

The proposed role of suppression in simultaneous interpretation

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In this paper we suggest that the cognitive mechanism of suppression attenuates interference in many language comprehension phenomena, and is particularly crucial when comprehension must share processing capacity with other cognitive tasks, as is manifestly the case in simultaneous interpreting. During lexical access, the mechanism of suppression attenuates the interference caused by the activation of other lexical information, such as the inappropriate meanings of homonyms. During anaphoric reference, the mechanism of suppression attenuates the interference caused by the activation of other potential referents. In this way, the referent to which the anaphor does refer becomes the most activated concept. During syntactic parsing, the mechanism of suppression attenuates the interference caused by a previous syntactic form. During metaphor comprehension, the mechanism of suppression attenuates the interference caused by a literal interpretation. During inferencing, the mechanism of suppression attenuates the interference caused by an initial but inappropriate inference. We propose therefore that suppression — a general, cognitive mechanism that attenuates interference — plays a crucial role in language comprehension and simultaneous interpretation.

The proposed role of suppression in simultaneous interpretation

To understand the cognitive processes and mechanisms that underlie language comprehension Gernsbacher (1990; 1991; 1995; 1997) developed the Structure Building Framework. According to the Structure Building Framework, the goal of comprehension is to build coherent mental representations or *structures*. These structures represent clauses, sentences, paragraphs, passages, and other meaningful units. To build these structures, first, comprehenders lay foundations for their mental structures (Carreiras, Gernsbacher, & Villa, 1995;

Gernsbacher & Hargreaves, 1988; Gernsbacher & Hargreaves, 1992; Gernsbacher, Hargreaves, & Beeman, 1989). Then comprehenders develop their mental structures by mapping on information, when that incoming information coheres or relates to the previous information (Deaton & Gernsbacher, in press; Gernsbacher, 1996; Gernsbacher & Givón, 1995; Gernsbacher & Robertson, 1992; Haenggi, Gernsbacher, & Bolliger, 1993; Haenggi, Kintsch, & Gernsbacher, 1995). However, if the incoming information is less coherent, comprehenders employ a different process: They shift and initiate a new substructure (Foertsch & Gernsbacher, 1994; Gernsbacher, 1985). So, most mental representations comprise several branching substructures. However, whenever we comprehend language, we experience various types of interference; therefore, successful comprehension involves successfully attenuating or inhibiting such interfering information. Gernsbacher (1997) has argued that a particular cognitive mechanism, what she calls the cognitive mechanism of suppression, reduces such interference. In her research, she has empirically illustrated the crucial role that suppression plays in many comprehension phenomena. Indeed, the role is so crucial that persons who are less skilled at comprehension are marked by less efficiency in suppressing or inhibiting interfering information.

In this paper, we review the research that Gernsbacher has previously reported and we apply the findings to a more complex form of comprehension: simultaneous interpretation. We consider simultaneous interpretation more complex because it goes beyond comprehension; it involves simultaneous comprehension, translation, and production. Clearly every simultaneous interpretation task invites many sources of interference. We shall illustrate a few of those successful and failed attenuations of interference during interpretation and use our illustrations as support for our proposed role of suppression. Whereas Gernsbacher's data that we use as our starting point were based on hundreds of undergraduate psychology majors in laboratory conditions, the illustrations that we use as our evidence come from one, a few, or at most a handful of interpreters and participants in interpreting experiments. However, we consider those illustrations case studies rather than anecdotes, and while Gernsbacher's laboratory data might be more scientifically reliable, the interpreting examples we present here have more ecological validity. Let us begin our review and comparison.

Suppressing lexical interference during comprehension

Lexical access refers to the process by which listeners and readers select (or "access") from their mental lexicons the meanings of the words that they hear and read. Gernsbacher (1997) has argued that during lexical access, the cognitive mechanism of suppression attenuates the interference caused by other lexical information that is activated when a printed word is read, or a spoken word is heard. Such information might be the meanings of a word that are not relevant to the immediate context — for example, the saloon meaning of *bar* in the pun *Two men walk into a bar and a third man ducks*. Or the interfering information might be other words or phrases that are related to the sound pattern of a spoken word or phrase, as in the classic *new display* often erroneously interpreted as *nudist play*.

