacy interventions for these grades. Further, the sample only included students who attended a residential school for the deaf. This limited the number of participating students and eliminated students who were placed in alternative educational settings. Another limitation that should be taken into consideration is that the researcher had used SIWI for two years prior to the implementation of the intervention; therefore, it can be assumed that she had a greater understanding of SIWI's driving principles than a teacher who was recently introduced to the approach.

Future research may include reanalysis of the language samples to further investigate patterns in the use of ASL features in order to better understand students' development. Instead of limiting the linguistic features to a quantifiable amount, as in the present analysis, a more qualitative analysis may better describe students' language in use. Likewise, an analysis of the writing samples from this study will investigate the impact of this 5-week intervention on word- and sentence-level writing skills and discourse-level written English concepts to determine linguistic transfer and how patterns

of one language influence another (Cummins, 1979; Krashen, 1991; Castilla, Restrepo, Perez-Leroux, 2009). These further analyses will extend the existing research base on SIWI to the upper elementary grades. In addition, videos of daily classroom instruction from this intervention constitute an untapped source of data. Video analyses will be conducted to identify patterns of teacher-student interactions and investigate the nature and role of dialogue in mediating understanding and encouraging participation. Finally, future research might investigate the impact of SIWI on deaf and hard of hearing students in mainstream settings.

In Conclusion

The overarching narrative of existing research studies of deaf and hard of hearing students and literacy is one characterized by terms like “plateau”, “struggle” and “persistent low achievement” due to late language acquisition (Musselman and Szanto, 1998; Yoshinaga-Itano & Downey, 1996; Yoshinaga-Itano, Snyder, and Mayberry’s, 1996; Nelson, Loncke, & Camarata, 1993). This study presents an alternative account of the development of language among d/hh students in which students can and do become purposeful, powerful communicators. Challenging the existing perceptions of d/hh students’ academic abilities and tackling the negative school rhetoric around students with language delays (e.g, “they can’t”, “they don’t”, “child most likely has an additional disability”) needs to become a priority for researchers and practitioners.

I have tried to write the last few lines of this dissertation several times, and finally realized that the only place I can write them is in my classroom. This is a place where students come eager to not only learn to "read the word," but also to "read the world" (Freire and Macedo, 1987). Many students have spent hours treading through language,

words and concepts in this room.

As I look around I realize the importance of written language to the students who inhabit this room every day—comic books created by a superhero club have been left on a bean bag chair, projected on the Starboard is a video of a student signing his research essay in order to translate it into English, drafts of students’ writings for the student-published book *Teenagers and Deafness* are spread across the writing workstation, students’ translations of ASL videos are on my desk for upcoming peer-to-peer writing conferences. On the corner of my desk is a note I had not seen before sitting down to write. It is one of many short notes around the school building because of Valentine’s Day this week. It reads:

I want to say thank you for being here to teach us. I have no idea why I giving you this note. Wanted to let you know that I do like to learn, I totally love to write. Thank you!

At the time of this study Andrea was a sixth grader placed in the lower language proficiency group not only for this intervention, but also as her permanent academic placement. This year, she has been transferred to the highest seventh grade language proficiency group and is currently writing a research report on Leonard DiVinci while serving as a writing mentor for two sixth grade students during her personal study time. Andrea is just one example—one reminder—of why deaf and hard of hearing students should be presumed competent and effective communicators who are capable of navigating two languages simultaneously.

LIST OF REFERENCES

REFERENCES

- Adrian, A. (Ed.). (1995). *Linguistics: an introduction to language and communication*. 4th ed. Cambridge, MA: MIT Press.
- Allington, R. L. & Johnston, P. H. (Eds.). (2002). *Reading to learn: Lessons from exemplary fourth-grade classrooms*. New York: Gilford.
- Anthony, D. (1971). *Seeing Essential English: Volumes 1 and 2*. Anaheim, CA: Educational Services Division, Anaheim Union School District.
- Antia, S. D., Reed, S., & Kreimeyer, K. H. (2005). Written language of deaf and hard-of-hearing students in public schools. *Journal of Deaf Studies and Deaf Education*, 10(2), 244–255.
- Applebee, A. N. (2000). Alternative models of writing development. In R. Indrisano & J. Squire (Eds.). *Perspectives on writing: Research, theory and practice*. Newark, Delaware: International Reading Association.
- August, D., & Shanahan, T. (Eds.). (2006). *Developing literacy in second-language learners*. Mahwah, NJ: Erlbaum.
- Baker, S. & Baker, K. (1997). *Educating children who are deaf or hard of hearing: Bilingual-bicultural education*. Knoxville, TN. (ERIC Document Reproduction Service No. ED414671)
- Baker, C. (1978). How does “Sim-Com” fit into a bilingual approach to education? In F. Caccamise & D. Hicks (Eds.), *Proceedings of the 2nd national symposium sign research and teaching* (pp. 3-12). Silber Springs, MD: National Association of the Deaf.
- Bergeron, J. P., Lederberg, A. R., Easterbrooks, S. R., Miller, E. M., & Connor, C. M.

- (2009). Building the Alphabetic Principle in young children who are deaf or hard of hearing. *The Volta Review*, 109(2-3), 87-119.
- Bess, F., Dodd-Murphy, J., & Parker, R. (1998). Children with minimal sensorineural hearing loss: Prevalence, educational performance, and functional status. *Ear and Hearing*, 19(5), 339–354.
- Bialystok, E. (2007). Acquisition of bilingual children: A framework for research. *Language Learning*, 57, 45-77.
- Bloomfield, L., 1933, *Language*. New York: Henry Holt.
- Bornstein, H. (1990). Signed English. In H. Bornstein (Ed.), *Manual communication: Implications for education* (pp. 128-138). Washington, DC: Gallaudet University Press.
- Brown, H. D. (1973). Affective variables in second language acquisition. *Language Learning: A Journal of Applied Linguistics*, 23, 231-244.
- Bruner, J. (1996). *The culture of education*. Cambridge, MA: Harvard University Press.
- Castilla, A. P., Restrepo, M. A., & Perez-Leroux, A. T. (2009). Individual differences and language interdependence: A study of sequential bilingual development in Spanish-English preschool children. *International Journal of Bilingual Education and Bilingualism*, 12(5), 565-580.
- Cazden, C. B. (2001). *Classroom discourse: The language of teaching and learning* (2nd ed.). Portsmouth, NH: Heinemann.
- Cazden, C. (1988). *Classroom discourse: The language of teaching and learning*. Portsmouth, NH: Heinemann.

