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Author
Locker, Rachel

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Lexical Equivalence in Transliterating for Deaf Students in the University Classroom: Two Perspectives

Rachel Locker
University of California, Los Angeles

This study examines the accuracy of transliterated messages produced by sign language interpreters in university classrooms. Causes of interpreter errors fell into three main categories: misperception of the source message, lack of recognition of source forms, and failure to identify a target language equivalent. Most errors were found to be in the third category, a finding which raises questions not only about the preparation these interpreters received for tertiary settings, but more generally about their knowledge of semantic aspects of the American Sign Language (ASL) lexicon. Deaf consumers' perceptions of problems with transliteration in the classroom and their strategies for accommodating various kinds of interpreter error were also elicited and are discussed. In support of earlier research, this study's finding that transliteration may not be the most effective means of conveying equivalent information to deaf students in the university classroom raises questions about the adequacy of interpreters' preparation for this task.

INTRODUCTION

Since the passage of federal legislation--the Rehabilitation Act of 1973, Section 504--mandating accessibility to federally funded facilities, an increasing number of deaf students have entered programs of study in tertiary institutions. Sign language interpreters have been the primary resource for making university classrooms accessible to them by providing simultaneous signed interpretation. This service usually takes the form of "transliteration," a part-English, part-ASL form of translation (see detailed definition below). But while a great deal of interpreter training and service provision has taken place over the last fifteen years, relatively little empirical research into the results and ramifications of what happens in the classroom with interpreters has been undertaken. This study is

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a small-scale descriptive investigation of the effectiveness of sign language interpreting as found in the university classroom, examined from two perspectives.

The first section of the study entails a pilot analysis of lexical choices made by sign language interpreters transliterating from spoken English to a signed form. Given that ASL and English are two distinct languages, the semantic range of an English word and ASL sign holding the same dictionary gloss is often different, (Colonomos, 1984). Lexical choice can therefore be problematic for an interpreter attempting to achieve message equivalence in a "word-for-word" transliterated form. The second, complementary section of this study is a survey of three deaf university students' perceptions and responses to interpreting error. The information gleaned from both these sources may be useful for emphasizing the need for study of semantic equivalence between languages in the professional preparation of sign language interpreters, and for raising questions about the viability of "transliteration" as a means of conveying equivalent information to deaf consumers.

Definition of Terms

The following definitions of basic terms are presented to orient the reader to the field of sign language interpreting:

American Sign Language (ASL) is a complete and independent language, with complex systems of phonology, syntax, and semantics (Bellugi & Klima, 1980). Furthermore, ASL expresses/creates a specific system of cultural meanings shared by the American deaf community, in the same way that Russian or Japanese embodies the conceptual universe of these cultures. It is important to stress, therefore, that any discussion of interpreting or transliteration must assume the interaction of two languages, not simply a coding operation from one modality to another.

Transliteration is broadly defined for this study as changing a spoken English message into a manual form (using the vocabulary of ASL) in order to represent the lexicon and word order of English (but not necessarily the grammatical affixes of English, e.g., suffixes for verb agreement, tense, plurals). In fact, there is no well defined or standardized description of transliteration (even though the term is used as if there were), since this target form attempts to accommodate both the syntactic order of spoken English and a range

of ASL features (including principally the lexicon) in order to convey the message in a signed modality. Transliteration thus results in a variety of interlanguage signing that is "less than a complete message . . . something approximating the source message but not expressing the same subtleties of either source or target language" (Winston, 1989, p.149). Winston notes that transliterators are more constrained in their task than translators or interpreters, because they are expected to produce a form that resembles the source message in English and yet is comprehensible in a visual-manual mode, while drawing on ASL features as part of the target form. Despite the lack of clear definition, however, transliteration appears to be the predominant style of "interpreting" found in higher educational settings in the United States.[1]

Interpreting, within the field of sign language interpreting, is a term often used generically to include both transliterating (as discussed above) and the more generally understood "interpreting," meaning to translate in real-time between two distinct languages (which in this case would be English and ASL). While in this study the focus is on transliteration, the people doing the transliterating are referred to as "interpreters," even though there is a move now in the field to call them "transliterators." This debate over terms hinges on whether transliterating is viewed as a process distinct from what an interpreter does when decoding and reconstructing meaning between English and ASL, or whether the only significant difference between interpreting and transliterating is the surface form in which the target message is represented. Lacking evidence that there exists any difference in the basic *process* involved in reconstructing an ASL or signed English (i.e., transliterated) message from a source message, participants in this study will be referred to as "interpreters" rather than "transliterators," but my choice of terms should not be read as definitive.

Review of Studies on Sign Language Interpreting Effectiveness

The literature in this area follow one or the other of two main approaches: (i) measuring interpreting effectiveness according to the overall comprehension of consumers (although no satisfactory definition of "effective interpreting/transliterating" has yet emerged), and (ii) analyzing interpreter errors in relation to a theoretical model of interpretation.

In a comparison of deaf and hearing students' ability to receive and recall information from an interpreted/heard lecture, Jacobs (1981) found that hearing students received higher combined scores on tests of lecture material than deaf students. Deaf students scored correctly on only 84% as many items as did the hearing students, and test scores averaged 83% for hearing, 69% for deaf. Since Jacobs also notes, however, that other studies have found no significant difference in grade point average between deaf and hearing college students, it is still unclear as to how (or if) the remaining information gap is closed by deaf students. Apparently, deaf students rely on other, as yet unknown, strategies for acquiring and assimilating the information necessary for success in college.

Rather than contrasting the efficiency of signed interpretation with audition, however, Fleischer (1975) compares the effectiveness, for deaf consumers, of four different types of classroom interpreting conditions. According to his results, conditions were ranked in the following descending order of effectiveness: ASL with background knowledge, ASL without background knowledge, signed English (transliteration) with background knowledge, and, lastly, signed English without background knowledge, the least effective interpreting condition. While Fleischer's study does not define "signed English," the term is widely understood in the field to mean some combination of ASL vocabulary produced in predominantly English word order, with fingerspelling of terms and some use of ASL parameters, such as the use of placing and indexing locatives in the signing space. This type of signing is distinct from a contrived signing system which represents the derivational affixes on English words, such as "Signing Exact English." Fleischer also notes that "[t]he higher the level of complete bilingualism the deaf student has, the higher the amount of information he receives from the interpreter" (pp. 74-75). His study concludes that it is the dominant or preferred communication mode of a deaf consumer which is crucial and which needs to be included as a factor in assessing interpreter effectiveness in any given situation.

