Sign Language Interpreters: Simultaneous Interpreting and Memory

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Abstract

This research examines the relationship between the interpreting process and content retention. Sign language interpreters simultaneously interpret two narratives: one from spoken English to American Sign Language (ASL) and the other from ASL to spoken English. The interpreters are tested on their retention of the content of each narrative after completing the task. The interpreters' scores are compared to the scores of two control groups. The results show that the "listeners" have better overall retention of content than the interpreters, regardless of the direction of the interpretation. When the interpreters are divided according to language background, differences are found. Interpreters who grew up with sign language exposure may have an advantage over interpreters who learn sign language later in life. The results show that the interpreters who grew up with sign language score higher on overall retention than the interpreters who learn sign language as a second language.

Introduction

Sign language interpreting is a multi-task process. The interpreter must receive the source language, analyze it for meaning, determine an idiomatically equivalent target message, produce that target, and monitor that target as the input of a new source message starts the cycle all over. Often the interpreter is performing these tasks simultaneously. With the sheer volume and complexity of information that is handled during the interpreting process, one wonders how much of that information the interpreter is able to retain after the fact. Does the interpreting process impede the formation of memory? How accurately and how much of the message content can the interpreter remember after completing the task of simultaneously interpreting that content into another language?

Some understanding of human memory is necessary in

order to discuss the relationship between retention and the interpreting process. Current theory represents human memory as a process that occurs in stages. The first stage is the sensory register. All stimuli from the physical world enter the human mind through the five senses. At this stage, information is imprinted in the sensory register as a perfect and identical representation of the original stimulus. Unfortunately, this representation only lasts one to two seconds. Information that does not go on to the next stage of memory decays and is lost (Wingfield & Byrnes, 1981).

The second stage of human memory is short-term memory (STM). All conscious processes occur in STM. This stage acts as a filter for the infinite amount of information that enters the sensory register. STM is estimated to hold from five to nine chunks of information for approximately 18 seconds. Stimulus that is emotionally charged, interesting, or consciously attended to moves into STM. In this stage, one can rehearse the information by thinking about it or mentally repeating it. Through this conscious cognitive action, the stimulus is retained in STM. If the information is not rehearsed or attended to, it is forgotten (Wingfield & Byrnes, 1981).

With rehearsal or attention, information can enter the third stage of human memory known as long-term memory (LTM). LTM is thought to fall into two categories. The deliberate attempt to memorize information is called effortful memory. Information that is emotionally charged or significant to the individual seems to enter LTM automatically via a process called effortless memory. All knowledge and skill is contained in LTM. LTM is believed to be limitless in both capacity and duration (Wingfield & Byrnes, 1981).

Information is processed in STM and potentially stored in LTM. Stored information is retrieved from LTM and brought to conscious awareness in STM. The failure of information to enter LTM can be the result of competing processes in STM. If multiple stimuli are present in STM, the information not attended to will be lost (Wingfield & Byrnes, 1981).

The interpreter's task requires the use of both STM and LTM. There is an equilibrium of information flow that must be maintained by STM in which new information continuously enters and replaces the old. If processing time is too long or too much information is present in STM, then information will be lost (Cokely, 1992). This idea seems to describe the continuous

turnover of stimuli experienced during the interpreting task. It suggests that there is little opportunity for rehearsal in STM and encoding in LTM. Robinson (1987) states that lag time in the interpreting process relies on STM capacity and that there is coordination with LTM to retrieve the meaning of stimuli as it enters STM.

If there are at least two processes occurring at the same time in STM during the interpreting task, can the interpreter attend to all of the information adequately enough for it to be encoded in LTM? It might seem that incoming source messages and outgoing target messages would compete for the interpreter's attention in STM. Some information may be of particular interest to the interpreter and effortlessly encoded in LTM. In theory, the interpreter would have to make some kind of effort to encode any neutral information in LTM.