- Chamberlain, C. (2002). *Reading skills of deaf adults who sign: Good and poor readers compared*. Unpublished doctoral dissertation, McGill University, Montreal.
- Coleman, R. & Goldenberg, C. (2010). What Does Research Say about Effective Practices for English Learners? Part II: Academic Language Proficiency. Oral Language Proficiency. *Kappa Delta Pi Record*, 47(1), 10-16.
- Croninger, R., & Valli, L. (2009). "Where is the action?" Challenges to studying the teaching of reading in elementary classrooms. *Educational Researcher*, 38 (2), 100-108.
- Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, 49(2), 10-15.
- Cummins, J. (1999). Biliteracy, empowerment, and transformative pedagogy. In J. V. Tinajero & R. A. DeVillar (Eds.), *The power of two languages: 2000*. (pp. 9-19). New York: McGraw-Hill.
- Cummins, J. (2005, September 23). *Teaching for cross-language transfer in dual language education: Possibilities and pitfalls*. Paper presented at the TESOL Symposium on Dual Language Education: Teaching and Learning Two Languages in the EFL Setting. Bogazici University, Istanbul, Turkey.
- Daniels, M. (1993). ASL as a factor in acquiring English. *Sign Language Studies*, 78, 23-28.
- Davies, A. 2003. *The Native Speaker: Myth and Reality*. Clevedon: Multilingual Matters
- Davis, J. (2010). *Hand Talk: Sign Language among American Indian Nations*. New York City, NY: Cambridge.

- Emmorey, K. (2001). Space on hand: The exploitation of signing space to illustrate abstract thought. In M. Gattis (Ed), *Spatial schemas and abstract thought*, pp. 147-174, The MIT Press: Cambridge, MA.
- Enns, C. J. (2006). *A Language and Literacy Framework for Bilingual Deaf Education*. Winnipeg, MB (SSHRC Standard Research Grant Report).
- Fleetwood, E., & Metzger, M. (1998). *Cued language structure: An analysis of Cued American English based on linguistic principles*. Silver Springs, MD: Calliup.
- Flower, L.S. & Hayes, J.R. (1980). The dynamics of composing: Making plans and juggling constraints. In L.W. Gregg & E.R. Steinberg (Eds.), *Cognitive processes in writing* (pp. 31-50). Hillsdale, NJ: Erlbaum & Associates.
- Finnegan, M. (1992). Bilingual-bicultural education. *The Endeavor*, 3, 1-8.
- Freire, P., and Donald M. (1987). *Literacy: Reading the word and the world*. South Hadley, MA: Bergin and Garvey.
- Fung, P. C., Chow, B. W.-Y., & McBride-Chang, C. (2005) The impact of a dialogic reading program on deaf and hard-of-hearing kindergarten and early primary school-aged students in Hong Kong. *Journal of Deaf Studies and Deaf Education*, 10, 82-95
- Furth, H. G. (1973). *Deafness and learning*. Belmont, CA: Wadsworth Publishing Company Inc.
- Genesee, F., J. Paradis, and M. Crago. 2004. *Dual language development and disorders: A handbook on bilingualism and second language learning*. Baltimore, MD: Brookes.
- Goldin-Meadow, S. (2005) *The resilience of language*. New York: Psychology Press.

- Goodson, I., & Foote, M. (2001). A sword over their heads: The standards movement as a disciplinarily device. In J. Kincheloe & D. Weil's (Eds.), *Standards and schooling in the United States: An encyclopedia* (pp. 703-709). Santa Barbara, CA: ABC-CLIO.
- Goppold, L. (1988). Early Intervention for Preschool Deaf Children: The Longitudinal Academic Effects Relative to Program Methodology. *American Annals of the Deaf*, 133: 285-287.
- Gopsill, F. P., "A historical overview of international languages". In *International languages: A matter for Interlingua*. Sheffield, England: British Interlingua Society, 1990.
- Graham, S. & Perin, D. (2007). *Writing next: Effective strategies to improve writing of adolescents in middle and high schools – A report to Carnegie Corporation of New York*. Washington, DC: Alliance for Excellent Education.
- Gustason, G., Pfetzing, D., & Zawolkow, E. (1980). *Signing Exact English*. Los Alamitos, CA: Modern Sign Press.
- Haneda, M., & Wells, G. (2008). Learning an Additional Language through Dialogic Inquiry. *Language and Education*, 22(2), 114-136.
- Hellwig, B. (2008, 5 15). *ELAN Manual*. Retrieved from ELAN - Linguistic Annotator version 3.5: <http://www.lat-mpi.eu/tools/elan>
- Heiling, K. (1995). *The development of deaf children: Academic achievement levels and social processes*. Hamburg: Signum Press.
- Hillocks, G. (1984). What works in teaching composition: A meta-analysis of experimental treatment studies. *American Journal of Education*, 93(1), 133-170.

- Hunt, K. (1965). *Grammatical structures written at three grade levels* (Report No. 3, Committee on Research). Champaign, IL: National Council of Teachers of English.
- Jamieson, J. (1995). Visible thought: Deaf children's use of signed and spoken private speech. *Sign Language Studies*, 86, 63-79.
- Johnson, R. E. (1983). *Sign language use and evaluation: Report to the collegiate faculty of Gallaudet College simultaneous communication advisory board*. Washington, D.C.: Gallaudet University.
- Johnson, R., Liddell, S., & Erting, C. (1989). *Unlocking the curriculum: Principles for achieving access in deaf education*. Washington, DC: Gallaudet University.
- Karchmer, M. A., & Mitchell, R. E. (2003). Demographic and achievement characteristics of deaf and hard-of-hearing students. In M. Marschark & P. Spencer (Eds.), *The Oxford handbook of deaf studies, language, and education* (pp. 21-37). New York: Oxford University Press.
- Krashen, S. D. (1985). *The input hypothesis*. New York: Pergamon.
- Krashen, S. D. (1991). Bilingual education: *A focus on current research*. Focus. National Clearinghouse for Bilingual Education. (ERIC Document Reproduction Service No. ED 337 034).
- Kress, (1982). *Learning to write*. London: Routledge & K. Paul.
- Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. New York: Cambridge University Press.
- Kuntze, M. (1998). Literacy and deaf children: The language question. *Topics in Language Disorders*, 18, 1-5.