Neither of the above studies explores the possibility that recall from a lecture situation may not be an accurate measure of interpreting effectiveness in other types of educational setting, e.g., the seminar format, in which the communication process is complicated by interactional dynamics, and hence the amount of information and participation lost is potentially greater. These issues have been addressed by Johnson (1989), however, in an

examination of conflicting communication strategies used by deaf and hearing participants in a the university classroom situation. Johnson found that miscommunication was sometimes due to the conflict of aural/oral and visual/manual norms for conveying information. For instance, when visual aids were used in class, deaf students were forced to choose where to direct their attention, thereby losing out on some of the information being responded to in class. Differences in conversation regulators (e.g., turn-taking signals) in auditory as opposed to visual modes also created problems for deaf students in the interpreted situation, particularly in the discussion situations typical of graduate classes.

Johnson also found that transliteration was problematic and confusing when the source message involved spatial descriptions or references to real-world images for which the interpreter had no available referent for visualization purposes (e.g., the appearance of a biological structure or a building layout). In such instances, interpreters tended to resort either to fingerspelling or to using citation forms of signs whose glosses matched individual English words but not necessarily the overall structure or sense of the utterance. This strategy, which did little to give the deaf student a visual equivalent to the spoken description, resulted in loss of information because the deaf students were unable to recover the intended source language (SL) meaning.

An interpreter's degree of familiarity with the subject matter at hand is also an important factor in achieving an understandable and functionally equivalent translation of the source message in a signed form. Wilcox & Wilcox (1985) explored the applicability of schema theory to interpreter accuracy by correlating interpreting proficiency with the ability to make "probability predictions" from an incoming message through use of an auditory cloze. The idea behind the study was that as the message unfolds, a probability prediction field is built up, the closure for which an interpreter may draw on the situational context and his or her own world knowledge. This process enhances comprehension and allows the interpreter to plan ahead based on a sense of what to expect next in the incoming message. Wilcox & Wilcox suggest that an interpreter's ability to make use of the clues in a message and predict accurately may be a major determiner of sign language interpreter proficiency.

Representing the second approach taken in the literature, Cokely (1985) analyzed the frequency and distribution of several types of interpreter target language (TL) errors in relation to a seven-

stage model of the process of interpreting between spoken English and ASL. While Cokely notes that syntactically related errors are overall the most severe obstacles for a consumer's recovery of the SL message, he found that lexically related errors were also problematic. The skilled interpreters he studied were found to produce an average of 1.21 lexical errors and unwarranted substitutions per syntactically acceptable TL sentence. Of these errors, about half were categorized as seriously deviating from the intended meaning of the source message. Using Cokely's theoretical model, analysis of the source of these types of error should be helpful in that it would isolate the different points at which an interpreter might strike trouble in the process of transferring an equivalent message, although as Cokely states, in reality there is more likely to be "a multiple nesting of stages" (p. 173) as the process takes place. In relation to the present study's focus on lexical errors due to mishearing, misunderstanding, or mistranslation, Cokely's model of the stages in the interpreting process (pp. 169-174) are informative, but four are particularly relevant to this study:

i) *Message reception:* At the initial point of "message reception," if the SL message is auditorally perceived incorrectly by the interpreter, an error will result even if subsequent stages are executed accurately. Sometimes the interpreter self-corrects after recognizing errors, but usually he or she interprets the error confidently, assuming the message perceived was the same as the one spoken.

ii) *Preliminary processing*: In this primary recognition process, lexical and other units are identified and "accessed" (or not, as the case may be) in the listener's--in this case the interpreter's--lexicon. Errors often arise at this point due to a lack of prior understanding of semantic and syntactic context. When interpreter "lag time," to allow for contextual processing, is insufficient, adverse effects on the processing of meaning result.

iii) *Realization of semantic intent*: At this stage, the interpreter arrives at some level of comprehension of at least a portion of the SL message. Ideally this comprehension coincides with the speaker's intent, but it is dependent upon the level (lexical, sentential, phrasal) at which the particular portion of the SL message was analyzed.

iv) *Determination of semantic equivalence*: After the interpreter has attributed meaning to the chunk, he or she now has to determine which linguistic/cultural factors are relevant to conveying

that meaning in the TL. Proficiency in this task, according to Cokely, is dependent on the interpreter's linguistic and cultural competence in the TL. It is also important to note that at this stage if the interpreter has not extracted meaning from the SL message and is simply processing the form of the message at word level (as frequently happens in transliteration), errors will arise because a one-to-one relationship between SL and TL lexical forms does not exist.

There are cases, though, in which the interpreter has understood the SL message but failed to accurately determine a semantic equivalent in the TL. Understanding the SL message does not, therefore, guarantee that a TL equivalent will be identified and produced by the interpreter. Cokely explains this by contending that these two processes are separate. This observation was also borne out in the present study by the results of questioning and retesting interpreters' lexical choices for incorrect interpretations, as will be discussed below. Of overall importance, however, is that according to Cokely's model of the cognitive steps involved in interpretation from one language/mode to another, deviations occurring at any stage of the interpretation process will affect subsequent stages. His analysis of the cognitive tasks involved at each stage of the interpreting process provides a useful theoretical model of the interpreting task, in that it may increase the chances not only of identifying and strengthening an interpreter's areas of weakness, but also of devising strategies for self-monitoring and repair of "faults in the circuit," as it were.

In practical terms, findings from all these studies suggest that deaf students need to be made aware that the sense of confusion they often experience in a classroom situation probably does not originate in their own inability to comprehend the class material. Rather, their confusion may derive from the distortion of a message as it is rendered from one form to another or from the different rules for organizing discourse (e.g., turn-taking) which obtain in aural/spoken vs. visual/manual interaction.

METHODOLOGY

Setting

The present study was carried out in a university setting, in the classes of three deaf students--two graduate students and one undergraduate. Six interpreters were videotaped in half-hour

segments as they interpreted for graduate classes in anthropology and TESL, and for undergraduate classes in chemistry and physics. The six interpreters were selected on the basis of availability and willingness to participate, but also because the classes in which they worked represented a range of subject matter. All interpreters used a predominantly English-like style of signing which would fit the definition of transliteration given above. In addition, the two graduate classes were seminar classes, involving student participation, while the undergraduate science classes were lecture classes.