Most models of lexical access propose that multiple types of information are activated when we read or hear a word; however, research demonstrates that the mechanism of suppression dampens the activation of the unnecessary information. For example, in a series of laboratory experiments, Gernsbacher and Faust (1991b) empirically demonstrated that suppression and not decay reduces the activation of inappropriate meanings. That is, reduced activation of inappropriate meanings over time is not due simply to their fading with time. Gernsbacher and Faust (1991b) also empirically ruled out a mental "winner takes all" explanation: When inappropriate meanings become less activated it is not because the more appropriate meanings have become more activated. Rather the source of the activation reduction comes from a higher level. Indeed, using a parallel distributed processing network, Gernsbacher and St. John (in press) computationally demonstrated how sentence-level suppression can dampen the activation of contextually inappropriate word meanings. In this connectionist network, suppression driven by a sentence-level representation, what St. John refers to as a gestalt level of representation, was the only type of top-down feedback that was allowed, and that one source of top-down suppression allowed a perfect simulation of the behavioral data.

Further demonstrating that suppression and not simply decay is the mechanism responsible for decreasing the activation of the inappropriate meanings of homonyms, Gernsbacher and Robertson (1994) empirically demonstrated that suppression carries costs. After participants read a sentence such as *He lit the match* they were considerably slower and considerably less

accurate at simply verifying that the sentence, *He won the match* made sense. If after reading the *He lit the match* sentence, the inappropriate meaning of match simply decayed, that is, the competition meaning of match simply returned to baseline, that meaning should not have been harder to activate in order to comprehend the subsequent sentence. Indeed, Gernsbacher and Faust (1995) created a laboratory condition in which it behooved participants to suppress the inappropriate meanings of homonyms, and Gernsbacher and Faust (1995) discovered that participants employed suppression more rapidly in this condition than they did in a condition in which the need for suppression occurred only rarely.

Furthermore, Gernsbacher and Faust (1991a) conducted an extensive series of experiments demonstrating that individuals who are less efficient at suppressing many types of information, for example, the color of ink in a Stroop color naming task, hold onto inappropriate meanings considerably longer than do individuals who are more efficient in suppressing extraneous information. More recently, Faust and Gernsbacher (1996) discovered a right-visual field, left-cerebral hemisphere advantage for suppressing the inappropriate meanings of homonyms. When homonyms were presented to the left-visual field (thereby hypothetically stimulating the right-hemisphere prior to the left-hemisphere), resolution of homonym meanings was slightly delayed. From these findings, Gernsbacher (1997) concluded that the mechanism of suppression, which enables the attenuation of interfering mental activation, such as the inappropriate meanings of homonyms, plays a crucial role in lexical access.

Suppressing lexical interference during interpretation

In the case of simultaneous interpreters, we propose that the added burden of speaking while comprehending diminishes the resources available for suppressing lexical interference. Our proposal is based on the simple observation of the sheer effort required to perform several cognitive tasks concurrently. We also predict that a higher rate of input will detract from interpreters' effective suppression of competing lexical meanings. An interpreter working under optimal conditions — native or near-native proficiency in the source and target languages, comfortable rate of input, familiar and unambiguous input text, contextual and linguistic redundancy, relatively simple syntax —

will presumably be cutting some slack for situations that might require greater attentional resources. However, as the task becomes more demanding, the interpreter will coordinate the allocation of limited resources, reducing those allotted to some subprocesses while maintaining the level of others, so as to keep up a steady output. One way in which the task can indeed become more demanding is by the inclusion of items in the incoming text that present competing interpretations, one or more of which must be attenuated, for example, false cognates.

False Cognates. In an interpreting task, the search for target-language equivalents need not necessarily entail full semantic processing (Gran, 1989; Fabbro & Gran, 1990; Isham, 1994). A shallower form of lexical access may occur, and may partly offset the cost of processing, particularly in the case of lexical forms that appear to have a cognate form, a calque, or a stock equivalent. In extreme cases, lexical access may become purely phonological, involving virtually no semantic processing. For example, the suffix *-ological* signals the probable existence of a cognate form in many languages and is likely to trigger near-automatic retrieval of that form without necessarily entailing semantic decoding; we predict this to occur especially with low-frequency words (e.g. *epistemological* and *teleological*).

One test case for the need for suppression of interfering lexical forms is presented by false cognates (words that are phonologically similar but whose meanings do not overlap, or overlap only in part). Suppression of the cognate (whether because it is semantically inappropriate or because an appropriate target-language form does not exist) will require effort.¹ The interpreter must, in effect, decide whether the cognate is true or false, and must then suppress the latter while also accessing the semantically appropriate target-language replacement. We predict that the attenuation of false cognates will interact with the rate of performance.

