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## The Effect of Mothers' ASL Skill Level on the English Literacy of Their Deaf Children

Shauna M. Buchholz  
*California State University, Fresno*

Lorin Lachs

Patrick Boudreault

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***The Effect of Mothers' ASL Skill Level on the English Literacy  
of Their Deaf Children***

**Shauna M. Buchholz, Ed.S., Lorin Lachs, Ph.D.,  
and Patrick Boudreault, Ph.D.**

*California State University, Fresno*

Abstract

Previous studies demonstrated a positive relationship between deaf children's ASL acquisition and their English literacy skills and the importance of parental language input. This study examined the role of mothers' ASL skill in the English literacy skills of their deaf children. Mothers and their deaf children in grades six through nine took the TGJASL-R. Correlations were performed to determine if a relationship exists between the mothers' ASL skill level, and the children's English literacy measured by the STAR test. No significant relationship was found; marginal significance was found between the students' ASL skill and their English literacy score.

*Keywords: English literacy, mothers' input, TGJASL-R, deaf child, ASL skill*

Acquiring age appropriate English literacy skills is more difficult for deaf children than for hearing children, due to the many obstacles that deaf children face. Unfortunately, by the time deaf students exit high school, approximately half will have only reached the fourth grade reading level or less (Traxler, 2000). Only 2-3% of the deaf population reach the reading level of their hearing peers (Allen, 1992) and approximately 30% are illiterate (Marschark, Lang, & Albertini, 2002). The issue is not a difference in potential. Deaf children and hearing children have equal potential to achieve appropriate English literacy skills. Deaf children however, need additional resources and different types of instruction to reach their potential (Freeman, Dieterich, & Rak, 2002). Deaf children who are identified early in life are likely to receive the supplemental support needed to achieve at a level that matches their hearing peers (Moeller, 2000).

Many theories have been proposed about how to facilitate the acquisition of proper English literacy skills, but many of these theories have not been supported by empirical evidence. In many cases, procedures have hindered rather than helped the development of necessary skills. Teaching deaf children American Sign Language (ASL) as their primary language however, is one method that seems to be highly effective in fostering the acquisition of English skills (Wilbur, 2000). The role parents play in the development of their child's language is very important also. It appears that parents' skill

in communicating with their children influences the language outcomes of the children.

## **ASL as a Solution**

A good solution to the problem of fostering English literacy in deaf children would be the acquisition of ASL first, followed by the learning of English. Becoming fluent in ASL is very beneficial in that like any other natural language, it is governed by rules. Knowing the rules of ASL prepares the learner to better understand the rules of another language, such as English.

Many believe that because of the differences between ASL and English, learning ASL would further inhibit the acquisition of English. However, numerous studies have shown that ASL does not interfere with English acquisition (Hoffmeister, 2000; Padden & Ramsey, 2000; Strong & Prinz, 1997). Knowing ASL allows deaf children to be on track with their peers in attaining age appropriate language. The Linguistic Interdependence Theory, which serves as a model for the bilingual education of deaf students using ASL and English, puts forward the common underlying proficiency (CUP) model of attaining proficiency in two languages. The CUP model posits that experience with either language augments the competency level in both of the languages (Cummins, 1991; Cummins & Swain, 1986). According to this theory, bilingualism where ASL is learned first should only assist in the acquisition of English.

## **Relationship Between ASL and English Literacy**

Research has identified a strong link between ASL and English literacy, which suggests that acquiring ASL as a primary language is beneficial to deaf children when it comes to English literacy. Strong and Prinz (1997), examined the relationship between ASL skill level and English literacy in 160 deaf children at a residential school for the deaf. Tests of ASL skill allowed students to be divided into three different levels of ASL skill: low, medium, and high. The English literacy of the students was then measured. It was found that those students who had high and medium levels of ASL skill performed better on tests of English literacy than those with low levels of ASL skill. This finding demonstrates that having even an average level of skill in ASL is advantageous for English literacy development.

Another study by Hoffmeister (2000) examined the relationship between ASL and reading comprehension in deaf children. The results indicated that ASL acquisition does not interfere with reading. In contrast, ASL is positively related to the development of reading skills. Padden and Ramsey (2000) examined another aspect of English literacy-reading ability and studied its relationship to ASL. They found that those with greater skill in ASL showed greater reading ability. These results indicate that ASL does not hinder the development of English literacy, but rather plays an enhancing role in it.

### **Possible Relationship Between ASL Skill Level of Parents and English Literacy of Their Children**

English literacy is a broad term that encompasses both receptive and expressive English skills, including reading ability, reading comprehension and writing. Parents' communication with their child plays a very important role in the child's acquisition of English literacy. The peak of language and communication development occurs between the ages of 1 and 4. At this point in a child's life, the majority of communication occurring is between the parents and the child. As a result, parents play a vital role in the language acquisition of their child (Freeman et al., 2002). Parents and children must share the primary mode of communication in order for the input of the parents to have an effect on the child's English literacy. Parents who have active conversations with their child help to lay the foundation for language acquisition and also help children adapt to the structure of an educational environment (Steinberg, Davila, Collazo, Loew, & Fischgrund, 1997).

ASL acquisition as the primary language has been shown to provide a very strong foundation for acquiring English as a second language. Parents who develop ASL skills and subsequently teach these skills to their children should be able to provide the consistent input needed for a child to acquire English literacy effectively and in a timely manner.

### **Purpose of the Study**

The purpose of this study is to examine the relationship between the ASL skill level of mothers of deaf children and the English literacy skills of their child. Many studies have examined the relationship between the child's level of ASL skill and his/her subsequent English literacy. However, studies have overlooked the importance of the role the language ability of parents may play in the acquisition of language in their child. The present study seeks

to examine whether there is a relationship between the ASL skill level of mothers and their deaf children's English literacy skills.

## Method

It is hypothesized that there will be a strong positive correlation between the mothers' indices of grammatical sensitivity on the Test of Grammatical Judgment in ASL-Revised (TGJASL-R) and their child's English literacy proficiency as measured by the California Standards Test or the California Modified Assessment. Additionally, it is predicted that there will be a strong positive correlation between the deaf children's indices of grammatical sensitivity on the TGJASL-R and their English literacy proficiency as measured by the CST or CMA.

## Participants

Deaf students who were in junior high or high school, and their mothers, were eligible for participation in this study. Both the mother and the student needed to use any amount of ASL to be able to participate in the study. Figure 1 shows the various sources used for the purposes of participant recruitment. The populations that were approached for recruitment and the resulting outcomes are illustrated in the flowchart.