Interpreter Error Analysis

Videotapes of the six interpreters were initially analyzed for nonequivalent meanings resulting from lexical choices in the target form of the message. Of the six interpreter data samples, only three were found to contain lexical errors relevant to this study (see definition of semantic sign choice errors below). It is interesting to note that the three interpreters who did *not* produce any lexical errors had higher levels of education than the other three (i.e., they all had at least a bachelor's degree, whereas the three who produced lexical errors had been through some kind of interpreter training program but did not hold a university degree). In addition, two of the more highly educated interpreters also had professional interpreter certification, whereas the other four were not certified. Thus, the three interpreters who did produce errors were all interpreting at an educational level above their own and in subject areas with which they were not personally familiar, a situation which probably affected their ability to make lexical choices that would achieve semantic equivalence.

Once the data samples had been narrowed to three, interpreter's errors on the videotapes were first transcribed and sorted into two categories: misperception errors and semantic sign-choice errors (see Appendix A for the complete list). Next, the three interpreters who produced lexical errors were "retested" on their interpreting errors. For this procedure, each interpreter was presented with a sample of his or her original errors two weeks after the class had been videotaped. From the English source message only, each interpreter was then asked to reinterpret these chunks for the researcher. The original incorrect interpretation was not shown or described to the interpreter during this part of the task. Although the chunks were presented out of context, each chunk was

introduced with an explanation of the context by the researcher. In most cases the interpreters had some recall of the general topic of the class from which the example was drawn, although none recognized the specific items presented to them as instances in which they had interpreted incorrectly the first time. Interpreters' second translations from the interview were then compared with the original inaccurate transliteration, and interpreter ability to self-correct was calculated, based on a comparison of the accuracy of first and second interpretations.

In a follow-up discussion with each of the three interpreters (after they had completed the retranslation), interpreters were shown their original and second transliterations and questioned about their reasons for making the original translation they had made on the videotape. Through this discussion, and by asking the interpreters to come up with explanations and definitions of the original English source messages which they had incorrectly interpreted, the researcher attempted to determine whether the error was due to a failure to understand the SL message, an inability to determine a conceptually accurate lexical equivalent, or a decision to simply relay the SL form rather than to determine meaning.

Definition of Semantic Sign-Choice Errors Analyzed in the Study

As has been mentioned, even though transliteration cannot usually represent the exact grammatical inflections of either spoken English or ASL, a minimal expectation is that an interpreter will use a conceptually equivalent sign rather than a literal representation of the English word. For example, the word *take* may be used in phrases with diverse meanings, such as "take some notes," "take a few minutes," "I'm going to take this beaker and pour it . . ." In these contexts, *take* means 'write,' 'use,' and 'pick-up,' respectively. When interpreters failed to convey the context-specific meaning in their choice of sign and instead produced a sign that matched the phonological form but not the meaning of the source message, this was considered a lexical (or sign-choice) error.

Another area of potential nonequivalence is when English words are used metaphorically or in a way which conjures up an image different from the literal sense of the word itself. For instance, "a tree diagram" usually refers to a downward branching information structure, for which the ASL sign "TREE," representing a standing tree with branches pointing upwards, is conceptually

wrong, and thus a different sign should be used which visually matches the concept of a "tree diagram."

Deaf Student Interviews

In the second part of this study, the perspective of deaf students regarding interpreting error was sought. Three deaf students were selected by virtue of their being in the classes of the three interpreters who produced lexical errors. These deaf students were interviewed about their general perceptions of interpreter accuracy and specifically about which kinds of errors they notice the most. In addition, they were asked to describe how they deal with ambiguity or distortions in the signed messages produced by interpreters (see interview questions in Appendix B). It should be noted that the interviews with the deaf students did not involve showing them the videotaped error samples, since the aim was to elicit general observations about interpreter error rather than responses to specific errors or specific interpreters.

RESULTS AND DISCUSSION: Interpreter Error Analysis

Misperception Errors

A small proportion (17%) of all errors were due to the interpreter's misperception of the source message because of the inability to hear the speaker clearly or to recognize what was actually said. These errors resulted in TL messages which were clearly nonsensical or unrelated to the context (also referred to as *anomalies*). Examination of the videotaped situations in which the following examples occurred indicated that some were due to difficulty in hearing the utterance fully (especially in discussion settings), but many of the errors derived from constraints on the interpreter's ability to accurately predict in order to extract a meaningful message when an utterance may have been less than 100% clearly perceived. Yet, whether these constraints lie in the individual's "probability prediction" skill (Wilcox & Wilcox, 1985), in auditory distraction or interference is impossible to discern from this data. Examples of errors in perception of the SL message include the following:

SPOKEN ENGLISH	SIGNED TRANSLITERATION (# indicates a fingerspelled word)
it says **"title"**--"give title"	**NOT STEAL IT**--TITLE
describe the **hypothesis, subjects,** method	DESCRIBE **FIVE OFFICES, TITLE** (subject heading), METHOD
I talked to a **lady** she said	ME TALK--TO **BOY**--BOY SAY
share-ware computer programs	**CHAIR** #W-A-R-E PROGRAM (looks puzzled)
These (*computer programs*) are written for a college audience	THIS WRITE FOR COLLEGE **FOOTBALL**

Based on the interpreters' confused facial expressions (furrowed brow, squinting) and apparent straining to hear (head tilting, looking at the speaker) which were evident on the videotape, it appears that the trouble which produced these kinds of errors arose at the initial stages of "message reception" and "preliminary processing" (Cokely, 1985), when the unsuccessful recognition of auditory signals subsequently results in deviations from the SL message in later stages of interpretation.