- Lidell, S. K. and Johnson, R. E. (1987). *An analysis of spatial locative predicates in American Sign Language*. Paper presented at the Fourth International Symposium on Sign Language Research, July 15-19, Lappeenranta, Finland.
- Lillo-Martin, D. (1996). Modality effects and modularity in language acquisition: The acquisition of American Sign Language. In T.K. Bhatia & W. C. Ritchie (Eds.), *Handbook of language acquisition*. Dan Diego, CA: Academic Press.
- Loban, W. (1976). *Language development: Kindergarten through grade twelve*. Urbana, IL: National Council of Teachers of English.
- Losey, K. M. (1995). Mexican American students and classroom interaction: An overview and critique. *Review of Educational Research*, 65, 283-318.
- Lowenbraun, S., Appelman, K., & Callahan, J. (1980). *Teaching the hearing impaired through total communication*. Columbus, OH: Charles E. Merrill.
- Luckner, J., Sebald, A., Cooney, J., Young, J. & Muir, S.G. (2006). An examination of the evidence-based literacy research in deaf education. *American Annals of the Deaf*, 150(5), 443-456.
- Luckner, J., Handley, M. (2008). A summary of the reading comprehension research undertaken with students who are deaf or hard of hearing. *American Annals of the Deaf*, 153(1), 6-36.
- Markowicz, H. (1972). Some sociolinguistic considerations of American Sign Language. *Sign Language Studies*, 1(15).
- Marmor, G. & Petitto, L. (1979). Simultaneous communication in the classroom: How well is English grammar represented? *Sign Language Studies*, 23, 99-136.

- Marschark (2011, February 17). *The promises (?) of Deaf education: From research to practice and back again*. Presented at the Association of College Educators of the Deaf and Hard of Hearing Annual Conference. Fort Worth, Texas.
- Marschark, M., Convertino, C.M., Macias, G., Monikowski, C.M., Sapere, P.M., & Seewagen, R. (2007). Understanding communication among deaf students who sign and speak: A trivial pursuit? *American Annals of the Deaf*, 152, 415-424.
- Mayer, C. & Wells, G. (1996). Can the linguistic interdependence theory support a bilingual-bicultural model of literacy education for deaf students? *Journal of Deaf Studies and Deaf Education*, 1, 93-107.
- McGill-Franzen, A. M., Lanford, C. & Adams, E. (2002). Learning to be literate: A comparison of five urban early childhood programs. *Journal of Educational Psychology*, 94(3), 443-464.
- McGraw-Hill (2011). *McGraw-Hill Education: Secondary*. Retrieved from www.mheonline.com/program/view
- Meadow-Orlans, K., Mertens, D., & Sass-Lehrer, M. (2003). *Parents and their deaf children: The early years*. Washington, DC: Gallaudet University Press.
- Meier, R., (1991). Language acquisition by deaf children. *American Scientist*, 79, 60-79.
- Meier, R. P. (1991). Language acquisition by deaf children. *American Scientist* 79:60-70.
- Meier, R. P., & Newport, E. L. (1990). Out of the hands of babes: On a possible sign advantage in language acquisition. *Language*, 66, 1-23.
- Meisel, J. 2007. *On autonomous syntactic development in multiple first language acquisition*. Boston University Conference on Language Development Proceedings 31: 26-45.

- Mitchell, R. E. & Karchmer, M. A. (2004). Chasing the mythical ten percent: Parental hearing status of deaf and hard of hearing students in the United States. *Sign Language Studies* 4(2), 138-162.
- Mithun, M. (1999/2001). *The languages of Native North America*. New York: Cambridge University Press.
- Musselman, C. & Szanto, G. (1998). The written language of deaf adolescents: Patterns of performance. *Journal of Deaf Studies and Deaf Education*, 3, 245-257.
- Musselman, C.R., Lindsay, P.H., & Wilson, A.K. (1988). An evaluation of recent trends in preschool programming for hearing-impaired children. *Journal of Speech and Hearing Disorders*, 53, 71-88.
- Nelson, K. E., Loncke, F., & Camarata, S. (1993). Implications of research on deaf and hearing children's language learning. In M. Marschark, & D. Clark (Eds.), *Psychological perspectives on deafness* (pp. 123-151). Hillsdale, NJ: Lawrence Erlbaum.
- Neuman, S. & Celano, D. (2001). Access to print in low-income and middle-income communities. *Reading Research Quarterly*, 36(1), 8-26.
- Northern, J. & Downs, M. (1984). *Hearing in children*. 3rd ed. Baltimore, MD: Williams & Wilkins.
- Owens, R. (2001). *Language development: an introduction*. 5th ed. Needham Heights, MA: Allyn and Bacon.
- Owens, R. (1995). *Language Disorders: A Functional Approach to Assessment and Intervention*. Second Edition. Needham Heights, MA: Allyn & Bacon.

- Paradis, J. & Genesee, F. (1996). Syntactic acquisition in bilingual children: Autonomous or interdependent? *Studies in Second Language Acquisition*, 18, 1-25.
- Paul, R. (2001) *Language Disorders from Infancy through Adolescence: Assessment and Intervention*. Second Edition. St. Louis: Mosby-Year Book.
- Paul, P. (1990, July). *Use of ASL to teach reading and writing to deaf students: An interactive theoretical perspective*. Paper presented at the meeting of the Bilingual Considerations in the Education of Deaf Students: ASL and English Conference.
- Porter, R. P. (1990). *Forked tongue: The politics of bilingual education*. New York: Basic Books.
- Pressley, M., Wharton-McDonald, R., Allington, R.L., Block, C.C., Morrow, L., Tracey, C., Baker, K., Brooks, G., Cronin, J., Nelson, E., & Woo, D. (2001). A study of effective first-grade reading instruction. *Scientific Studies of Reading*, 5, 35-58.
- Prinz, P. M. & Strong, M. (1998). ASL proficiency and English literacy within a bilingual deaf education model of instruction. *Topics in Language Disorders*, 18(4), 47-60.
- Reagan, T. (2010). *Language policy and planning for sign languages*. Washington D.C.: Gallaudet University Press.
- Rodda, M., & Grove, C (1987). *Language, cognition and deafness*. New Jersey: Erlbaum.
- Rogoff, B. (1990). *Apprenticeship in thinking: cognitive development in social context*. New York, NY: Oxford University Press.
- Scardamalia, M. & Bereiter, C. (1986). Research on written composition. In M. C. Wittrock (Ed.), *Handbook of research on teaching* (3rd ed., pp. 778-803). New York: MacMillan.

- Schiavetti, N. & Whitehead, R. L. (1996). Voice onset time in speech produced during simultaneous communication. *Journal of Speech and Hearing Research* 39(3), 565-572.
- Schiavetti, N., and Whitehead, R. L. (1998). Effects of fingerspelling tasks on temporal characteristics and perceived naturalness of speech in simultaneous communication. *Journal of Speech, Language, and Hearing Research*, 41(1), 5-17.
- Schow, R. & Nerbonne, M. (2002). *Introduction to audiologic rehabilitation*. Boston, MA: Allyn & Bacon.
- Singleton, J. L., Supalla, S., Litchfield, S., & Schley, S. (1998). From sign to word: Considering modality constraints in ASL/English bilingual education. *Topics in Language Disorders*, 18(4), 16-29.
- Snodden, K. (2008). American Sign Language early intervention. *The Canadian Modern Language Review*, 64(4), 581-604.
- Spencer, P. (2004). Language at 12 and 18 months: Characteristics and accessibility of linguistic models. In K. Meadow-Orlans, P. Spencer, & L. Koester (Eds.), *The world of deaf infants: A longitudinal study* (pp. 147–167). New York: Oxford University Press.
- Stahl, S. (2003). No more “madfaces”: Motivation and fluency development with struggling readers. In D. Barone & L. Mandel Morrow (Eds.), *Literacy and Young Children* (pp. 195-209). New York: Guilford Press.