Our predictions have been supported in a preliminary study. Shlesinger (in progress) manipulated cognate status and rate of input. Fifteen professional simultaneous interpreters heard six 1700-word texts. Five false and five true cognates were embedded in otherwise identical sentences in each text. The texts were presented twice, with a one-month interval between presentations, at 120 and 140 wpm. (Rates, cognate status and order of presentation were counterbalanced across subjects.) Shlesinger observed that false cognates were more likely to be produced with the faster (140 wpm)

rate. Perhaps, as the rate increased, attempts to monitor the output appeared to add to the strain on cognitive capacity and diminished the interpreters' success at suppressing the interference caused by false cognates.

Consider as an example, the following utterance: *The next Dostoevsky may wind up writing nothing more than a second-rate, boring, convoluted, pretentious novel*. The semantically inappropriate target-language (Hebrew) cognate *novella* was produced by four of the twelve interpreters at 140 wpm. However, none of the four interpreters produced the inappropriate (false) cognate at 120 wpm; we suggest that at the slower rate, these interpreters were able to suppress the interference caused by the false cognate. Consider as a final example the utterance, *My usual spot is on a sunny, spacious, attractive, pleasant terrace*. The semantically inappropriate target-language cognate *terrassa* appeared in five of the interpreters' outputs at 140 wpm, and in only one output at 120 wpm. Moreover, four interpreters who produced the false cognate *terrassa* at the faster input rate produced the semantically appropriate target-language equivalent at 120 wpm.

Homophones and Pseudo-homophones. Proper use of language-specific cues is often a function of the interpreter's directionality, that is, whether the source language is the interpreter's first, second, or third language (Williams, 1994; Mägiste, 1979; Fishman, 1980). We predict that the greater the interpreter's proficiency in the source language, the greater the likelihood of his/her suppressing the inappropriate homonym. Consider the following excerpt:

... the flavor, texture and, above all, eating quality of the fruits and vegetables is assuming much greater importance. In our department, we have prepared a short film entitled *Iceberg in the Desert — The Story of the Crispheart from Israel*.

The word *iceberg* in the above utterance refers to a type of *lettuce*, rather than to its more common meaning of *glacier*. The text was presented to a group of 13 interpreting students, five of whom were native speakers of the source language, English. All five native speakers inferred correctly, on the basis of still-limited contextual information, that *iceberg* was being used in reference to the vegetable. Of the remaining eight students (native speakers of the target language), only one inferred the meaning correctly, while the remaining seven failed to suppress the more familiar *glacier*-meaning despite the fact that the preceding text provides some priming toward the intended meaning. A post-test revealed that all the participants were familiar with both meanings, though the *glacier*-meaning was clearly more salient; the participants'

familiarity with the intended meaning was also evidenced by their self-corrections after hearing the complete sentence. It is the salience of the inappropriate meaning — and the added effort needed to suppress it — that seemed to evoke the incongruous translations of *iceberg* in the case of the less proficient students.

A speaker whose topic was listed as "The Cultivation of Roses" began his talk with the following utterance: *I'd like to share with you my thoughts about [blu: dzi:nz]*. Given the common collocation of *blue* and *jeans*, the interpreter first heard this utterance as *blue jeans*, a sense that would fit the context (given that this was the opening sentence), but not the situation (a conference centering on flowers). We predict that the cognitive mechanism of suppression would be needed to attenuate the interference caused by this sense of the phrase so that as the text continues, and it becomes apparent that the speaker is about to describe ways of producing blue roses, the *blue genes* sense of the phrase would be more accessible than the *blue jeans* sense.

Coping with a speaker's unfamiliar accent is a challenge frequently facing interpreters. Consider the following utterance produced by a native Japanese speaker producing English as a second language: ... *the position of the clown [crown] will affect the nature of the occlusion*. The Japanese speaker's failure to distinguish between *crown* and *clown* forces the interpreter to receive interference from the latter; however, that lexical form does not fit the context (a conference on dental surgery). The semantic disparity between the two words facilitates the suppression of the inappropriate allophonic variant.² While no studies have been conducted into the effects of such pseudohomophony, in terms of reaction time or spillover effect,³ we predict that suppression of what appears to be *clown* but must be processed as *crown* will entail greater processing capacity, particularly among interpreters who are not exposed to systematic variations of this type on a regular basis. We now turn to examine the role of suppression in resolving anaphoric reference in both comprehension and interpretation.