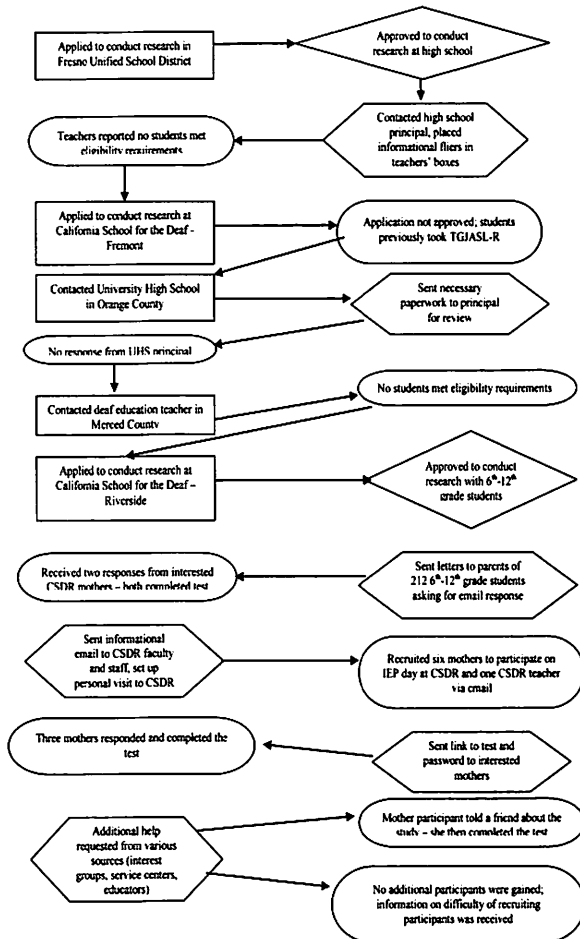


Figure 1. Flowchart of participant recruitment.

A total of six mothers and seven children participated in the current study. One parent was the mother to two of the students both of whom completed the test. Five of the seven students attended the California School for the Deaf at Riverside at the time of testing and two of the seven attended other schools at the time of testing. One mother and her son were excluded from the data analysis. Additionally, one mother had two children who participated in the study, explaining the difference in the number of mother and student participants. Table 1 shows this information for each mother and student pair.

Table 1.  
*Information on Mother and Student Pairs*

Participant	Gender	Age	Grade	Participant	Age
Student 1	Female	12	6	Mother 1	42
Student 2	Female	14	9	Mother 2	37
Student 3	Female	13	7	Mother 3	33
Student 4	Male	15	8	Mother 1	42
Student 5	Female	13	7	Mother 4	29
Student 6	Female	15	9	Mother 5	32

## Instruments

The primary independent variable was the ASL skill level of the mother of the deaf child participant. Mothers and children were tested using the TGJASL-R; (Boudreault, 1999, 2006; Boudreault & Mayberry, 2000). The test consists of 78 ASL sentences presented to participants on a computer. The task of the participants was to decide whether each sentence was grammatically correct by indicating "yes" or "no." Six different types of sentences are utilized in the test: simple sentences, negative sentences, verb agreement sentences, relative clauses, wh- question sentences (i.e. who, what, where, when), and classifier sentences. For each of first five categories, six grammatical and six ungrammatical sentences are presented. In the classifier sentences category, there are 18 different sentences presented (see Appendix A). This method of determining grammaticality is often used to assess language skills and the test has been found to be a reliable and valid method of measuring ASL competency (Boudreault, 1999). To check for reliability during the design of the test, three ASL signers assessed the grammatical correctness of each sentence (Boudreault, 1999). If there was not complete agreement on whether

or not the sentence was grammatically correct, it was modified until complete agreement was reached. An index of grammatical sensitivity (A') was calculated for each participant based on their responses on the TGJASL-R.

To obtain each participant's A' score from the TGJASL-R, participants took the test online through Surveygizmo.com. Those mother and student pairs deciding to participate were sent a link to their email address which led them to the website for the administration of the questionnaire and/or test, and the password. The informed consent and assent form (see Appendices B-C) were shown after the password was entered. The participants were asked to provide their electronic signature as consent or assent to participate and release test scores. As an incentive for participation in the study, mothers and students were entered into a draw to win one of three \$100 gift cards and one of four \$50 gift cards upon completion of the task.

After providing their consent to participate, mothers were asked a series of questions regarding themselves, and another set of questions about their deaf child who was also a participant in the study (see Appendix D). When all of the questions were answered, the mothers encountered an instructional video about the TGJASL-R. (After the students provided their assent to participate, they viewed the introduction to the TGJASL-R; and did not answer any demographics questions.) The instructional video was accompanied by a text translation of the video. After watching the instructional video, mothers were asked if they would like to view the video again. If they answered "No," they moved on to the test. If they answered "Yes," they viewed the instructional video again. Four practice items were administered before the test items were presented. After the four practice items were completed, they were asked, "Are you ready to start the test?" If the participant chose "No," they viewed the practice items again. If they chose "Yes," they moved onto the TGJASL-R test items.

Each test and practice item consisted of the presentation of one video of an individual signing a sentence in ASL. For the test and practice items, all participants clicked on an onscreen button if they believed the sentence presented in the video was agrammatical, and a different button if they believed the sentence to be grammatically correct. After making their choice, participants clicked on the "NEXT" button at the bottom of the screen to move on to the next question. When all questions were completed, participants were to click the "SUBMIT" button. Once this button was clicked, the results were submitted and the participant saw a screen with a thank-you note on it.

Participants completed a total of 78 questions in this manner and from these 78 answers, the *A'* for each participant was calculated.

The variable of interest was the children's English literacy skills. The children's English literacy skills were determined by their scores on the English-Language Arts portion of the CST or CMA taken from their school records. Only children on Individualized Education Plans (IEPs) who scored in the "below basic" or "far below basic" performance level on any previous year when taking the CST were eligible to take the CMA. The CMA differs from the CST in that the reading passages are shorter, the font is larger, there are fewer multiple-choice options, and there is more blank space on each page (see Appendix E). Both the CMA and the CST evaluate the same grade-level standards, albeit in different formats (California Department of Education, 2010a). The English-Language Arts portion of both tests evaluates word analysis, reading comprehension, literary response and analysis, writing strategies and written conventions. These are paper and pencil tests administered school-wide.

## Research Design

The study examined the relationship between the mother's ASL skill and her deaf child's English literacy skills. The relationship between the child's ASL skill and his/her English literacy skills was also examined in order to replicate previous findings (Strong & Prinz, 1997). The independent variables of ASL skill for both mothers and children were quantified using *A'* analysis which yields an index of grammatical sensitivity (Boudreault, 2006; Linebarger, Schwartz, & Saffran, 1983). The dependent variable of English literacy skills as measured by the English-language arts portion of the CST and CMA is expressed in a scaled score ranging from 150 to 600, each with a corresponding categorical level. These five levels of proficiency are: advanced, proficient, basic, below basic and far below basic.