- Stokoe, W. C., Casterline, D. C., & Croneberg, C. G. (1965). *A dictionary of American Sign Language on linguistic principles*. Washington, DC: Gallaudet College Press.
- Stokoe, W. C. (1979). Sign language structure: An outline of the visual communication systems of the American deaf. *Journal of Deaf Studies and Deaf Education*, 10(1), 3-37.
- Tevenal, S. & Villanueva, M. (2009). Are you getting the message? The effects of SimCom on the message received by deaf, hard of hearing, and hearing students. *Sign Language Studies*, 9(3), 266-286.
- Tharp, R. G. (1997). *From at-risk to excellence: Research, theory, and principles for practice* (Research Report 1). Santa Cruz, CA: Center for Research on Education, Diversity & Excellence.
- Tharp, R., & Gallimore, R. (1991). *The instructional conversation: Teaching and learning in social activity* (Research Report 2). Santa Cruz, CA: The National Center for Research on Cultural Diversity and Second Language Learning, University of California, Santa Cruz.
- Thompson, R. L., Vinson, D. P., & Vigliocco, G. (2009). The link between form and meaning in American Sign Language: Lexical processing effects. *Journal of Experimental Psychology*, 35(2), 550-557.
- Trezek, B., Wang, Y., & Paul, P. (2010). *Reading and deafness: Theory, Research, and Practice*. Clifton Park, NY: Delmar, Cengage Learning.
- Valli, C., Lucas,., Mulroney, K. (2005): *The Linguistics of American Sign Language: An Introduction*, Fourth Edition. Washington D.C.: Gallaudet University Press.

- Vygotsky, L. S. (1987). Thought and word. In R. W. Rieber & A. S. Carlton (Eds.), *The collected works of L. S. Vygotsky: Volume 1*. New York: Plenum.
- Wertsch, J. V. (1991) *Voices of the mind: A sociocultural approach to mediated action*. Cambridge, MA: Harvard University Press.
- Wells, G. (2000). Dialogic inquiry in education. In C. D. Lee & P. Smagorinsky (Eds.), *Vygotskian perspectives on literacy research: Constructing meaning through collaborative inquiry*. New York: Cambridge University Press.
- Wilbur, R. B. & L. Petersen. 1998. Modality Interactions of Speech and Signing in Simultaneous Communication. *Journal of Speech, Language, and Hearing Research*, 41(1), 200-12.
- Wolbers, K., Dostal, H., DeLozier, L. (under review). I was born full deaf: An examination of written language outcomes across one year of Strategic and Interactive Writing Instruction (SIWI). *Journal of Deaf Studies and Deaf Education*.
- Wolbers, K. (2010). Using ASL and print-based sign to build fluency and greater independence with written English among deaf students. *L1-Educational Studies in Language and Literature*, 10(1), 99-125.
- Wolbers, K. (2008). Strategic and Interactive Writing Instruction (SIWI): Apprenticing deaf students in the construction of English text. *ITL International Journal of Applied Linguistics*, 156, 299-326.
- Wolbers, K. (2007). Using balanced and interactive writing instruction to improve the higher order and lower order writing skills of deaf students. *Journal of Deaf Studies and Deaf Education*, 13(2), 255-277.

Yoshinaga-Itano, C., & Downey, D. M. (1996). Development of school-aged deaf, hard-of-hearing, and normally hearing students' written language. *Volta Review*, 98(1), 3-7.

Yoshinaga-Itano, C., Snyder, L.S. & Mayberry, R. (1996). How deaf and normally hearing students convey meaning within and between written sentences. *Volta Review*, 98(1), 9-38.

APPENDICES

APPENDIX A

STUDENT LANGUAGE QUESTIONNAIRE

Language Questionnaire

Adapted from Wolbers Literacy Questionnaire (2007)

1. How do you rate your fluency with America Sign Language (ASL)?

5	4	3	2	1
strong		average		weak

2. How do you rate your fluency with English?

5	4	3	2	1
strong		average		weak

3. How often do your family members sign with you at home?

5	4	3	2	1
everyday		once a week		almost never

4. How do you rate your family members' fluency with ASL?

5	4	3	2	1
strong		average		weak

5. How do you rate your family members' fluency with English?

5	4	3	2	1
strong		average		weak

APPENDIX B

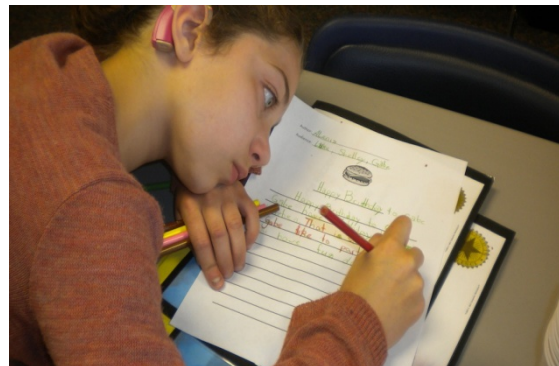
WRITING PROGRESSION: GUIDED, PAIRED, INDEPENDENT



Top two pictures:
Group guided writing

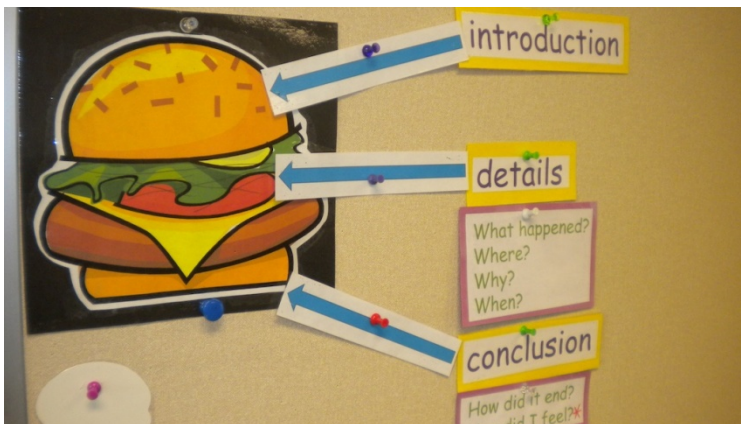
Bottom left:
Paired writing

Bottom right:
Independent writing



APPENDIX C

VISUAL SCAFFOLDS



Above: Wall display of visual scaffolds that correspond with previously taught NIP-it lessons