Literature Review

There are three standard measures of information retention: recall, recognition, and relearning. Recall requires the retrieval of specific items from LTM. "Fill-in-the-blank" tests, in which one must retrieve the correct data on demand, are commonly used to assess recall (Bolles, 1988; Wingfield & Byrnes, 1981). Recognition is usually based on a sense of familiarity with an item. Multiple-choice tests, in which one must choose the correct item from a group of potential answers, are often used to assess recognition. A third measure of memory is the phenomenon of relearning. To test this, the time it takes for a subject to learn new information is recorded. When it appears that the material is forgotten, the subject relearns the information and the time is again recorded. The fact that subjects typically relearn the information in a shorter period of time is attributed to memory (Wingfield & Byrnes, 1981).

It is unclear what, if any, relationship exists between recall and recognition. It has been proposed that recall and recognition are different stages of the same process. Recognition is often considered to be the easier task. It is one thing to know a face in the crowd (recognition) and another thing to put a name to that face (recall). Overall, memory is better if the stimuli are organized and have meaning. The basis of human memory is order and meaning. Random, nonsensical stimuli are not conducive to either recall or recognition. Recall is thought to be

more order-dependent since one may have to go through a chronological series of memories before arriving at the desired piece of information. Recognition is thought to be more context-dependent in the sense that retrieval is more successful if associated stimuli are also present (Bolles, 1988). It is sometimes harder to recognize a co-worker encountered in a non-work environment.

It has also been proposed that recall and recognition are separate processes. However, recall is still considered to be the harder task and one that requires more effort. Recognition is viewed as automatic retrieval that is triggered by associated stimuli (Wingfield & Byrnes, 1981). Being an automatic process, recognition would be faster and more accurate than recall (Arnold, 1984).

Some research on the interpreting process of spoken languages and memory has been done. There are opposing theories on the accuracy and amount of source information that the interpreter retains in LTM after completing the interpreting task. The goal of much of the research has been to establish if the interpreting process, by its very nature, interferes with the formation of LTM or reinforces it (Ingram, 1992).

After the interpretation of a cohesive discourse, recall may be fairly good because strong coherence implies sense and meaning, which aid LTM. However, it is possible that the incoming source message interferes with the encoding of the preceding message in LTM (Robinson, 1987). There is some speculation that language interpreters retain very little of the content that they interpret. Mahmoodzadel (1992) proposes that it is almost impossible for the interpreter to remember the message content because the interpreting process occupies too much of the interpreter's STM capacity to allow for proper encoding in LTM. Daro (1989) states that the interpreter is not motivated to remember the message and that the interpreter's attention is so divided during the task that the information is not stored in LTM.

Another theory suggests that bilingual persons may have better retention than monolingual persons (LeNy, 1978). Because of the nature of their work, all interpreters are bilingual. The suggestion is that bilinguals have two separate memory systems; one for each language (O'Neil, Roy & Tremblay, 1993; Paivio & Begg, 1981). In theory, when the bilingual interprets from one language to another, both memory systems are

activated and have a commonality on the semantic level. Recall by a bilingual person, with two memory systems, would be better than recall by a monolingual person, in which only one memory system can be activated. It is believed that the utilization of two memory systems makes for stronger memory and increases the likelihood of retrieval (Paivio & Begg, 1981).

Typically, research on the interpreting task and memory is based on a comparison of listening versus interpreting. That is, a subject's retention is tested after a single task (listening to information), and a subject's retention is tested after a dual task (interpreting information). Others have compared retention after shadowing tasks with retention after interpreting tasks. The results of studies can seem contradictory. Daro (1989) finds no significant difference in subjects' ability to retain information in LTM after either interpreting tasks or shadowing tasks. It has been suggested that the depth of processing involved in a task is directly related to retention. A study found that recognition after listening or reading is better than recognition after interpreting or sight translating. The rationale is that one could devote full attention and processing capacity to the single task of listening or reading. The dual task of interpreting or sight translating divides one's attention and processing capacity, which is not conducive to retention (Viezzi, 1990). On the other hand, it is suggested that the recall and recognition of interpreted information is greater than the recall and recognition of shadowed information (ONeil, Roy & Tremblay, 1993).

Lambert (1989) studied the recognition and recall of interpreted information immediately following a task. Listening, as a single task, was used as the control condition. The listener can devote full attention and processing capacity to the task. Simultaneous interpreting is a complex task in which one must analyze both message input and output. Surprisingly, recall after listening and simultaneous interpreting was found to be equivalent. Recognition after listening was significantly better than recognition after simultaneous interpreting. It would seem that the dual task of simultaneous interpreting interferes on some level with the depth of processing that is possible (Lambert, 1989).