## Procedure

Letters indicating the general purpose of the study as well as what participation would entail were created to be sent to the mothers of 212 6th to 12th grade CSDR students. The letters were sent to CSDR, where they were then addressed and sent to the students' homes (see Appendix F). The researcher's contact information was included in the letter, and those deciding to participate were asked to contact the researcher via email. A



similar informational letter was distributed to the CSDR faculty and staff via email from the Assessment Services Department. Additional participants were recruited in person at CSDR. Another participant was recruited with the help of one of the CSDR mothers who mentioned the study to a friend of hers. The mother and student participant pairs were then sent an electronic link which led them to the website for the administration of the questionnaire and/or test and the password. They completed the informed consent or assent form and then went forward with completing the questionnaire and test or test only. Once both the parents and students had submitted their results, the 2010 CST or CMA test scores were obtained from CSDR. If CSDR did not have record of the test score or if the student did not attend CSDR, the score was obtained from the student’s mother. The TGJASL-R answers and demographics questionnaire answers were then downloaded from SurveyGizmo.com. After the data from SurveyGizmo.com and CST or CMA data were collected, the draw for the raffle prizes was conducted. The winners of the raffle were notified via email. The winners provided their home addresses and the gift cards were sent.

**Results**

Tables 2 and 3 provide a description of the characteristics of the five participating mothers and six participating students. One student had been adopted by his mother five months previous to their participation in the research. For that reason, they were excluded from the data analysis.

Table 2.  
*Demographic Information of the Mothers*

Mother Participant	Hearing Status	Marital Status	Age	Years of ASL Usage	Ethnicity	Education Level
M1	Deaf	Single	37	20	Hispanic	High School
M2	Hearing	Divorced	33	8	Hispanic	Some College
M3	Deaf	Married	42	42	Caucasian	Bachelor’s Degree
M4	HOH	Cohabitating	29	29	Caucasian	Some College
M5	Deaf	Divorced	32	14	Hispanic	Bachelor’s Degree

*Note.* HOH = Hard of Hearing

Table 3.

*Demographic Information of the Students*

Student Participant	Gender	Age	Grade	Degree of Hearing Loss	Assistive Devices Used
Student 1	Female	12	6	Profound	None
Student 2	Female	14	9	Unknown/ Don't know	None
Student 3	Female	13	7	Profound	Cochlear Implant
Student 4	Male	15	8	Profound	None
Student 5	Female	13	7	Severe	Digital Hearing Aid
Student 6	Female	15	9	Profound	None

It was predicted that mothers with a higher index of grammatical sensitivity on the TGJASL-R will have children who reached higher levels of proficiency on the 2010 CST or CMA. Additionally, children with higher indices of grammatical sensitivity on the TGJASL-R were predicted to obtain higher levels of proficiency on the 2010 CST or CMA. To address the hypotheses, correlations were calculated between these variables.

The answers from the TGJASL-R were analyzed to compute an index of grammatical sensitivity. The index was calculated using  $A'$  analysis. The goal in using this type of analysis is to examine the percentage of hits (correct identification of a grammatical sentence that is truly grammatical) and false alarms (incorrect identification of an agrammatical sentence that is truly grammatical) that the participants made. By using this type of analysis, the probability of the score being due to chance is considered and the participants' guessing behavior can be taken into account (Boudreault, 2006; Linebarger et al., 1983).  $A'$  adjusts for any response bias that is present and estimates the percentage of correct responding. The formula utilized is:  $0.5 + [(y+x)(1+y+x)]/4y(1-x)$  where  $x$  equals the proportion of false alarms (ungrammatical incorrect answers) and  $y$  equals the proportion of hits (grammatical correct answers).  $A'$  varies between 0.50 and 1.00 with a value of 0.50 indicating little sensitivity to grammatical structure, and 1.00 meaning high sensitivity to grammatical structure. A mean  $A'$  of greater than 0.50 indicates that the respondent's answers were not simply due to chance.

The students' English literacy was assessed based on their score on the ELA section of the CST or CMA taken in 2010. The scaled scores and proficiency levels were obtained. Table 4 shows the TGJASL-R A' scores for mothers and students as well as the students' ELA score and the number of years the mothers have used ASL.

Table 4.  
*TGJASL-R A' Scores, 2010 ELA CST or CMA Scores, ASL Usage*

Mother-Student Pair	Mothers' TGJASL-R A'	Students' TGJASL-R A'	Years of ASL Use-Mother	Students' ELA Score
Pair 1	0.907	0.770	42	286
Pair 2	0.722	0.657	20	227
Pair 3	0.538	0.736	8	307
Pair 4	0.907	0.834	42	223
Pair 5	0.824	0.934	29	356
Pair 6	0.720	0.601	14	214

Figure 2 illustrates the correlation between the students' TGJASL-R A' scores and CST or CMA ELA scaled score. The mean A' for all mother responses on the TGJASL-R. was  $A' = 0.77$  ( $SD = 0.14$ ) and the mean A' for all student responses on the TGJASL-R was  $A' = 0.75$  ( $SD = 0.12$ ). The mean student ELA score on the 2010 CST or CMA was  $M = 268.83$  ( $SD = 56.93$ ). No significant relationship was found between the mothers' TGJASL-R A' and the students' ELA score on the 2010 CST or CMA,  $r(4) = .12, p > .05$ . A marginally significant relationship was found between the students' TGJASL-R A' and the students' ELA score on the 2010 CST or CMA,  $r(4) = .70, p = .06$  (see Table 5).

No significant relationship was found between the mothers' TGJASL-R A' and the students' TGJASL-R A',  $r(4) = .46, p > .05$  (see Figure 3).

A significant relationship was found between the years of ASL usage by the mother and her TGJASL-R A',  $r(4) = .95, p < .01$ .