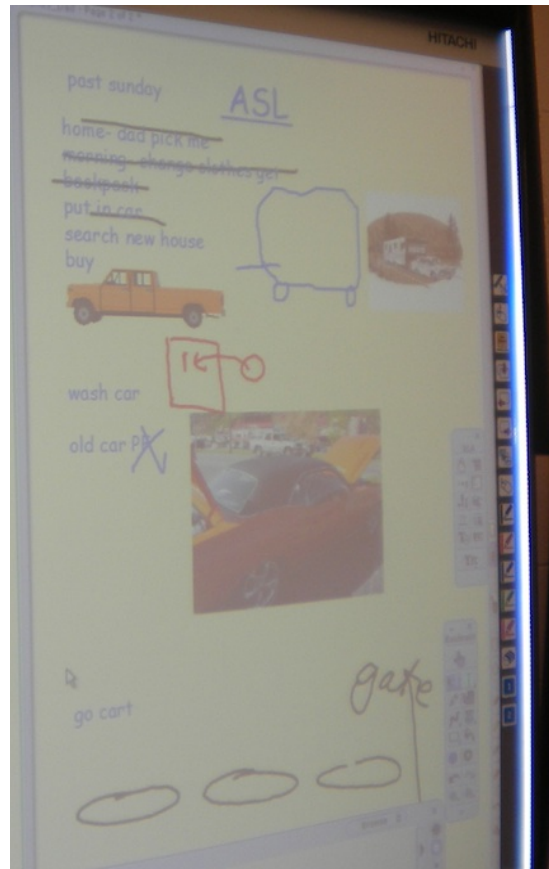
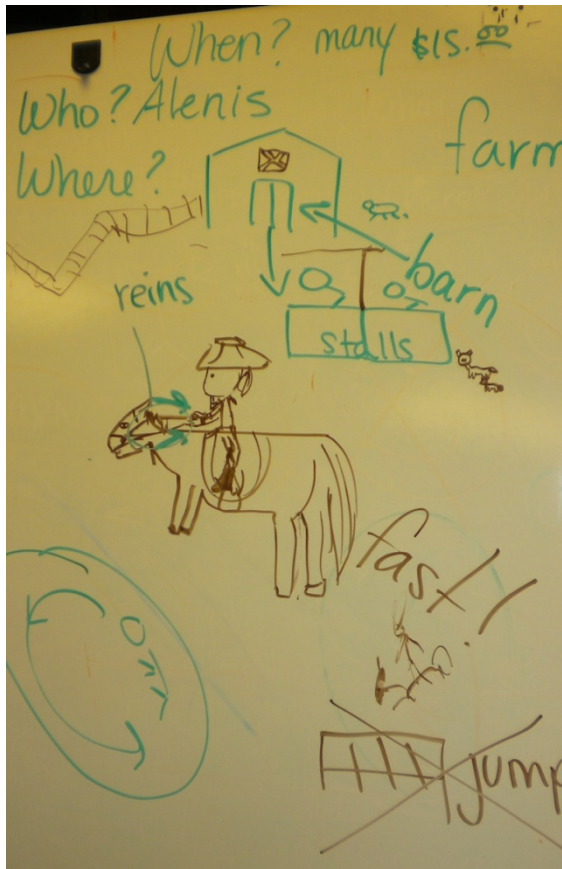
Middle: A visual scaffold used to support students with constructing a paragraph



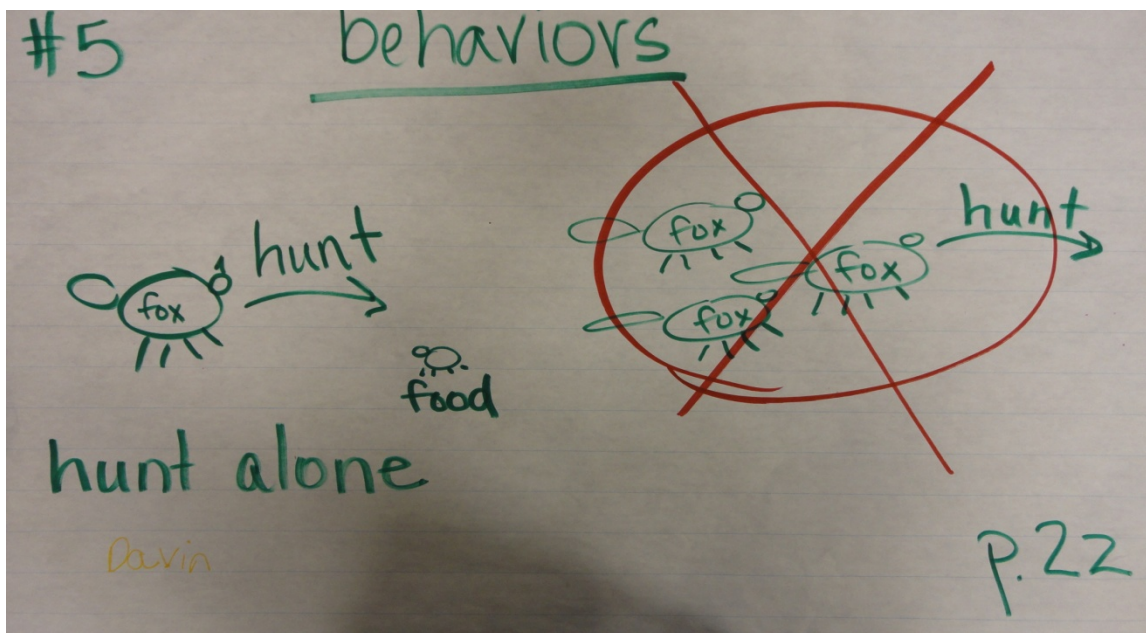
Below: Student using visual scaffolds during independent writing

APPENDIX D

ASL HOLDING ZONES



Top left: white board example; **Top right:** smart-board example; **Bottom:** chart paper example



APPENDIX E

INTRODUCTORY LESSON ABOUT THE SIMILARTIES AND DIFFERENCES BETWEEN ASL AND ENGLISH



APPENDIX F

FIDELITY INSTRUMENT/ SIWI EVALUATION FORM

Observation and SIWI Fidelity Instrument
Wolbers (revised 2010)