There is a limited amount of research that focuses on sign language interpreting (versus spoken language interpreting) and memory. Ingram (1987) found that content recognition

improved after interpreting or transliterating sign language. These tasks involve a deeper level of processing, which leads to stronger retention. Later, Ingram (1992) compared retention after listening tasks, interpreting tasks, and shadowing tasks. Recall after the single task of listening was best. Recall after the interpreting task was better than recall after the shadowing task. The recognition of meaning was better than the recognition of form regardless of the task involved. Overall, the recognition of meaning after interpreting and transliterating sign language tasks was better than recognition of meaning after the listening task. The results suggest that the two languages use separate memory capacities and that two memory capacities reinforce one another to produce better retention of content (Ingram, 1992). Isham and Lane (1993) suggest that the act of sign language interpreting immediately involves LTM during semantic processing. They found that recall is equal for listening tasks and interpreting tasks because both occur at the semantic level.

Research Questions

The original question remains: What relationship is there between the interpreting process and post-task memory? The field of sign language interpreting is bi-directional by its very nature. The published research on sign language interpreting and content retention does not address the potential differences that may exist because of this situation. Lambert (1989) comments that spoken language interpreters typically work from their second language ("B" language) to their native language ("A" language). This is one of the most striking differences between sign language and spoken language interpreting. Sign language interpreters are required to work both from their "B" language into their "A" language and from their "A" language into their "B" language. Seleskovitch (1978) concurs that the simultaneous interpreter usually cannot successfully work into the "B" language; he/she generally does not perform as well when working into the second language. Simultaneous interpreting can only be done properly into one's native language unless one is a true bilingual (Seleskovitch, 1978). The current study will address the issue of content retention after the interpreting process versus retention after a "listening" task. This study will also deal with the issue of content retention and the interpreting process in terms of the direction of the interpretation.

Methodology

Two videotapes were recorded for this research, one in ASL and the other in spoken English. A female, native signer provided the ASL narrative and described a series of anecdotes from her childhood. A female, native speaker of English provided the spoken English narrative and told a child's story. Both videotape segments were approximately 13 minutes in length. An 18-question test was created based on the content of each narrative. Each test consisted of a balanced mix of "fill in the blank" and multiple-choice questions. The "fill in the blank" type questions required the recall of specific information and the multiple-choice type questions required the recognition of familiar information, (Bolles, 1988). The tests were graded to determine the percentage of correct recall and recognition of semantic information from the narratives.

The interpreters were asked to simultaneously interpret the narrative and take the respective test for that narrative immediately upon completion of the task. Then the same format was followed for the second narrative. Each interpreter was provided with an "audience": a Deaf person for the spoken English to ASL condition and a hearing person for the ASL to spoken English condition. One interpreter did not have a Deaf "audience" for the spoken English to ASL condition, but that interpreter's scores seem to be compatible with the other participants in the study.

Two control groups of "listeners" were included for comparison purposes. Three Deaf listeners watched the ASL narrative and took the same test as the interpreters did. Three hearing listeners watched the spoken English narrative and took the same test as the interpreters. All participants were told of the nature of the study and given the same background information. The interpreters' scores were compared to the control group scores for the respective conditions. The interpreters' scores were also compared within group for the respective tasks.

Subjects

Nine interpreters participated in the study. All of the interpreters held either the RID Comprehensive Skills Certificate (CSC), the Certificate of Interpreting (CI), or both. Four of the interpreters stated that their first language is ASL/sign language and spoken English. One interpreter listed Spanish and English as first languages. The four remaining interpreters identified spoken English as their first language. There were five females and four males. The interpreters in the study indicated that they had studied sign language for a range of 5 to 25 years. Two stated that they had studied it all their lives. The participants had been interpreting for a range of 5 to 20 years. One stated that he/she had interpreted all his/her life.

The three Deaf "listeners" in the control group were all female and fluent signers. The three hearing "listeners" in the control group included two females and one male. All of the "listeners" were asked to watch only the respective narrative for their group (a single task).