Figure 2. Scatterplot of students' TGJASL-R A' and ELA score

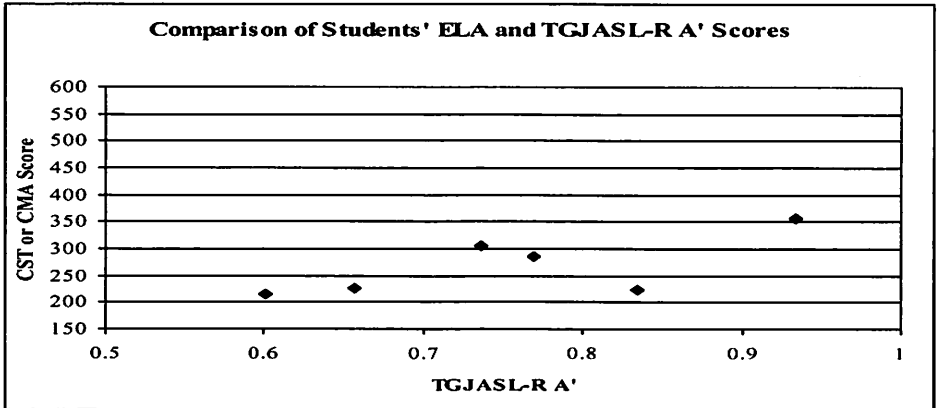
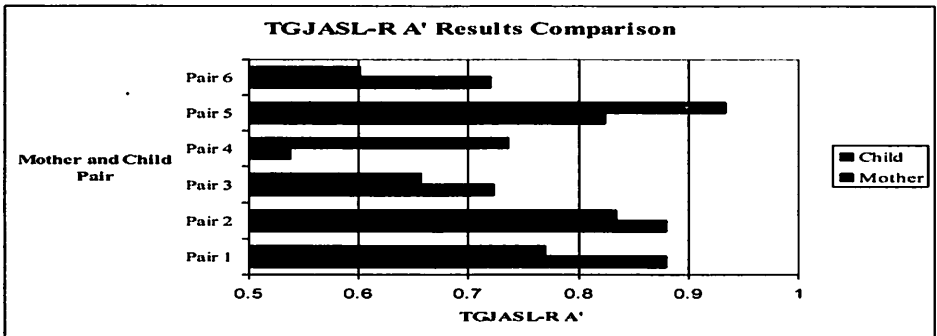


Figure 3. Comparison of mother and student TGJASL-R A'



An independent-samples *t* test was conducted to determine if there was a significant difference between the TGJASL-R A' of the mothers who were native signers and the mothers who were non-native signers. The mothers who were native ASL users ( $M = 0.88, SD = 0.05$ ), had significantly higher TGJASL-R A' scores than those mothers who were non-native ASL users, ( $M = 0.66, SD = 0.11$ ),  $t(4) = 3.27, p < .05, d = 2.66$ . An independent samples *t* test was conducted to determine if there was a significant difference between the TGJASL-R A' scores of the children of native ASL users and the TGJASL-R A' scores of the children of non-native ASL users. The children of native ASL users ( $M = 0.85, SD = 0.08$ ), had significantly higher TGJASL-R A' scores than the children of non-native ASL users ( $M = 0.66, SD = 0.07$ ),  $t(4) = 2.93, p < .05, d = 2.39$ .

Table 5.

*Correlation Table of TGJASL-R A' Results, ELA Results, and ASL Usage*

Variables	Mothers' TGJASL-R A'	Students' ELA Score	Years of ASL Use-Mother	Students' TGJASL-R A'
Mothers' TGJASL-R A'	1	-.08	.95*	.46
Students' ELA Score	-.08	1	-.00	.70
Years of ASL Use-Mother	.95*	-.00	1	.57
Students' TGJASL-R A'	.46	.70	.57	1

Note.  $n = 6$ ,  $*p < .01$ .

## Discussion

The purpose of this study was to determine whether or not there is a relationship between the amount of skill a mother has in communicating with her child via ASL and her child's resulting literacy in the English language. It was hypothesized that mothers with higher ASL communication ability would have children with better English literacy skills. The primary hypothesis has not been supported by the results of the study. When the mothers' ASL skill, as measured by the TGJASL-R A' score, was compared to the students' English literacy, as measured by their scores on the 2010 ELA CST or CMA, no significant relationship was found.

The secondary hypothesis posited that students with better ASL ability would also have better English literacy skills, as measured by their score on the ELA CST or CMA from 2010. This hypothesis was also not supported, however, the resulting correlation was marginally significant. Those students who had higher A' scores from the TGJASL-R, also tended to have higher scores on the ELA CST or CMA from 2010. The findings are suggestive of a relationship between a student's ASL ability and his/her English literacy skills. A significant finding would be consistent with the findings of Strong and Prinz (1997) who found that those students who had high and medium levels of ASL skill performed better on tests of English literacy than those with lower levels of ASL skill. Strong and Prinz's (1997) study involved a sample of 145 deaf students. Therefore, it is possible that a sample size larger than the one used in the present study would have yielded a stronger relationship.

Strong support was found for the construct validity of the TGJASL-R and its usability in differentiating between ASL ability levels. A strong significant relationship was found between the number of years that a mother had used ASL and her A' score on the TGJASL-R. The mothers who were native ASL users, who were those who had used ASL before the age of 4, had significantly higher TGJASL-R A' scores than those mothers who learned ASL after the age of 4. The mothers who had more years of experience with ASL obtained higher A' scores from the TGJASL-R than those mothers who had not had as much experience with ASL. The mean A' for native ASL users in Boudreault's (2006) study with deaf adults was 0.85 ( $n = 35$ ). The mean A' for native ASL users in the current study was 0.88 ( $n = 3$ ) which is analogous to that generated from a larger sample. Thus, these results are consistent with Boudreault's (2006) findings based on the data from 99 deaf adults who took the TGJASL-R.

The finding of a significant difference in performance between those who are native users of ASL and those who are non-native users of ASL is expected given the research regarding a critical period effect on second language acquisition. Johnson and Newport (1989) examined the English proficiency levels attained by native Korean or Chinese speakers who had come to live in the United States between the ages of 3 and 39 and who had remained in the United States between 3 and 36 years. They found that those who had arrived in the United States earlier in life had much higher levels of English proficiency than those who had arrived in the United States later in life. Even when considering additional factors such as motivation, amount of experience with the English language, self-consciousness, and American identification, these differences were still evident. These results give support for the existence of a critical period for second language acquisition in addition to first language acquisition. This strong relationship also demonstrates a clear advantage for children acquiring a new language over adults acquiring a new language. It appears that after the age of puberty it becomes much more difficult to obtain a high level of proficiency in the learned language.

Overall, the present results do not provide the basis for more than some very tentative conclusions. A problem inherent in the study of special populations is the small population pool available from which to recruit participants. The present research question was chosen because this research area has not been greatly investigated. This may be due to the difficulty that lies in recruiting participants to investigate questions on this topic.