Ratings: SD-Strongly Agree; D-Disagree; A-Agree; SA-Strongly Agree

Strategic Writing Instruction & Procedural Facilitators

- | | | | | |
|--|----|---|---|----|
| 1. Skills and strategies are taught in the context of producing text. | SD | D | A | SA |
| 2. The teacher utilizes symbolic tools or visual scaffolds to represent particular notions or teach writing strategies, skills or content. (e.g., diagrams, different colors). | SD | D | A | SA |
| 3. When teaching a strategy (i.e., mnemonic or routine), the teacher first develops background knowledge and teaches necessary vocabulary words. | SD | D | A | SA |
| 4. Supports such as mnemonics are a temporary scaffold, and students use them less and less over time. | SD | D | A | SA |
| 5. The teacher discusses or thinks-aloud how strategies may be used with other text structures or writing activities – she models how to generalize. | SD | D | A | SA |

Interactive Writing Instruction & Apprenticeship

- | | | | | |
|--|----|---|---|----|
| 6. Students are invited to participate in the construction of text. | SD | D | A | SA |
| 7. The teacher allows enough wait time for students to think and come up with ideas before stepping in. | SD | D | A | SA |
| 8. The teacher finds a way for all children to enter the text, even if at different levels. | SD | D | A | SA |
| 9. The teacher “takes up” students’ ideas and uses contingently responsive discourse. | SD | D | A | SA |
| 10. Students are asked what they think, asked to evaluate text and asked to problem-solve. The teacher uses step back moves by asking, “What do we do here? Why? How?” | SD | D | A | SA |
| 11. The teacher uses metacognitive questioning: 1) What is the problem? 2) How do we fix it? 3) When do we do that? 4) Why is that important? | SD | D | A | SA |
| 12. The teacher uses a moment to moment assessment method that gauges students’ individual understandings (e.g., thumbs up/ thumbs down). | SD | D | A | SA |
| 13. The teacher transfers control of the meaning making process to students. | SD | D | A | SA |
| 14. As the intervention progresses, students are taking up more of the collective work, the thinking and the problem solving. | SD | D | A | SA |

15. The teacher models, thinks aloud and explains “why” with the learning of new skills.
SD D A SA
16. The teacher leads slightly in advance of what the students are able to do individually (i.e., ZPD).
SD D A SA

Building Metalinguistic Knowledge

17. When ideas are offered in ASL, there is an established way of recording the ideas in a separate space.
SD D A SA
18. When ideas are offered in ASL, there is an established way of translating the ideas to the English easel.
SD D A SA
19. Students are actively involved in building metalinguistic knowledge for ASL and English. E.g.) They discuss which expressions are ASL, which are English, and what are the distinguishing elements.
SD D A SA

Curriculum & Content

20. The teacher is knowledgeable about the grade level curriculum and embeds this in instruction.
SD D A SA
21. The interactive space is used for more than the teaching/ learning of conventions and grammar (e.g., learning text structure, organization, coherence, audience, etc.).
SD D A SA

Instructional Procedures

22. Text is agreed upon by a class consensus or a class majority.
SD D A SA
23. The teacher writes the ideas that students give and the exact language students offer (i.e., when writing on the English easel).
SD D A SA
24. The class rereads the text on the English easel often and exactly how it is written.
SD D A SA
25. The teacher employs a method of rereading that shows the correspondence between the written text and the sign or fingerspelled expressions.
SD D A SA

Audience

26. Students are aware that the text will be published and shared with a specified audience.
SD D A SA
27. The audience becomes a focus when constructing text (e.g., “Will Jill’s mom understand who ‘I’ is?”).
SD D A SA

APPENDIX G

GUIDELINES FOR COUNTING ASL MORPHEMES

Language Samples

Morpheme Count Guidelines: Special Considerations

Considering the content of these language samples and the prompts used to elicit language, the following considerations should be made when coding this set of language samples. This is not an inclusive list; these are only reminders for unique situations that occurred during the initial coding of this set of language samples. References to support these special considerations are listed at the end of this document. Please also use the general information listed below and references listed at the end of this document to guide your coding.

General Information:

- Morpheme= smallest meaningful linguistic unit (free, bound, content, function morphemes)
 - Free morphemes: independent units; English examples—dog, happy, walk; ASL examples—four, love
 - Bound morphemes: occur with other morphemes; English examples—plural s (dogs), prefixes added to root words (unhappy), third person s (walks); ASL examples—FOUR-DAYS (four combined with the sign day), DON'T-LIKE (the sign “like” with reversal of orientation for negation)

Example Video-Clips

- Example Clip 1: For the translated ASL signed sentence, “Train going up the hill”, count 1 morpheme for classifier use, 1 morpheme for the upward movement, 1 for the slow speed of the movement
- Example Clip 2: Since the student explained what the character was holding in his hands (tray) before adding a verb (walking), do not count the item twice—count 1 morpheme for the character’s name, 1 morpheme for the item the character was holding, 1 morpheme for the action of holding the item, and then the morphemes included in the character’s actions (walking)

Nouns/Pronouns

- Repetition of nouns count as 1 morpheme but if it’s an action, like open door, it counts as 2
- If the student identifies a person by name or by using a pronoun, that counts as 1 morpheme, however, if they do not reference the person in subsequent utterances, then a morpheme should not be counted for an “implied person” (e.g., “I WATCH” counts as 2 morphemes, “WATCHED counts as 1)
 - a. Non-manual markers must still be taken into consideration; for example, if during conversation the signer has established where a person or object is in space and uses eye gaze to reference the location, that qualifies as a separate morpheme
- Proper nouns count as 1 morpheme (e.g., Mr. Brown)
- Compound words count as 1 morpheme (THINK+OPPOSITE=DISAGREE)

False Starts/ Repetitions

- If a word is repeated it should be treated like a false start, unless the repetition holds a separate meaning
- If a student repeats signs for emphasis while adding non manual makers (e.g., facial expressions), count that as 2 morphemes (1 morpheme for the sign and 1 for the emphasis), do not count past 2 morphemes for reoccurrence of words for emphasis (e.g., no, no, no counts as 2 morphemes, 1 morpheme for the word “no” and 1 morpheme for emphasis)
- Hesitations indicated by the use of “then”, “for” “and”, or “you know” should not be included in the total morpheme count, unless those words hold meaning for the previous or upcoming comment

- Do not count false starts or elaborations
- “I don’t know” counts as 3 morphemes, unless it does not carry meaning and is serving as a pause or hesitation, then the utterance should not be included in the total morpheme count
- Morphemes should be counted even if the utterance is identified as unintelligible

Fingerspelling

- If a student fingerspells a noun and immediately provides a sign for the fingerspelled word, only count 1 morpheme (e.g., “CAT” (fingerspelled), then “CAT” (signed) is 1 morpheme)
- If the student fingerspells a noun and then describes any part of the noun, additional morphemes are counted (e.g., “CAT” (fingerspelled) and “EAR” (classifier) are 2 morphemes)
- If a student struggles to fingerspell a word and does not complete the word, do not count it as a morpheme
- If a student struggles to fingerspell a word and the idea is conveyed, then it counts as 1 morpheme
- If a student abandons fingerspelling a word and provides a description, only count the morphemes in the description