Sign-Choice Errors

A much larger proportion (83%) of the semantic mismatches occurring in the data were categorized as sign-choice errors. Examples of this sort include:

SPOKEN ENGLISH	SIGNED TRANSLITERATION (# indicates fingerspelled word)
The phones were **down** (*because of the earthquake*)	PHONE **BANKRUPT/FOLD**
So--**how are you doing** with this?	#S-O--**WHAT'S UP?** (*informal ASL greeting = how are you?*)
In the **meantime**	**LATER**
had certain symbolic **advantages**	HAVE SYMBOL **TAKE-ADVANTAGE-OF** (*rip-off*)

since this is (*because*)	**SINCE** (*time passing*)
argumentative type of writing	**ARGUE**(*two persons*) KIND WRITE

Sign-choice errors could have been due to time constraints in the transliterating situation (insufficient lag time to understand the surrounding context or speaker's rate of speech), ignorance of the exact meaning of a SL word as used, or unfamiliarity with the conceptually equivalent ASL sign. Since it would be difficult to isolate and control for these potential sources of error in specifying a cause, interpreters were subsequently retested on interpreting some of the same phrases they had made errors on in the data. The assumption was that making the same error on the retest would indicate either that an interpreter lacked a correct translation in his or her TL lexicon or that he or she could not match the SL word with a definition in their personal English lexicon.

Retest of Interpreters on Sign Choice Errors

The results of the three interpreters' second attempt at interpreting semantic sign-choice errors were as follows:

	Errors Corrected on Retest %	Errors *not* Corrected on Retest %
Interpreter 1	40	60
Interpreter 2	57	43
Interpreter 3	50	50
(Average)	(49)	(51)

Given that 49% of the errors were corrected on the retest (i.e., the second translation offered was more semantically equivalent), it seems most likely that constraints of the transliterating situation itself (e.g., time, ability to hear the speaker clearly, fatigue) were probably influencing the interpreters' preliminary processing and leading to inaccurate lexical choice, rather than the interpreters' knowledge of the meaning of SL or TL forms.

In order to determine the source of error for those items which were not corrected on the retest, each interpreter was

subsequently asked to explain the meaning of the problemematic SL word or phrase. The discussion with the interpreters revealed that of the repeated incorrect translations, the error source could be identified (using Cokely's model) as follows:

	Failure to Realize Semantic Intent (not understanding SL message) %	Failure to Determine Semantic Equivalence (incorrect lexical choice in TL) %
Interpreter 1	50	50
Interpreter 2	21	79
Interpreter 3	60	40
(Average)	(44)	(66)

In the case of the third interpreter, the abstract and philosophical nature of the subject matter and vocabulary might account for failing to understand 60% of the retested SL errors; however, the unknown words in question were not terms specific to the field and are found in general academic English usage. These include: *disenfranchise*, *articulated* set of goals, English-*dominated*, *reformulate* culture.

Overall, slightly less than half of the retested errors were due to a lack of understanding of the SL message, suggesting that first language (English) proficiency and background knowledge plays an extremely important role in interpreter effectiveness. As for failure to determine semantic equivalence in choosing signs, this type of problem accounted for more than half of the retested persistent errors and may be attributable either to a limited range of lexical choices available to the interpreters as second language users or to an incomplete understanding of the semantic properties of certain ASL vocabulary items.

The extent in this small study to which English words were outside the interpreters' receptive vocabulary and the frequency of cases in which lexical equivalents were genuinely not known give pause for thought. The results point to possible weaknesses in the interpreters' training in the semantics of both English and ASL. Since in both lexicons words and signs have various meanings in various contexts, subtleties of semantic equivalence and contrast may need to be studied more thoroughly. Moreover, fluency in source language (English, in this case) and target language (ASL) may need to be treated with more equal emphasis than is done in

interpreter training programs, which often tend to take first-language (L1) proficiency for granted.

As for specific problems with English vocabulary in a university setting, this study suggests that the rate of error may be linked to an interpreter's level of formal education, since the three university-educated interpreters, of the original six participants, did not produce lexical errors of this type and were thus excluded from the error analysis. One obvious implication is that interpreters working in higher education need to avail themselves of the content matter of various fields before expecting to be competent interpreters of these subjects, even if this extra training only extends to the level of conceptual familiarity with the language and typical phrases commonly encountered in that field. An alternative implication is that recruits for interpreter education programs need to have at least a bachelor's level of education, in addition to bilingual proficiency as a prerequisite to entry (as is the case with spoken language interpreters), so as to be equipped for all the contexts in which they might work.

RESULTS AND DISCUSSION:
Deaf Students' Perceptions of Interpreter Errors

The deaf students interviewed for this study differed from each other in terms of experience with interpreters, bilingual proficiency, and language preference. Student 1, a native ASL signer from a deaf family, describes himself as bilingual (in ASL and English) but ASL-dominant in terms of his everyday, preferred mode of communication; although Student 2 was deafened at age 5, entered a residential school for the deaf at that time, and has used ASL ever since as her primary mode of communication, she is a fluent bilingual and has taught English; Student 3 was born deaf but educated orally. She is fluent in spoken English (her primary mode of communication) but learned sign language as an adult and now signs fluently with English-like syntax, relying on lip-reading with signing for receptive communication. In terms of bilingual fluency and language preference, these three students represent the sort of range of deaf language backgrounds that is found in higher educational settings. Their responses to the interview questions (see Appendix B) are discussed below.

Proportion of Information Received Through an Interpreter

In answer to the first question, all three students said that the percentage of information in class they understood through an interpreter depends on the individual interpreter. Students 1 and 2 felt that if the interpreter is highly skilled, they can receive 90-100% of the information, but if the interpreter is "not good" this percentage would drop to somewhere below 40 or 50%. In Student 3's answer to this question, she drew a distinction between her level of comprehension in a lecture as opposed to a seminar class, saying that her estimation for a seminar class would be around 50% while for a lecture closer to about 80%. The explanation she offered for this discrepancy was that seminar/discussion classes are complicated by interactional dynamics as well as by the physical constraints on an interpreter's ability to interpret more than one voice at any one time or to hear all participants clearly. This is certainly a valid distinction not only in terms of the potential for interpreter accuracy, but also in terms of the student's capacity to follow the flow of a discussion when it is received through a single channel, sometimes without identification of different speakers.

The students' higher estimates for "good interpreter" conditions (80-100% recovery of class content) more or less concur, though perhaps rather on the generous side, with Jacobs' (1976) finding of an 84% comprehension level for deaf students. Since students in this interview were only estimating and not actually being tested on how much information they successfully received, it is not surprising that their estimations are somewhat higher than one might expect, given the interpreters' error data and Cokely's analysis of error frequency. In light of Nida's (1976) assertion that comprehension even between speakers of the same language might not typically rise much above 80%, these deaf students' estimates seem optimistically high. For now there seems no direct way of measuring understanding other than by taking the word of consumers. The *perceived* experience of learning through an interpreter, however, is what is of interest in this study.