## **Future Directions**

Research attempting to study this population in the future, will need to include much larger sample sizes in order to be able to draw stronger conclusions. Despite the great deal of effort put forth into participant recruitment, this study's sample size was very small. However, it should be highlighted that difficulties with participant recruitment should not let this area of research to be neglected. As this study illustrated, there is a very large population of students who are deaf, but who are not being communicated with in a signed language. An even larger percentage of these are not being communicated with in ASL. Numerous studies (e.g. Hoffmeister, 2000; Mayberry, 1989; Padden & Ramsey, 2000; Wilbur, 2000) have shown that ASL competency and its use as a base language is beneficial for literacy in the English language. Parents should be informed about the importance of ASL knowledge for their child and its impact on literacy in English. Without an increase in the use of ASL by the parents of deaf children, research of this nature involving adequate sample sizes will continue to be difficult. Parents should be encouraged to communicate with their deaf children in a common language in order to help create a foundation which will allow English literacy to develop. Efforts to support parental involvement and ASL learning in the parents of deaf students should be a focal point in deaf education research.

### **Contact Information**

Shauna M. (Buchholz)  
Thompson  
1919 N. Miramar Lane  
Clovis, CA 93619  
shauna.margaret@gmail.  
com  
(559) 250-0804

Patrick Boudreault  
California State University,  
Northridge  
18111 Nordhoff St.  
Northridge, CA, 91330-8265  
patrick.boudreault@csun.edu  
(888) 285-4041 (Voice Only)

Lorin Lachs  
California State University,  
Fresno  
2576 E. San Ramon ST11  
Fresno, CA 93740  
llachs@csufresno.edu  
(559) 278-2691

## Appendix A: TGJASL-R Test Questions

Practice Sentences: [4 items]

### **Stimuli**

---

1. MAN BUY BOOK
  - 1b. \***BOOK BUY** MAN
  - 2a. FRIEND SELL HOUSE **COLOR YELLOW**
  - 2b. \***COLOR YELLOW** FRIEND SELL HOUSE
- 

Simple Sentence: [12 items]

### **Stimuli**

---

- 1a. IN OFFICE OLD MAN WHITE-HAIR **PONDER**
- 1b. \*IN OFFICE **PONDER** OLD MAN WHITE-HAIR
- 2a. 4 BOYS FROM 'DEAF-INSTITUTE' **CHAT**
- 2b. \***CHAT** 4 BOYS FROM 'DEAF-INSTITUTE'
- 3a. SCHOOL FINISH BOY **PLAY** BASEBALL OUTSIDE
- 3b. \*SCHOOL FINISH **PLAY** BOY BASEBALL OUTSIDE
- 4a. COLLEGE STUDENT TEND **RUN** EVERY-NIGHT
- 4b. \***RUN** COLLEGE STUDENT TEND EVERY-NIGHT
- 5a. BEFORE WW2 MANY WOMEN **WORK** FACTORY
- 5b. \*BEFORE WW2 **WORK** MANY WOMEN FACTORY
- 6a. WINTER #ALL BEAR **SLEEP** UNTIL SPRING
- 6b. \*WINTER #ALL **SLEEP** BEAR UNTIL SPRING



---

Negative Sentence: [12 items]

**Stimuli**

---

Subsection A: Negative sign with positive Non-Manual Signal

- 7a. POSS-1 BROTHER HOUSE REMODEL DON'T-FINISH <sup>neg.</sup>  
7b. \*POSS-1 BROTHER HOUSE REMODEL DON'T-FINISH
- 8a. TODAY #HS STUDENT MATH DON'T-KNOW <sup>neg.</sup>  
8b. \*TODAY #HS STUDENT MATH DON'T-KNOW
- 9a. POSS-1 CHILDREN ICE-CREAM DIFFERENT DON'T-LIKE <sup>neg.</sup>  
9b. \*POSS-1 CHILDREN ICE-CREAM DIFFERENT DON'T-LIKE

Subsection B: Negative Non-Manual Signal appeared in wrong clause

- 10a. POSS-1 GRANDMA BIKE NEW USE <sup>neg.</sup>  
10b. \*POSS-1 GRANDMA BIKE NEW USE
- 11a. SCHOOL PT-3 (Loc.) GIRL CHUBBY EXERCISE <sup>neg.</sup>  
11b. \*SCHOOL PT-3 (Loc.) GIRL CHUBBY EXERCISE
- 12a. BEFORE POSS-1 SON HURT CRY <sup>neg.</sup>  
12b. \*BEFORE POSS-1 SON HURT CRY
- 

Verb Agreement Sentence: [12 items]

**Stimuli**

---

Subsection A: Subject 1st person and Object 3rd person

- 13a. PACKAGE HEAVY PT-1 1-SEND-3 UNCLE  
13b. \*PACKAGE 1-SEND-3 HEAVY PT-1 UNCLE
- Subsection B: Subject 3<sup>rd</sup> person and Object 1<sup>st</sup> person

- 14a. POSS-1 FRIEND 3-INFORM-1 PARTY TONIGHT

14b. \*POSS-1 FRIEND PARTY 3-INFORM-1 TONIGHT

15a. POSS-1 NEIGHBOR SMALL DOG 3-BITE-1

15b. \*POSS-1 NEIGHBOR 3-BITE-1 SMALL DOG

16a. POSS-1 FAMILY DOCTOR 3-WARN-1 MUST LOSE-WEIGHT /U+U/

16b. \*POSS-1 FAMILY DOCTOR MUST LOSE-WEIGHT /U+U/  
3-WARN-1

Subsection C: Subject 1<sup>st</sup> person and Object 2<sup>nd</sup> person

17a. YESTERDAY SPANISH CLASS TEST PT-1

1-ANSWER-2++

17b. \*1-ANSWER-2++ YESTERDAY SPANISH CLASS TEST  
PT-1

Subsection D: Subject 3<sup>rd</sup> person and Object 3<sup>rd</sup> person

18a. TEACHER<sub>i</sub> STUDENT<sub>j</sub> BOOK THICK 3<sub>i</sub>-GIVE-3<sub>j</sub>

18b. \*3<sub>i</sub>-GIVE-3<sub>j</sub> TEACHER<sub>i</sub> STUDENT<sub>j</sub> BOOK THICK<sub>j</sub>

---

Wh. Question Sentence: [12 items]

**Stimuli**

---

Sub section A: Wh Question

- 19a. RECENTLY BOY TWO-OF-THEM FIGHT WHY? wh.
- 19b. \*RECENTLY WHY? BOY TWO-OF-THEM FIGHT wh.
- 20a. HOCKEY CANADA RUSSIA MATCH WIN WHO? wh.
- 20b. \*HOCKEY WHO? CANADA RUSSIA MATCH WIN wh.
- 21a. POSS-2 UNLCE B-O-B NEW #JOB WHAT? wh.
- 21b. \*POSS-2 UNLCE B-O-B NEW WHAT? #JOB wh.

Sub Section B: Wh. Question marker

- 22a. YESTERDAY POSS-2 MOTHER BUY GLASS COLOR? wh.
- 22b. \*YESTERDAY POSS-2 MOTHER BUY GLASS COLOR? wh.
- 23a. MOOSE MEAT, TASTE LIKE? wh.
- 23b. \*MOOSE MEAT, TASTE LIKE? wh.