Verbs

- If a student signs a verb and then describes the action, count the morphemes for the signed verb and the morphemes included in the description but do not count the same verb twice (e.g., “EAT BEAR EATING” is 3 morphemes because eat is not counted twice—eat (1), bear (1), progressive (1))
- Action verbs that are and are not or are not connected to a location
- Count action verbs and their locations if the meaning is obvious, but if the student only signs the action verb with no location, then that counts as only 1 morpheme (e.g., “GO” versus “GO THERE” or “FALL” versus “FALL OVER”)

References

- Baker-Shenk, C., & Cokely, D. (1980) *American Sign Language: a teacher’s resource text on grammar and culture*. Washington, D.C: Gallaudet University Press.
- Brown, R. (1973). *A first language: The early stages*. London: George Allen & Unwin Ltd.
- Owens, R. (2001). *Language development: An introduction* (5th ed.). Needham Heights, MA: Allyn and Bacon.
- Paul, R. (2001). *Language productions from infancy through adolescence: Assessment and intervention*. St. Louis, MO: Mosby, Inc.
- Roseberry-McKibbin, C., & Hegde, M.N. (2000). *An advanced review of speech-language pathology: Comprehensive preparation for students and practitioners*. Austin, TX: pro•ed.
- Valli, C., Lucas, C., & Mulrooney, K.J. (2005). *Linguistics of American Sign Language*. Washington, DC: Gallaudet University Press.

APPENDIX H

ASL FEATURES CODING AND INFORMATION SHEET

Language Samples: Coding & Features Information Sheet

Information from: Valli, C., Lucas, C., & Mulrooney, K.J. (2005). *Linguistics of American Sign Language*. Washington, DC: Gallaudet University Press.

The chart below shows the codes that will be used while coding student language samples within ELAN.

ASL Morpheme	Morphological Features	ELAN Code
<i>Movement</i>	Plural Nouns	PL
<i>Location/Space</i>	Pronouns	[PRO]
<i>Location/Space</i>	Indicating Verbs	[V-TO]
<i>Movement</i>	Verb Reduplication	++

Description of features with coding notes and examples:

Plural Nouns

“While many English nouns form the plural by adding the bound morpheme –s (door/doors), noun signs in ASL tend to occur only in the syntactic frame. That is, unlike English nouns, it seems that there are no bound morphemes that attach to nouns in ASL to pluralize or to otherwise modify them. Instead, ASL nouns often use determiners (SOME, MANY, FEW) to indicate that a sign is plural. An example of a determiner (MANY and INDEX-arc) and noun that show plurality would be: MANY #CAR INDEX-arc STILL NEW. ...A small number of ASL nouns form the plural by reduplication...most nouns, however, cannot be reduplicated” (p. 114).

Coding Note(s)—The following will be recognized and coded as plural: 1) fingerspelled words that end with an “s” to indicate plurality (indicate that they are fingerspelled with a FS when coding); 2) items presented as a list (e.g. FIRST DOG BLACK, SECOND DOG WHITE, THIRD DOG WHITE BLACK SPOTS); 3) the use of determiners (e.g., many, few) with a noun; 4) repetition of a noun to show plurality; 5) the inclusion of a number before or after a noun

Examples: C-A-R-S (fingerspelled); FEW #CAR (few cars); CL CAR-CAR-CAR; #CAR (cars)

Pronouns

“There are both similarities and differences between English and ASL pronouns. Consider the ASL sentence PRO.3 SILLY, which can be translated in English as ‘He is Silly.’ In this ASL sentence, PRO.3 is a pronoun and is produced with the index finger pointing away from the signer. We use the gloss PRO.3-i (i = index finger) for this pronoun. While the sign is for a third person (as opposed to first person I or ME, glossed as PRO.1), it does not indicate whether the third person is masculine or feminine, in the way that English words he and she do. The third-person pronoun in ASL can also be produced with the thumb, and we gloss that pronoun as PRO.3-t (t = thumb)” (p. 122-123).

“Recent work by Liddell and Johnson suggests that there is no clear distinction between second and third person pronouns in ASL...For example, if the signer points away from her body, that same sign may refer to a second person or to a third person. Which one it refers to depends on the sentence in which it occurs” (p. 123).

Coding Note(s): do not accept manually-coded English signs for pronouns; approximated signs that refer to self should be coded (i.e., the signer does not clearly shape the sign ‘myself’, but is referencing self with a quick movement towards/on their chest); if pronouns are repeated, code one as a correct pronoun and one as an incorrect pronoun (e.g., SHE FUNNY SHE).

Examples: *English personal pronouns*—I, me, myself, we, us, ourselves, you, yourself, you-all, yourselves, he, him, himself, she, her, herself, it, itself, they them, themselves; *English possessive pronouns*—mine, ours, yours, his, hers, its, theirs; *English possessive determiners*—my, our, your, his, her, its, their

Indicating Verbs

“Indicating verbs are more dynamic than plain verbs. They move toward specific people, objects, or spatial locations, and in doing this, they incorporate additional information about the subject and object of the sentence. Generally, these signs move from the signer toward a person or location or from the person/location to the signer” (p. 76).

“In [PRO.1 TELL MOTHER], the sign TELL begins with the index finger in contact with the chin. The hand then moves outward toward the actual mother and ends with the index finger pointing at the mother. The directionality of the sign TELL in this example is crucial. Without it, signers would judge the signing to be incorrect. Clearly, then, the directionality of indicating verbs is highly significant” (p. 372).

“The semantic structure of the verb TELL includes not only a representation of the act of telling but in addition, two schematically represented participants. That is, a prototypical act of telling involves an entity to do the telling and an entity toward which the telling is directed. For this verb, the entity within the semantic representation conceived of as performing the action would be called trajectory and the entity within the semantic representation conceived of as receiving the information would be called the landmark. In the semantic representation of the verb TELL, both the trajectory and landmark are unelaborated entities” (p. 373).

Coding Note(s): code all formal signs, informal signs, or gestures that the student adds directionality to indicate movement/action

Examples: give; show; tell; pay; inform

Verb Reduplication

“Reduplication is a process of forming new words either by doubling an entire free morpheme (total reduplication) or part of it (partial reduplication). English makes no systematic use of reduplication, but other languages do make sometimes extensive use of reduplication” (p. 331).