Effect of Subject Matter

When asked if the accuracy of an interpreter is affected by the specific subject matter, Students 1 and 2 replied that the interpreter's general level of skill was a far more important

determinant of the interpreter's ability to convey information clearly and accurately than the subject matter. However, Student 1 also observed that an interpreter could be an effective interpreter in the arts and humanities yet have a hard time interpreting science classes to the same standard--in other words, that the subject matter can affect performance but not to the same extent as the general proficiency and flexibility of the individual interpreter. Student 3 responded that although proficiency level was generally a better predictor of accuracy in any given subject, some subjects in her experience, such as English literature, had presented serious hurdles even to very skilled interpreters because of the unusual nature of the language involved. She felt that social science subjects were generally easier to interpret because content consisted of more generalizations and everyday language than special terminology. Two of the respondents also commented that interpreters coming into a new field understandably make more errors in fingerspelling words and names related to the specific subject.

Awareness of Interpreter Errors: Sign Choice

The students were also asked what kinds of errors were noticeable and bothersome in their perception of the message. All the students noted that the major source of conceptual errors, and the most distracting to watch, were either inappropriate lexical choices (e.g., "the phones were down"/"PHONE BANKRUPT/FOLD") or transposing the auditory form of the English word to a sign form which didn't match the meaning (e.g., "he paid *interest* on his mortgage"/ "HE PAY *INTEREST* (*ASL verb*: *to be interested in*) ON HIS #M-O-R-T-G-A-G-E."

When students were asked how these types of inaccuracy affected their understanding of the message, they described different strategies for coping. Student 1 said that the first time the incorrect sign choice appears, he immediately analyzes where the confusion is (relying on context and his knowledge of English homynyms) and translates the form to the appropriate meaning in his head. If the error recurs, he makes a mental note of the deviation, puts it into a kind of short-term reference lexicon for that interpreter for the duration of that class, and refers to this lexicon for clarification each time the error appears in the interpreter's message. His strategy is thus one of accommodation to the interpreter's level of conceptual accuracy, meaning that he takes responsibility for doing the extra work required to recover the intended meaning of the SL message.

Student 2 also goes through the process of mentally translating the lexical item once she has recognized a discrepancy between meaning and form, but when the error recurs a second time, she corrects the interpreter by modelling the correct sign. This approach returns the responsibility for conveying meaning appropriately to the interpreter, hopefully reducing the student's distraction from the content caused by incorrect forms and encouraging the interpreter to be more aware of accuracy. Student 3 was not conscious of how she coped with sign-choice errors, although she reported them to be highly distracting to her comprehension of the content of the message.

Redundant/Confusing Grammar Forms

Students were asked to comment on their reactions when interpreters attempt to sign exact representations of English grammatical function words and structures which do not exist in natural ASL forms (e.g., articles, -ing, -ed, copula forms). All three students said that this bothered them because it looked "unnatural" and unnecessary, though they could usually still manage to extrapolate the meaning. Of course, if this very literal type of transliteration is used for a specific purpose, such as demonstrating an English sentence structure or for a quotation, then it was regarded as perfectly appropriate. In other cases, while the students didn't exactly consider this phenomenon to be "error," they did regard it as unhelpful and even a hindrance for effectively conveying the concept of the SL message. However, Student 3 commented that one area of confusion she had experienced repeatedly is when important grammatical information about passive structures is *omitted* from or not conveyed equivalently in the signed form (because inflections, such as copula and -ed affixes, are not usually conveyed in transliteration). Student 3 said she was frequently confused about who was the agent and who was the object of an action in passive constructions for which the interpreter might transliterate a sentence such as *"I feel I'm not being understood"* to "ME FEEL ME NOT UNDERSTAND." In such a transliteration, the opposite meaning is conveyed, since the subject and object of the sentence are represented in the passive order but without any indication in the sign gloss of an agent (or the lack of one). As Levitt (1984) notes, the best alternative in these situations is to completely reorder the sentence into an active form (i.e., to reorder or insert the subject and object of the sentence) or to make use of the directional properties

which many transitive verbs in ASL possess (in other words, to interpret into ASL rather than transliterate word glosses). Given the frequency of passive constructions in academic discourse, it is not surprising that at least one of the deaf students interviewed in this study cited this as a source of frequent confusion. She also commented that it had taken her a long time to understand why she was experiencing this sense of confusion and of never being sure what the intended SL message could have been.

Misuse of Classifiers

Classifiers, a highly productive system of predicate morphology in ASL (Schick, 1987), are handshapes used to represent objects, people, locatives, and actions. ASL classifiers use three dimensional space to incorporate pronouns, verbs, adverbial aspect, and adjectives, often simultaneously. The classifier system is often quite difficult for second language speakers of ASL (most interpreters) to acquire. When asked if they noticed errors in interpreters' use of classifiers, all three students reported that the inaccurate use of classifiers (to describe spatial relationships or movement between objects or people) was especially frequent and problematic when the teacher was verbally describing a scene or picture without the aid of a diagram or model in the classroom to refer to. The students agreed that if there were a visual aid of some sort to refer to or if the relationships had previously been made clear, they could accommodate deviations in the interpreter's representation without major disruption of the message (although use of visual aids does require deaf students to make a momentary choice as to where to direct their attention). When visual aids are lacking, however, the interpreter's accuracy in the use of classifiers to specify spatial relationships becomes crucial to understanding the message, and all students reported that this type of information is frequently lost or confused through the translation process (see also Johnson, 1989). For conveying information in a visual modality such as sign language, classifiers are uniquely efficient in making use of three-dimensional space to indicate spatial relationships, quality and type of movement, or subject/object marking in a sentence. Yet the achievement of message equivalence for the accuracy and specificity of meaning conveyable in a signed form by classifiers is often impossible or cumbersome in signed English transliteration. Thus, even interpreters who work principally in a transliterated mode (as opposed to ASL) can greatly enhance the

range of communicative tools at their disposal by becoming skilled in the use of ASL classifier systems.