Sub Section C: Y/N Question marker with Wh. Question wiggle

- 
- 24a. MAN TALL MUSCULAR EXERCISE EVERYDAY? Wh.

**Wiggle**

- 24b. \*MAN TALL MUSCULAR (Wh. Wiggle) EXERCISE EVERYDAY?
-

Relative Clause Sentence: [12 items]

**Stimuli**

---

Sub section A: RC Marker

- 25a. rc  
BLACK CAT<sub>i</sub> EAT MOUSE<sub>j</sub>, SLEEP
- 25b. \*SLEEP, rc  
BLACK CAT<sub>i</sub> EAT MOUSE<sub>j</sub>,
- 26a. rc  
BOY<sub>i</sub> SNOWBALL THROW GIRL<sub>j</sub>, PUNISH
- 26b. \*PUNISH, rc  
BOY<sub>i</sub> SNOWBALL THROW GIRL<sub>j</sub>,
- 27a. rc  
GIRL<sub>i</sub> PUSH POSS-3 BROTHER<sub>j</sub>, ESCAPE
- 27b. \*ESCAPE, rc  
GIRL<sub>i</sub> PUSH POSS-3 BROTHER<sub>j</sub>,
- Sub Section B: THAT marker

- 28a. top  
CAT<sub>i</sub> STARE MOUSE<sub>j</sub> THAT<sub>j</sub>, TEND EAT BIRD.
- 28b. \*CAT<sub>i</sub> STARE top  
THAT<sub>j</sub> MOUSE<sub>j</sub>, TEND EAT BIRD.
- 29a. top  
WIFE<sub>i</sub> DISPUTE HUSBAND<sub>j</sub> THAT<sub>j</sub>, TEACH  
CHEMISTRY.
- 29b. \*WIFE<sub>i</sub> DISPUTE top  
THAT<sub>j</sub> HUSBAND<sub>j</sub>, TEACH  
CHEMISTRY.
- 30a. top  
TEACHER<sub>i</sub> DISPUTE STUDENT<sub>j</sub> THAT<sub>j</sub>, VERY-STRICT.
- 30b. \*TEACHER<sub>i</sub> DISPUTE top  
THAT<sub>j</sub> STUDENT<sub>j</sub>, VERY-STRICT.
-

Classifiers Sentence: [18 items]

**Stimuli**

Sub section A: Agent > verb of motion & Object > CL or SASS

- 31a. **GARBAGE CL:/C+C/ [can]**<sup>1</sup>, **MOUSE CL:/Vc/ [climb inside]**<sup>2</sup>  
 31b. \***MOUSE CL:/Vc/ [climb inside]**, **GARBAGE CL:/C+C/ [can]**<sup>3</sup>  
 32a. **WHITE HOUSE CL:/C/ [mouthing “CHA”-big]**<sup>1</sup>, **WOMAN CL:/V/ [pass by]**<sup>2</sup>  
 32b. \***WOMAN CL:/V/ [pass by]**, **WHITE HOUSE CL:/C/ [mouthing “CHA” big]**<sup>3</sup>  
 33a. **CHAIR CL:/Vc/<sub>i</sub>/**<sup>1</sup>, **RED BALL CL:/C/<sub>j</sub>/ [bouncing on chair]**<sup>2</sup>  
 33b. **RED BALL CL:/C/<sub>j</sub>/ [bouncing on chair]** **CHAIR CL:/Vc/<sub>i</sub>/**<sup>3</sup>  
 34a. **TREE CL:/ARM/**<sup>1</sup>, \***CAR CL:/3/ [hit tree]**<sup>2</sup>  
 34b. \***CAR CL:/3/ [hit tree]**, **TREE CL:/ARM/**<sup>3</sup>  
 35a. **STEEL CL:/F+F/**, **BOY CL:/1+Vc/ [climbing]**  
 35b. \***BOY CL:/1+Vc/ [climbing]**, **STEEL CL:/F+F/**  
 36a. \***HAY CL:/5/ [pile]**<sup>1</sup>, **COW CL:/Cs/ [eat hay]**<sup>2</sup>  
 36b. \***COW CL:/Cs/ [eat hay]**, \***HAY CL:/5/ [pile]**<sup>3</sup>

Sub section B: Agent > verb of motion 1 & Theme/Patient > verb of motion 2

- 37a. **THIEF CL:/1/ [running]**<sup>1</sup>, **POLICE CL:/1/ [pursuing thief]**<sup>2</sup>, **CL:/L-Lc/ [shoot at thief]**<sup>4</sup> **CL:/V/ [fall]**<sup>5</sup>  
 37b. \***THIEF CL:/1/ [running]**<sup>1</sup>, **POLICE CL:/1/ [pursuing thief]**<sup>2</sup>. **(PO: Reversed)**, **CL:/Lc-L/ [shoot at thief]** **(MVT: HMH Reversed on thumb level)**<sup>4</sup>, **CL:/V/ [fall]**<sup>5</sup>  
 38a. \***CAR CL:/3/<sub>x</sub>/ [car X]**<sup>1</sup> **GREEN LIGHT CL:/O-5/, [light up]**<sup>2</sup> **CL:/3/<sub>x</sub>/ [car X cross street]**<sup>1</sup> **CL:/3/<sub>y</sub>/ [car Y hit car X]**<sup>2</sup>  
 38b. \***CAR CL:/3/<sub>x</sub>/ [car X]**<sup>1</sup> **GREEN LIGHT CL:/5-O/ [light up]**<sup>2</sup>. **(MVT: HMH reversed)**, **CL:/3/<sub>x</sub>/ [car X cross street]**<sup>1</sup> **CL:/B/<sub>y</sub>/ [car Y hit car X]** **(HS: incorrect)**<sup>2</sup>  
 39a. **TABLE CL:/B/**<sup>1</sup> **CAT SLEEP CL:/Vc/ [cat’s sleeping position on table]**<sup>2</sup>, \***DOG CL:/B+B/ [barking at cat]**<sup>6</sup>, **CL:/B+Vc > V+V/ [the cat awake from table]**  
 39b. \***TABLE CL:/B/ (PO: Reversed)**<sup>1</sup> **CAT SLEEP CL:/Vc/ [cat’s sleeping = position on table]**<sup>2</sup>, \***DOG CL:/1+1/ [barking at cat]** **(HS: incorrect)**<sup>6</sup>, **CL:/B+Vc > V+V/ [the cat awake from table]**

<sup>1</sup>: Non Dominant Hand – Sign hold at the end of the movement as a reference point for Dominant Hand.