Results

The interpreters' scores were compared to the appropriate control group scores depending on the direction of the interpretation. The nine interpreters simultaneously interpreted the ASL narrative to spoken English and received a total mean score of 80% content retention. The Deaf control group's total mean score was 84% retention for the ASL narrative. These scores can be sub-divided for recall and recognition. The total mean score for recall was 78% by the interpreters and 80% by the Deaf control group. The total mean score for recognition was 83% by the interpreters and 89% by the Deaf control group. The "listeners" did better on all measures than the interpreters. Both groups did better with recognition than recall, as theory would predict (see Tables 1 and 2).

Table 1
Deaf "Listeners": ASL Narrative

	Recall	Recognition	Total Retention
Listener #1	61%	78%	69%
Listener #2	78%	100%	89%
Listener #3	100%	89%	94%
Group Mean	**80%**	**89%**	**84%**

Table 2
Simultaneous Interpreting: ASL to Spoken English

	Recall	Recognition	Total Retention
Interpreter #1	56%	78%	67%
Interpreter #2	89%	89%	89%
Interpreter #3	78%	78%	78%
Interpreter #4	89%	78%	83%
Interpreter #5	89%	89%	89%
Interpreter #6	56%	78%	67%
Interpreter #7	78%	78%	78%
Interpreter #8	100%	89%	94%
Interpreter #9	67%	89%	78%
Group Mean	**78%**	**83%**	**80%**

Tables 3 and 4 provide summary data on how the interpreters and "hearing listeners" compared in dealing with spoken English. The nine interpreters simultaneously interpreted the spoken English narrative to ASL and received a total mean score of 71% content retention. By comparison, the hearing control group's total mean score was 82% for the spoken English narrative. The total mean score for recall was 68% by the interpreters and 83% by the hearing control group. The total mean score for recognition was 74% by the interpreters and 80% by the hearing control group. Again, the "listeners" did better on all measures than the interpreters. The interpreters did better with recognition than recall, and the "listeners" did better with recall than recognition.

Table 3
Simultaneous Interpreting: Spoken English to ASL

	Recall	Recognition	Total Retention
Interpreter #1	33%	72%	53%
Interpreter #2	67%	100%	83%
Interpreter #3	94%	67%	81%
Interpreter #4	72%	67%	69%
Interpreter #5	72%	67%	69%
Interpreter #6	67%	78%	72%
Interpreter #7	61%	89%	75%
Interpreter #8	72%	78%	75%
Interpreter #9	78%	44%	61%
Group Mean	**68%**	**74%**	**71%**

Table 4
Hearing "Listeners": Spoken English Narrative

	Recall	Recognition	Total Retention
Listener #1	78%	94%	86%
Listener #2	94%	67%	81%
Listener #3	78%	78%	78%
Group Mean	**83%**	**80%**	**82%**

Based on the background information gathered for this research, the interpreters can be divided into two groups and their scores can be compared. Four interpreters noted that they had been exposed to ASL or some sign language all of their lives. Five interpreters can be more formally described as second-language learners of ASL.

The four interpreters who grew up with ASL or sign language had a total mean score of 88% content retention when working from ASL to spoken English. Their total mean score for recall was 89% and the total mean score for recognition was 86% for this condition (see Table 5). When working from ASL to spoken English, the five interpreters who learned ASL as a second language had a total mean score of 75% content retention. For this condition, their total mean score for recall was 69% and the total mean score for recognition was 80% (see Table 6).

Table 5
Simultaneous Interpreting: ASL to Spoken English
Grew up with ASL or Sign Language

	Recall	Recognition	Total Retention
Interpreter #2	89%	89%	89%
Interpreter #3	78%	78%	78%
Interpreter #5	89%	89%	89%
Interpreter #8	100%	89%	94%
Group Mean	**89%**	**86%**	**88%**

Table 6
Simultaneous Interpreting: ASL to Spoken English
Learned ASL as a Second Language

	Recall	Recognition	Total Retention
Interpreter #1	56%	78%	67%
Interpreter #4	89%	78%	83%
Interpreter #6	56%	78%	67%
Interpreter #7	78%	78%	78%
Interpreter #9	67%	89%	78%
Group Mean	**69%**	**80%**	**75%**

The four interpreters who grew up with exposure to ASL or sign language had a total mean score of 77% content retention when working from spoken English to ASL. Their total mean score for recall was 76%, and the total mean score for recognition was 78% for this condition (see Table 7). When working from spoken English to ASL, the five interpreters who learned ASL as a second language had a total mean score of 66%. Their total mean score for recall was 62%, and the total mean score for recognition was 70% for this condition (see Table 8).