Misperceived "Anomalies"

The three students were also asked about "anomalies" in interpreted information (i.e., instances when the message seemed to be nonsensical or wildly divergent in context), such as those caused by the interpreter mishearing or somehow completely misunderstanding the SL utterance. All the students reported that this kind of error is difficult to identify. Student 1 said that he often sees something that looks like a deviation from the context but is never absolutely sure whether the source of the anomaly is the speaker, the interpreter, or his own comprehension. Students 2 and 3 made similar comments, emphasizing that confusion often occurs in such instances without any conscious explanation or resolution. Student 3 said that she can sometimes "hold onto" these puzzling fragments for a short time and "figure it out" in light of subsequent context in the incoming message. Both students 2 and 3 mentioned relying on their notes (taken by a hearing notetaker) to clarify or discount any anomalous deviations noticed during class. From these reports it is clear that deaf students are doing extra cognitive "work" in their processing and review of incoming information as they analyze and filter possible sources of misunderstanding coming through the interpreter.

Omission

When asked to comment on interpreter omission of information, the students made the general observation that it is difficult for deaf consumers to know for sure if something has been omitted unless they are in a position to clearly see if speech or conversation is taking place which is not being transmitted by the interpreter. Student 2, however, noted that she is sensitive to whether the interpreter has lost or is omitting information either by his/her facial expression and body cues or (sometimes) the interpreter's aside that he or she has missed something. This student also commented that she appreciates it when an interpreter takes the initiative to ask the speaker for clarification if something is not heard clearly or is an unfamiliar term, instead of simply continuing and hoping to pick up the information from context later on, as is commonly done by interpreters in those situations. Student

1 noticed that he is most aware of information omission when the speaker is following a predictable course (e.g., explaining a diagram to which she is pointing systematically, following an outline previously specified), or when other class members react visibly to something to which he was not privy, such as an aside comment or a joke that the interpreter felt unable to translate effectively and so chose to ignore.

Student 3 cited instances of interpreters beginning a sentence, then breaking off abruptly in the middle and going on to something else with no explanation or apparent cause for the lack of completion. She found this partial conveyance of information very irritating and puzzling, for she was left trying to guess what interference might have affected the reception of the source message or the interpreter's translation. Sometimes, of course, interpreters are capturing a speaker actually breaking off in mid-sentence, a not uncommon occurrence in extemporaneous speech, especially when a teacher might be performing two tasks at once (for example, writing on the board and talking). Similarly, a speaker may begin a sentence and then decide to retract or rephrase the statement part way through without signifying this in any way except with the briefest pause. At other times, particularly in discussions, it appears that an interpreter has to make choices between competing voices. An interpreter thus might begin interpreting one speaker, then suddenly become aware of an interjection and begin to interpret that voice instead, leaving the deaf consumer hanging as to what happened to the first half-utterance. When faced with competing, overlapping voices, an interpreter is also frequently unable to hear any one speaker clearly enough to continue interpreting and may therefore choose to sign fragments. These are clearly unavoidable contingencies in the interpreting process, but the implication of these students' comments is that it would be informative if interpreters would at least briefly indicate the loss of information to the deaf consumer, rather than just obscuring or ignoring it.

Interpreter's Representation of New Terms

When asked about the issue of interpreting new terminology or words for which no commonly used sign exists, students varied somewhat as to how they thought the information should be conveyed. All the students agreed that a new term must be clearly fingerspelled initially, but for repeated translation of the word they expressed different preferences. Students 1 and 3 had no objection

to an interpreter inventing a sign on the spot to be used for the duration of that class if it facilitated the smooth flow of information. However, Student 1 said that repeated fingerspelling presented no comprehension problems for him (unless the interpreter is not a proficient fingerspeller), whereas Student 3 felt that repeated fingerspelling definitely required extra decoding concentration on her part and was disruptive to the flow of the message. Student 2 felt strongly that invention of signs by interpreters exceeds the interpreter's role (and their limitations as second-language acquirers of sign language in most cases). She reported that she prefers to provide the interpreter with a sign or to quickly negotiate a translation form which is mutually acceptable to both of them to be used from then on. Some tension in attitudes and responses was evident here, between pragmatic concerns for getting the information, on the one hand, and concerns as to whether the role of an interpreter warrants creation of new lexical sign forms, on the other.

Strategies for Coping with Ambiguity

As a native ASL signer (i.e., born to deaf parents and raised with ASL as a first language), Student 1's comments reveal a willingness to tolerate and accommodate interpreter distortions to a much greater degree than Student 2 whose comments show her to be more interested in being actively involved in attaining accuracy in the interpreting process. This tendency on her part might come from her being experienced in teaching sign language to hearing people, in that she has a teacher's instructive instinct when faced with language errors. Student 3, the more English-oriented signer, also expressed a tolerance for interpreters' conceptual inaccuracy in the classroom, though it was she who reported the greatest degree of confusion and ambiguity in the messages she perceived in class, a response which was consistent with the low estimates for overall comprehension she gave in Question 1. Of course, since tolerance levels for ambiguity vary from individual to individual, this might also be a factor in coping with interpreter distortion, aside from language preference or degree of bilingualism.

The experiences of these deaf students correspond with Cokely's (1985) assertion that transliteration is only viable for bilingual consumers because "transliterations . . . require that TL consumers understand the SL form in order to understand the intended SL meaning . . . the strategy merely places the burden of

coping with SL message form on the TL consumers" (pp. 220-221). This burdening effect is even more apparent when the transliteration or interpretation is conceptually inaccurate at the lexical level. The ability to decode transliteration is thus clearly contingent upon familiarity with the forms and structures of the two languages involved (in this case, English and ASL), but consumers also apparently need to be able to extrapolate meaning from partial, incomplete, or distorted forms of both languages, which comprise a substantial portion of the TL message in signed transliteration.

Overall Interpreting Preference

Finally, when asked to make an overall choice between an interpreter who is a proficient transliterator, conveying every word uttered in class but in a less fluent signing style, and an interpreter who translates concepts and structures into more ASL-like forms, but is fluent and comfortable to watch, all three students unhesitatingly said they would pick the latter. Student 1 remarked that no matter how accurate a transliterator may be, if the transliterated message produced is visually boring to watch, the deaf consumer will be unable to focus attention and will lose the information in the long run, despite the interpreter's diligence in conveying every word. Such comments support the view that "where conceptual exchange between teacher and student is far more crucial than proper language exposure, the interpreter should be sensitive to and in tune with Deaf students' maximum comfort in regard to communication mode" (Fleischer, 1975, p. 75).