<sup>2</sup>: Dominant Hand joined the Non Dominant Hand on hold.

- 3: Dominant Hand executed without the reference point of Non Dominant Hand.
- 4: Dominant Hand – Sign hold at the end of the movement as a reference point for Non Dominant Hand.
- 5: Non Dominant Hand acted on the result of the Dominant Hand on hold.
- 6: Non Dominant Hand is temporarily absent while the CL sign use both hands.

## Appendix B: Informed Consent Form

You and your child are invited to participate in a study conducted by Shauna Buchholz, a School Psychology graduate student and Dr. Lorin Lachs, Associate Professor of Psychology at California State University, Fresno. The results of this study will help us to see whether there is a relationship between the American Sign Language level of mothers, and their deaf child's English literacy. You were selected as a possible participant in this study because you are the mother of a deaf student who is in junior high or high school, and you use ASL.

If you and your child decide to participate, both of you will be taking a test to determine American Sign Language skill level. The test will be presented via a computer and your answers will be recorded on the computer. You will also be filling out a short questionnaire. Your decision to participate also allows the researcher to obtain your child's English Language-Arts test score from the 2010 CST or CMA test as well as their English-Language arts score on district-wide tests. The risk is minimal at most; the study will require a time commitment of about 45 minutes. A potential benefit of participation is contribution to knowledge gained in this area of research. Mothers and students who participate will be entered into a drawing to win one of four \$50 gift cards and one of three \$100 gift cards to restaurants or retailers.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. After the data are used the information will be destroyed. If you give me your permission by signing this document, I plan to disclose the information only to others involved in the research, including Dr. Boudreault of the University of California at San Francisco.

Your decision whether or not to participate will not prejudice your future relations with California State University, Fresno. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without penalty. The Committee for the Protection of Human Subjects at California State University, Fresno has reviewed and approved the present research. If there are any concerns please contact the head of the Committee, Constance Jones, at (559) 278-4468.

If you have any questions, please ask me. If you have any additional questions later, please do not hesitate to email Shauna Buchholz at 2testASL@gmail.

com. You will be given a copy of this form to keep if requested.

**Electronic Signature**

**Your Deaf Child's Name**

**Your name**

**YOU ARE MAKING A DECISION WHETHER OR NOT YOU AND YOUR CHILD WILL PARTICIPATE. YOUR ELECTRONIC SIGNATURE INDICATES THAT YOU HAVE DECIDED TO PARTICIPATE, HAVING READ THE INFORMATION PROVIDED ABOVE.**

**Yes**

**No**



## Appendix C: Assent Form



### California State University, Fresno

The Effect of Parents' ASL Skill Level on the English Literacy of their Deaf Child

### ASSENT FORM

#### **What is research?**

We are asking you to be in a research study. Research allows us to test new ideas and learn new things. Participating in research is your choice; you can say Yes or No. Either choice is OK.

#### **Why are we doing this research?**

In our research study we want to see if your mother's American Sign Language abilities are related to how well you do in areas related to English. We are asking children who are deaf and in junior high and high school to be in our study.

#### **What will happen in the research?**

You will take a short test. You will see the pictures of signed sentences on the computer screen and decide if you think those sentences were signed correctly or not. You will indicate "YES" by clicking on the green button, and "NO" by clicking on the red button. You won't be graded on your answers, so just do your best. We will also be looking at your school records and using some of your previous test scores.

#### **What are the good things that can happen from this research?**

What we learn in this research will help us to know how we can help you, and others like you succeed in English.

#### **What else should you know about the research?**

You decide whether or not you want to be a part of this research. You can say Yes or No, either choice is OK. If you say Yes, and change your mind later, that is OK. Take the time you need to make your choice. Email me if you have any questions.

#### **Child's Statement**

The researcher has told me about the research. I had a chance to ask questions

and I know I can ask questions any time. I want to help with the study.

If you have questions please talk to:

Shauna Buchholz  
School Psychology Graduate Student  
Psychology  
2testASL@gmail.com

Dr. Lorin Lachs  
Associate Professor of

llachs@csufresno.edu

Electronic Signature

Your name

YOUR ELECTRONIC SIGNATURE INDICATES THAT YOU HAVE  
DECIDED TO PARTICIPATE, HAVING READ THE INFORMATION  
PROVIDED ABOVE

Yes

No

Appendix D: Demographics Questionnaire

Questionnaire

Demographics

What is your age? \_\_\_\_\_

What is your gender?

- a. male
- b. female

What is your ethnicity?

- a. African American
- b. Asian American
- c. Caucasian
- d. Hispanic
- e. Hmong
- f. Native American
- g. Pacific Islander
- h. Middle Eastern
- i. Other (please specify): \_\_\_\_\_

What is your marital status?

- a. married
- b. single
- c. divorced
- d. cohabitating
- e. separated

What is the highest level of education you have attained?

- a. elementary school
- b. high school diploma
- c. some college
- d. Associate's Degree
- e. Bachelor's Degree
- f. Some graduate school
- g. Graduate school (Masters, Doctorate, etc.)

What is your Deaf child's age? \_\_\_\_\_

Manually Coded English (MCE)													
Other													
N/A [Currently not enrolled yet]													

Please estimate how many children's books were available in your household BEFORE your child entered elementary school:

- a. none
- b. 1-20
- c. 21-40
- d. 41-60
- e. 61 or more

Before your child entered elementary school, how often did you or another member of the family read to your child in a typical week?

At bedtime:

- a. never
- b. once
- c. 2-3 times
- d. 3-4 times
- e. 5 or more

Other times:

- a. never
- b. once
- c. 2-3 times
- d. 3-4 times
- e. 5 or more

What is your hearing status?

- a. hearing
- b. hard of hearing
- c. deaf

What is your child's degree of hearing loss?

- a. none (0-25 decibels)
- b. mild (26-40 decibels)
- c. moderate (41-55 decibels)
- d. moderate to severe (56-70 decibels)
- e. severe (71-90 decibels)
- f. profound (91+ decibels)
- g. unknown

Was your child's hearing loss caused by...

- a. congenital (present at birth)
- b. don't know
- c. acquired (occurred after birth) \_\_\_\_\_

What hearing device(s) does your child currently use?

- a. analog hearing aids
- b. digital hearing aids
- c. cochlear implant
- d. none
- e. other (please specify): \_\_\_\_\_

What was the cause(s) of your child's hearing loss?