“...there are pairs of verbs and nouns in ASL that differ from each other only in the movement of the sign. For example, in the pair SIT and CHAIR, the handshape, location, and orientation of the two signs are the same, but the movement is different. It is the movement that creates the difference in meaning between the two signs. In the same way, the handshape, location, and orientation of FLY and AIRPLANE are the same, but the movement is different.

...related verbs and nouns may have the same handshape, location and orientation, and that the noun simply repeats or reduplicates the segmental structure of the verb. The segmental structure is the movements and holds of a sign. So, for example, the basic structure of the verb SIT is hold-movement-hold, and the basic structure of the noun CHAIR is movement-hold-movement repeated” (p. 52-53).

“This process of repetition is called reduplication. Similar to the derivation of nouns from verbs in English, the morpheme in ASL is the process of reduplication. We do not add a form to the ASL morpheme SIT to derive the noun CHAIR; we repeat the morpheme SIT” (p. 54).

Coding Note(s): document if any verbs or nouns from the pair appear; only code for verbs and nouns if they are in the correct form (i.e., nouns are repeated, verbs contain one movement)

Examples: sit-chair, sit signed once, chair reduplicated; fly-airplane, fly signed once, airplane reduplicated; paint-paint, paint (verb) signed once, paint (noun) reduplicated (page 52)

APPENDIX I

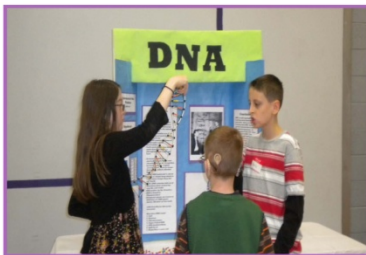
COLLABORATIVELY CREATED PIECE

**Tennessee
School for
the Deaf**

Science Fair



By: Elementary and
Middle School
Students



TSD Science Fair

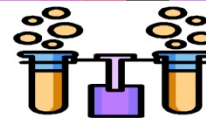
On April 13, 2010 elementary school, middle school, and high school students from TSD went to the science fair in the gym. The science fair was from 9:00am to 12:00pm. People took turns presenting their science projects. Carlie, Valeria, and Alyssa showed their project to Luke. Alenis and Thomas won \$10.00, because they were the first place winners! Fourth graders enjoyed the science fair.

Authors: Nakisha, Brett, Justin, Andrew, Gabe, Jacinda, Ethan

Scientists

April 13, 2010 all of the TSD students went to the science fair. We wore nice clothes and we were mature so that we could explain about our science fair project to the judges. 5th grade, middle school, and high school students explained their project to people. People were curious and looked at our pictures. Wilhemina, Clarence, and Cornelius won 4th place. Davin and Jared won 3rd place. Alexis and Athena won 2nd place, and they won \$10.00 as their prize. Thomas and Alenis won 1st place and they got \$20.00. They shared their money. Alenis actually cried because she was so happy that she won, but Thomas didn't. We enjoyed the science fair, it was so fun!

Authors: Thomas, Wilhemina, Clarence, Cornelius, Davin, Jared, Alenis, Athena, and Alexis



On April 13, 2010 middle school, high school, and elementary students were interested in the science fair. Judges watched Harley present the reflection and refraction of light. Christian commented about rainbows, and Nakia talked about air pressure. Judges announced: first place Austin, second place Kaleb, third place Joseph and Johnathan, fourth place William and Ethan, fifth place Jamal and Hunter M., and sixth place Christian. We had fun at the science fair.

Authors: Christian, Nakia, Harley

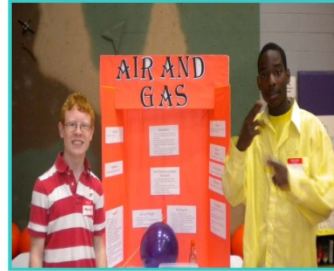


Science Fair

The T.S.D. science fair was on Tuesday, April 13, 2010. We fixed our boards with a picture and paragraph about our project. Then we tested our experiment and if it was right, we were allowed to present. At the gym we practiced presenting many times, then the judges looked at our poster and watched our presentation. Then we showed the judges our experiment. No one did any gross projects. Connor, Gregory, Carlos, and Hunter S. tested to see if plants like sweet water.



Hunter J. and Peyton learned about the rock cycle. Tristen and Tiffany's project was about the Earth's crust. Samuel just arrived to TSD, so he didn't have a project. 7th graders enjoyed the science fair, but unfortunately a 6th grader (Austin) beat us!



Authors: Connor, Hunter J., Peyton, Carlos, Tiffany, Gregory, Tristen, Samuel, Hunter S.

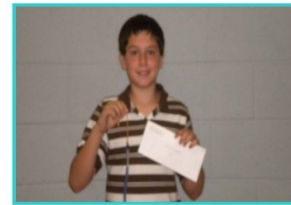
Ta-Da!

On Tuesday morning we all were nervous about science fair and the judges. We worried because we might make mistakes and confuse people with our signing. We goofed-up a few times, but we continued our presentation. After we were used to presenting, we were less nervous and we did an excellent job. There was a crowd of people who were curious about our presentation, and we think they enjoyed our presentation too.



One funny mistake happened while we were at the science fair. A high school student accidentally spilled William and Ethan's experiment. They were surprised and wanted to know who did it.

Authors: Anna, Austin, Jessica, & Mathew



A note to the judges...

Dear Judges,

The 8th graders appreciate that you came to our science fair last Tuesday. Thank you for judging our science projects. You watched and were curious about our middle school experiments. You even judged when William and Ethan's blue water spilled. The winner was Austin! From,
Jamal, Amanda, Hunter M., Brittany, Ethan,
Kirt, William

Science Fair

On April 13, 2010 everyone at TSD went to the science fair at the gym. Our teacher, Mrs. Grove, helped with the science fair, and Randall helped, too. Joseph and Johnathan were partners their science fair project was "The Phases of the Moon" and they won third place. Carlie, Valeria, and Alyssa were partners their project was "Water Cycle". Kaleb didn't have a partner his science fair project was "Electricity" and he won second place. We had fun at the science fair!

Authors: Carlie, Valeria, Joseph, Johnathan, Kaleb

VITA

Hannah Dostal was born and grew up in California. She earned a Bachelor of Science in Education with a dual concentration in educational interpreting and human services in 2004 from the University of Tennessee at Knoxville. While working as an interpreter in a K-12 educational setting and working as a residential supervisor at Tennessee School for the Deaf, she earned a Master of Science in Education from the University of Tennessee in 2006. She currently teaches middle school language arts and serves as a writing intervention coach at Tennessee School for the Deaf. Upon acceptance of this dissertation, Hannah will have graduated with a Ph.D. in Teacher Education with a concentration in Literacy Studies from the University of Tennessee at Knoxville in 2011.