CONCLUSION

Given that Fleischer's suggestion appeared in 1975 , it might seem redundant to be citing new data that supports the same conclusion. Yet, the results of this small study reveal an anachronistic reality in which at least a proportion of interpreters are still making the same kinds of mistakes fifteen years later. One major difference between now and then, however, is that an increasing number of deaf students are entering mainstream universities for study at all levels. The issue of an interpreter's ability to convey accurate and equivalent information to deaf students has thus become even more crucial than in the mid-1970s, when studies on interpreter effectiveness in the classroom were just emerging. Another difference is that today there exists a larger body

of research, information, and expertise in the field of sign language linguistics and interpreting, all of which could be more effectively applied to improving interpreters' understanding and performance of their important task.

This study has reiterated the observation that the most conspicuous problem arising in transliteration is the transfer of source language forms rather than meanings into the signed modality. This problem involves three main challenges for the interpreter: (1) complete comprehension of the meaning of the source language message; (2) accurate selection of equivalent lexical forms for expressing that meaning in the target language; and (3) whether the task is approached as simply coding or as one which requires mental processing identical to interpreting, i.e., analysis of meaning at the phrasal and textual level. If this third question of interpreters' perception and practice of their task would be more thoroughly grounded in research, the answer could be applied to interpreter preparation, and specifications for the requisite skills of a "qualified" interpreter might be better defined. Once accomplished, this definition of the interpreter's task and reorientation of training goals might then lead to eventually redressing the first two problems.

It should be noted that when the interpreters in this study were interviewed, they seemed to find the analysis of their errors to be enlightening and even surprising in many cases. The interpreters were challenged to question what interpreting decisions they had been making and why, and they found this interaction with a critical observer to be productive. Their reactions suggest that regular external feedback could significantly enhance interpreters' awareness and monitoring of meaning equivalence. Many interpreters no doubt know this, but they can't, don't, or won't put this knowledge into practice, to the probable ongoing detriment of deaf consumers. Unfortunately, the kinds of errors considered here to be avoidable by improved training are those which result from the lack of intuitive judgments about semantic equivalence, which accompanies a lack of second language proficiency/experience. This is a familiar problem to teachers of foreign languages, but it is even more crucial for professionals working between two languages, for the success or outcomes of communication rest partly on their lexical decisions (among other factors, of course).

In addition, this study shows that the perspectives on sign language interpreting/transliterating gained from interviews with deaf students are informative, both in terms of their common

observations and of the individual variation in responses that they reflect. Indeed, research that elicits this sort of consumer feedback can be of benefit both to deaf consumers and to interpreters working in educational settings. The combination of presenting interpreters with the type of errors analyzed in this study and of eliciting feedback from deaf students about distortions they perceive in transliterated information may be just the kind of stimulus required to jolt interpreters and interpreter educators into addressing more analytically the problem of semantic equivalence in interpreter education.

Notes

[1]The dynamics of how, where, and why code-switching occurs spontaneously between ASL and English-like forms of signing by deaf and hearing signers is treated at length in Lucas (1989, Chapter 1).

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APPENDIX A: ERROR DATA

Key:
indicates a fingerspelled word
parenthetical remarks provide contextual and semantic explanations
++ indicates repetition of a sign to show continued progressive aspect

Misperceived Errors

it says "title"-- "give title"	NOT STEAL IT--TITLE
describe the hypothesis, subjects, method	DESCRIBE FIVE OFFICES, TITLE (*subject heading*), METHOD
I talked to a lady--she said	ME TALK TO BOY BOY SAY
I'm not saying this is pedagogically defensible--vocabulary in context and so on--obviously you don't have to draw pictures on the screen	ME NOT-KNOW HOW PUT IN ALL WORDS BUT OBVIOUS NEED USE WORDS BUT NOT HAVE-TO DRAW
share-ware (*computer*) programs	CHAIR #W-A-R-E PROGRAM
These (*computer programs*) are written for a college audience	THIS WRITE FOR COLLEGE FOOTBALL
then it's very difficult for me to give you anything but zero for that problem	THEN VERY HARD FOR ME GIVE ZERO POINTS THAT PROBLEM
but he did it, he came up with--any questions about retrograde motion--just the idea?	BUT HE #D-I-D #I-T--KNOW ANY IDEA ITSELF CONNECT (*about*) #R-M (*affirmative head nod*)
The reason this trick works for drawing ellipses	#S-T-O-R-Y WORK--BECAUSE
sociolinguistics--the study of national identity and what language you do your paper-work in--it's very interesting. It's a whole kettle of worms	SOCIOLINGUISTICS--CONNECT SOCIETY LANGUAGE--WHICH PAPER WITH--WHOLE QUOTE #K-E-T-T-L-E #O-F WORMS
in more traditional societies it works better than ones that show obvious variation on the surface	NOT ALWAYS SHOW VARIATION SURFACE
several disparate groups	SEVERAL DESPERATE GROUPS

Semantic Sign-Choice Errors

have a certain predisposition	HAVE SPECIFIC POSITION
that implies	THAT IDEA
an abiding personality type	OBEDIENT PERSONALITY