- a. Ear infections (otitis media)
- b. Ototoxic (damaging to the auditory system) drugs
- c. Meningitis
- d. Measles
- e. Encephalitis
- f. Chicken pox
- g. Influenza
- h. Mumps
- i. Head injury
- j. Noise exposure
- k. Don't know
- l. Heredity/genetic causes (please specify): \_\_\_\_\_
- m. Prenatal infections or complications (please specify):  
\_\_\_\_\_
- n. Other (please specify): \_\_\_\_\_


Appendix E: CMA and CST Comparison

Samples - ELA (Grade 3)

## CMA

**Part 1** California Modified Assessment

**Dolphins Use Mirrors to Observe Changes in Themselves**



Until recently, it was not known if cetaceans (other than chimpanzees, gorillas, orangutans, and humans) could identify themselves in a mirror. Cats and dogs have been known to see themselves in a mirror and think another cat or dog was looking at them. Studies have shown that dolphins are able to use mirrors to notice the difference between themselves and other dolphins.

Dolphins have excellent memory skills. Researchers at New York Aquarium performed a test to determine if the dolphins' high level of intelligence would include recognizing themselves in a mirror. First, researchers placed a mirror in a pool and told them it is a pool with a mirror on the wall. Then, the dolphins were paired with a second dolphin that looked like a mirror image. They were asked to swim to the mirror, catch a piece of fish, and return to the stomachs, or fins which they could not see without a mirror. Both Preziaty and the swimmer directly to the mirror, catch turning and angling to expose the mark and taking a long, hard look in the mirror. It was the first time a dolphin had reacted to a mirror by examining itself.

The test was repeated with the marked location changing each time, but the reaction was always the same. The dolphins swam straight to the mirror and studied the marked spot on their bodies. They were not interested in the other dolphin. They were only interested in the mirror. The researchers were amazed to demonstrate an ability to recognize themselves and to notice changes in their appearance.


**Go On** ▶

CMA, 10/10/06

## CST

**Part 1** California English-Language Arts Student Test

**Halley's Comet**



For centuries, comets have been one of our biggest mysteries. They are bright streaks of fire that appear in the night sky and disappear in minutes. People from all over the world have been awestruck—and often scared—by the sight of a comet blazing across the sky. Edmund Halley, an astronomer in the late 1600s, was very interested in comets. He studied them for most of his life.

Part of Halley's studies involved tracking the paths of comets through the night sky. Halley learned that comets move around the Sun in the path of an ellipse. (An ellipse is like a circle that has been stretched out in one direction.) He discovered that because comets travel in an elliptical path, the same comet could be seen from Earth again and again. This was a brand new concept during his time.

In 1682, Halley noticed a comet that was especially bright and large. He spent a long time studying it. Then he disappeared from view. Based on his calculations, Halley predicted that this bright comet would return in 1758 or 1759. This was about 75 years after he first saw the comet. However, Halley died in 1742. Thus, he was not able to see his comet.

This same bright comet returned right on time. Not long after that, however, Halley had learned to much about it, the comet was named "Halley's comet" in his honor.

Scientists who had been following Halley's work began to look back through history. They learned that for centuries there had been mentions of a comet in the sky about every 75 years, going all the way back to 467 B.C. Often, the names of Halley's comet seemed to coincide with important events in history. For many years people believed that Halley's comet carried messages, from ancient to now.

Since then, scientists have learned more about comets. They now know that comets do not cause bad events. They have also learned what comets are like. All comets consist of a head and a tail. Some comets tails are longer than others. This head is made mostly of ice, plus some dust and pieces of rock. U.S. astronomer Fred Whipple named the phrase "dirty snowball" to describe comets. Comets move through the sky very quickly. Halley's comet has been observed many times. Comets are also seen from other planets. For example, on Venus, or at the equator, it moves about 2,000 miles per hour. When it is closest to the Sun, at its perihelion, it moves at an amazing 122,000 miles per hour!

For a long time scientists wondered where comets came from. Today, most scientists believe that comets come from an unseen cloud of particles called the Oort Cloud. This cloud probably surrounds our solar system. It is only sometimes disturbed by passing stars.

People today remain fascinated by this celestial time-traveler. The most recent visit from Halley's comet was in 1985-1986. This time, scientists all over the world studied the comet. Two Soviet spacecraft, the Vega 1

**Go On** ▶

CST, 10/10/06

blue-nov07item14  
Attachment 6  
Page 10 of 4

- CMA
- Shortened passage length
  - Additional white space
  - Larger font sizes
  - Font - Helvetica (a sans serif font)

- Differences between CST and CMA reading passages:
- CST
- Standard passage length
  - Customary use of white space
  - Standard font sizes
  - Font - Times (a serif font)

## Appendix F: Letter to CSDR Parents



Dear Mothers of students at California School for the Deaf-Riverside:

My name is Shauna Buchholz and I am from the Department of Psychology at California State University, Fresno. I'm working to obtain my graduate degree in school psychology. I would like to invite you and your child, along with other schoolmates and their mothers, to participate in a research project concerning the relationship between deaf children's English literacy levels and their mothers' American Sign Language (ASL) skill level.

To be eligible to participate, you have to use any amount of ASL. If you and your child choose to participate, you both will be taking a test to assess ASL skill level. As the mother, you will also fill out a questionnaire with demographics questions as well as questions regarding language, deafness and literacy practices. There are 78 questions on the test of ASL skill level that are answered with either a yes or no. The test and questionnaire will be completed over the Internet at your convenience. Completing the questionnaire and test should take around 45 minutes of your time. I am also asking that you allow me to obtain your student's state, district and school standardized test scores from Dr. Lawrence at CSD-Riverside.

If you would like you and your student to participate, please email me at [2testASL@gmail.com](mailto:2testASL@gmail.com) with your contact information. I look forward to hearing from you. As a thank you, students and mothers who participate will be entered into drawings to win one of four \$50 gift cards and one of three \$100 gift cards for restaurants or other retailers.

You and your child's participation in this project are completely voluntary. Your child will also be asked if he or she would like to take part in this project. No data will be collected from your child until both you and he/she have given your permission to participate. Only those children who have parental permission and who want to participate will do so, and any child may stop taking part at any time. You are free to withdraw your permission for your child's participation at any time and for any reason without penalty. These decisions will have no affect on your future relationship with the school or your child's status or grades there. In order to ensure confidentiality, only those directly involved in the research will have access to any identifying

information. Participants will be given an identifying code to ensure anonymity to all other parties.

The Committee for the Protection of Human Subjects at California State University, Fresno has reviewed and approved the present research. If there are any concerns please contact the head of the Committee, Constance Jones, at (559) 278-4468.

If you would like to participate, or have any further questions, don't hesitate to contact me. Thank you so much for your consideration of this matter.

Sincerely,

Shauna Buchholz  
School Psychology Graduate Student  
XXXX  
2testASL@gmail.com

Dr. Lorin Lachs  
Associate Professor of  
Psychology  
(559) 278-2691



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