Table 7
Simultaneous Interpreting: Spoken English to ASL
Grew up with ASL or Sign Language

	Recall	Recognition	Total Retention
Interpreter #2	67%	100%	83%
Interpreter #3	94%	67%	81%
Interpreter #5	72%	67%	69%
Interpreter #8	72%	78%	75%
Group Mean	**76%**	**78%**	**77%**

Table 8
Simultaneous Interpreting: Spoken English to ASL
Learned ASL as a Second Language

	Recall	Recognition	Total Retention
Interpreter #1	33%	72%	53%
Interpreter #4	72%	67%	69%
Interpreter #6	67%	78%	72%
Interpreter #7	61%	89%	75%
Interpreter #9	78%	44%	61%
Group Mean	**62%**	**70%**	**66%**

Discussion

As a group, the nine interpreters had better retention when working from ASL into spoken English than when working from spoken English into ASL (80% versus 71%, respectively). For both conditions, the control groups received higher scores than the interpreters as a group for both recall and recognition. These results might suggest that the complex task of interpreting, regardless of the direction, created more interference to content retention than the single task of listening. However, that tendency is not quite so clear when the nine interpreters are divided according to language background.

Theory states that interpreters will perform better when working into their native language (Seleskovitch, 1978). One might expect the five interpreters who learned ASL as a second language to score higher on content retention when working from ASL (B language) into spoken English (A language). The

results support this assumption (75% versus 66% when working from spoken English into ASL). These five interpreters scored higher on recognition than recall regardless of the direction of their interpretation. This result would fit the assumption that recognition is an easier task than recall. Both control groups did better than the five interpreters on all measures of retention. Hearing "listeners" had a total mean score of 82%, and Deaf "listeners" had a total mean score of 84%.

The four interpreters who grew up with exposure to ASL or sign language also scored higher on content retention when working from ASL into spoken English (88% versus 77% when working from spoken English into ASL). These four interpreters scored slightly better on recognition than recall when working from spoken English to ASL. They scored slightly better on recall than recognition when working from ASL into spoken English. Hearing "listeners" scored higher on all measures of retention than these four interpreters when working from spoken English into ASL (82% versus 77%, respectively). When working from ASL into spoken English, the four interpreters scored higher overall than Deaf "listeners" (88% versus 84%, respectively).

The study made use of videotaped narratives to ensure consistency of the source messages. Some of the interpreters who participated commented that in a live situation they might have asked for repetition of information or asked the speakers to slow down. All of the participants agreed that the videotape quality for both narratives was clear and satisfactory. No evaluation of the quality of the interpretations was included in the scope of this study. Additionally, there was no determination if failure to retain information by any of the subjects was due to actual forgetting or a lack of source comprehension. All memory tests were administered in written English. It is unknown what impact other modalities of presentation might have produced. All tests were administered immediately upon completion of the task. It is unknown if retention scores would have been consistent over time. The source narratives were assumed to be equitable enough for comparison, and the respective tests were assumed to be of equal difficulty.

Conclusion

The results suggest that the process of simultaneous sign

language interpreting may interfere with the retention of content. This interference may be more prominent when the interpreter is working from spoken English into ASL. As a group, the interpreters had better retention of content when working from ASL into spoken English. Those interpreters who grew up with exposure to ASL or sign language appear to have an advantage over interpreters who learn ASL as a second language. Interpreters who grew up with ASL or sign language scored higher on all measures of retention than interpreters who learned ASL as a second language, regardless of the direction of the interpretation.

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Saving Face: The Interpreter and Politeness

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An ASL version of this paper is available on videotape (signed in ASL by the author). Those interested should send 1) a blank VHS videotape cassette and 2) a large self-addressed stamped envelope (in which to return the videotape) to: Jack Hoza, Director, Sign Language Interpretation, UNH-Manchester, 400 Commercial Street, Manchester, NH 03102. (Note: Requests can only be honored during the academic year—Sept. 1 through May 15.)