I wasn't having much luck with it	ME NOT LUCKY
My hobby is amateur radio	#A-M-A-T-E-U-R-E--BEGINNER RADIO
the phones were down (*because of the earthquake*)	PHONE BANKRUPT/FOLD
The hospital was a mess	HOSPITAL TERRIBLE
Dennis has given us a little cognate	#D-E-N-N-I-S GIVE LITTLE-BIT HELP
I called at 8pm, at that time they didn't know	ME CALL TIME 8--BEFORE (*long time ago*) THEY NOT-KNOW
(*pointing to sentence on blackboard*) If you have two spaces here	IF TWO (*hits thumb as on typewriter spacebar*)
It's something like a tree--a branching out kind of program, with options--you can see how it has a tree pattern, where if you pick one thing you get something else down below	SAME TREE (*upright tree sign*)--OPTIONS--TREE (*makes action of selecting from tree fingers, in upward direction*)
translate to Spanish	BECOME SPANISH
So--how are you doing with this?	#S-O--WHAT'S UP? (*informal ASL greeting = how are you?*)
a "how to" kind of outline	HOW TO (*directional*) KIND OUTLINE
argumentative type of writing	ARGUE (*two persons*) KIND WRITE
Most molecules can be made into a solid	MOST MOLECULES CAN SHAPE SOLID
If I'm going to handle it I need to wear a mitt	IF GOING CONTROL NEED GLOVE
we'll see if we can get it (*the experiment*) to behave	SEE IF CAN CONTROL #I-T
in the meantime	LATER
We can guess the amount of oxygen	CAN GUESS HOW-MANY (*question form*) #O-X
in small amounts	IN SMALL COUNTS
We get a chemical reaction	GET CHEMICAL RESPONSE (*reply*)
carbon compounds	#C-A-R-B-O-N PARTS--#C-O-M-P-O-U-N-D-S
has the same properties	HAVE SAME PARTS

This process absorbs heat	THIS PLAN ABSORB HEAT
on a similar vein to these questions	ON SAME WAY THIS QUESTIONS
Let's hope he comes through on that (*marking the homework*)	HOPE HE SHOW-UP
There have been--historically--two major advances in theories of gravity	#H-A-V-E #B-E-E-N 2 THEORY RAISE-LEVEL IN GRAVITY
So--if you're not careful you'll conclude that Mars is moving from left to right, which is actually backwards to the direction Mars is going	NOT CAREFUL YOU THINK #M-A-R-S ITSELF MAYBE LEFT (*sign moves left-to-right across sign space*) NOT (*negative headshake*) BACK (*over shoulder*) FROM MARS #I-S- GO
their profit orientations	THEIR PROFIT KNOWLEDGE-EXPERIENCE
had certain symbolic advantages	HAVE SYMBOL TAKE-ADVANTAGE-OF (*rip-off*)
Most churches are English-dominated	MOST CHURCH ENGLISH CONTINUE
allows them to reformulate (*culture*)	ALLOW AGAIN--FORMULA (*math*)
you disenfranchise many people	DISCONNECT MANY PEOPLE
it relieves the burden of having to know	OFFER--TAKE RESPONSIBILITY PEOPLE MUST KNOW
shared, articulated set of goals	SHARE, SPEECH SET-UP GOALS
substantial sharing of cultural knowledge in general	#S-U-B-S-T-A-N--ENOUGH SHARE INFORMATION GENERAL
general cognitive sharing and non-sharing about cultural knowledge	GENERAL UNDERSTAND++SHARE AND NOW SHARE ABOUT KNOWLEDGE
takes a point of view	SET-UP POINT LOOK-AT-PERSON
He was combatting a dominant view at the time	HIMSELF AGAINST TIME (*period*)
this idea that there's an ideal personality	IDEA THAT HAVE SPECIFIC TASTE--ALL MATCH ONE
we can assume that	WE CAN TAKE-UP/ADOPT THAT
Around the 9th century	AROUND (*encircling*) 9TH #C-E-N-T-U-R-Y
a major battle	MOST BATTLE
since this is (*because*)	SINCE (*time passing*)

What does that remind you of?	WHAT THAT REMIND (*tap shoulder/get attention*) YOU #O-F?
Someone's hoarding them!	SOME ONE COLLECT++HOLD
they managed to destroy	THEY MANAGE (*control*) DESTROY
it was largely in the process of	LARGE PROCESS #O-F
that very behavior is	THAT VERY (*intensifier*) BEHAVIOR
this cylinder will turn it upside down on top of the candle burning here	(*CLASSIFIER hold tubular shape and upturn*) TOP #O-F #C-A-N-D-L-E
The test will be 8 to 10 questions	TEST WILL #B-E- 8 TO (*directional*) 10 QUESTION
an expository, narrative outline	CONVERSATION OUTLINE
Have you tried to write?	HAVE (*possessive*) YOU (*plural*) TRY WRITE?
Have you looked at that program?	HAVE (*possessive*) YOU (*plural*) FINISH READ?
and so will the midterm	#S-O WILL MIDTERM
This was made into a solid	THIS MAKE IN SOLID
now I'm going to take a liquid	NOW ME GO TO (*directional*) TAKE #L-I-Q-U-I-D
it will change into a gas	WILL CHANGE IN GAS
how complicated it must have been for Kepler	HOW COMPLEX MUST (*modal*) HAVE (*possessive*) #B-E FOR #K-E-P-L-E-R
You might have noticed	YOU MAYBE HAVE (*possessive*) NOTICE

APPENDIX B: INTERVIEW QUESTIONS FOR DEAF STUDENTS.

1. Approximately what percentage of a lecture do you feel you understand through an interpreter?
2. Does the type of subject (e.g., a more technical subject) make a difference as to how well the interpreter can get the information across?
3. Do you ever notice that interpreters make errors?
4. Do any *kinds* of interpreter errors bother you in particular?

For example:

(i) Interpreter uses wrong sign, e.g., EVERYDAY instead of SAME to mean something *in common.*

(ii) Interpreter signs English grammatical words that have no meaning in ASL, e.g., MUST HAVE (*possessive*) BEEN VERY DIFFICULT.
(iii) Interpreter wrongly uses ASL classifiers to indicate visual elements such as diagrams (e.g., wrong direction or placement).
(iv)Interpreter mishears/misunderstands then signs something anomalously out of context.
(v) Interpreter omits information, comments, etc.

5. If an unfamiliar word comes up in the lecture, do you prefer the interpreter to fingerspell or make up/approximate a sign for it, or do you tell the interpreter what to sign?
6. What do you do when you think the interpreter has made an error? Can you make sense of the message?
7. Which is more important to you: (i) that the interpreter accurately signs absolutely everything said in class in the same order it was said, or (ii) that the interpreter translates the ideas and language in a way that is more ASL-like, but is fluent and comfortable to read?

Rachel Locker, a native of New Zealand, is a doctoral student in applied linguistics at UCLA, from where she also holds an M.A. in TESL. As a professional sign language interpreter, she has practiced in New Zealand as well as in the United States. Her research interests include second language acquisition of signed languages by hearing people, acquisition of English by deaf people, New Zealand sign language (NZSL) research, and analysis of the interpreting process.