Suppressing anaphoric interference during comprehension

Anaphoric reference is the process by which readers or listeners understand to whom or to what an anaphor, such as a pronoun, refers. In a series of experiments, Gernsbacher (1989) discovered that suppression enables anaphoric reference by attenuating the interference caused by the activation of

other referents (i.e., the people or things to whom or which an anaphoric expression does not refer). For example, consider the sentence, *Ann predicted that Pam would lose the track race, but she came in first very easily*. In this sentence, the pronoun *she* is an anaphoric device, which most people interpret to refer to the referent *Pam*. Gernsbacher (1989) discovered that correctly decoding such anaphoric devices is not so much a matter of activating one of the two possible referents: Both are highly activated because they were just mentioned in the first clause. Rather, understanding to whom the pronoun *she* in the second clause refers, depends on how quickly comprehenders can reduce the activation of the referent to whom the pronoun *she* does not refer (i.e., *Ann* in the example sentence).

In Gernsbacher's (1989) experiments participants read sentences word by word. The first clause of each sentence introduced two people, for example, *Ann* and *Pam* as in *Ann predicted that Pam would lose the track race*. In the second clause, one of those two people was referred to anaphorically, using either a very explicit repeated name anaphor, such as *Pam*, or a less explicit pronominal anaphor, such as *she*, as in *but she came in first very easily*. Gernsbacher (1989) measured activation of the anaphors' referents (like *Pam*) and what she referred to as the nonreferents (like *Ann*) using the probe verification task. Participants were shown a test name, like "Pam" or "Ann," or a name that had not occurred in the sentence, and their task was to verify whether the test name had occurred in the sentence. Presumably, the faster participants respond to the test name, the more activated the referent represented by that test name is. In half the experimental sentences the referent was the first-mentioned person in the sentence, and in half the referent was the second-mentioned person, as *Pam* was in the example sentence. In one experiment activation was measured immediately before versus immediately after the name versus pronoun anaphors occurred, and the first test point served as a baseline.

Immediately after the very explicit name anaphors were read, the referents were considerably more activated than they were before; that is, reaction times decreased. More intriguingly, immediately after the very explicit name anaphors were read, the nonreferents were considerably less activated than they were before; that is, reaction times increased. By rementioning one participant, the other participant decreased in activation. However, this pattern occurred only for the very explicit name anaphors. For the pronouns, neither the referents nor the nonreferents changed in the activation.

This pattern has been replicated in English (MacDonald & MacWhinney,

1990) Spanish (Carreiras, Gernsbacher, & Villa, 1995), Korean (Lee, 1992), and American Sign Language (Emmorey, 1997). These data suggest that very explicit repeated name anaphors immediately lead to the suppression of nonreferents. In contrast, less explicit — and indeed momentarily ambiguous — pronoun anaphors do not immediately lead to suppression.

In a further experiment, Gernsbacher (1989) measured activation immediately before repeated-name versus pronoun anaphors, as before, and again this before-the-anaphor test point served as a baseline. However, in this experiment the comparison test point was at the end of the sentence, after the semantic/pragmatic information, which could disambiguate the syntactically ambiguous pronouns, had occurred. For example, activation was measured at the two test points indicated by asterisks in the following example sentence: *Ann predicted that Pam would lose the track race, but *Pam/she came in first very easily.** By the end of the sentence, even the gender-ambiguous pronoun anaphors had led to a reliable amount of suppression of the nonreferents.

In yet a further experiment, Gernsbacher (1989) placed the contextual information before the anaphors, as in, *Ann lost a track race to Pam. Enjoying the victory, Pam/she headed toward the shower, or Ann lost a track race to Pam. Accepting the defeat, Ann/she headed toward the shower*. Despite the context preceding the anaphors, the less-explicit pronoun anaphors still did not lead to a reliable amount of suppression until the end of the sentence. Thus, information from outside an anaphor can also trigger suppression, although it does so more slowly and less powerfully. This is good, because with zero anaphors, as in *Ann lost a tennis match to Pam and 0 cried all the way home*, the anaphor provides no information about its referent. All the information is provided by the semantic, pragmatic, and syntactic context. Therefore, zero anaphors should be the least effective at triggering suppression, a prediction confirmed by Corbett and Chang (1983). From these experiments Gernsbacher (1989; see also Gernsbacher, 1997) drew the following conclusion about the role of suppression in anaphoric reference: Suppression enables anaphoric reference by attenuating the interference caused by other referents.

Suppressing anaphoric interference during interpretation

The need to disambiguate an anaphoric reference and attenuate the interference of an inappropriate antecedent creates a common pitfall in interpreting

— particularly when the interpreter is working from a gender-unmarked language into a gender-marked language. Consider as an example the following utterance:

... so that's the situation insofar as what the facts are and what action has been taken. Up until now the response to this has been an expression of frustration. All of the organizations involved in the monitoring committee understand the *problem*. Nobody seems to disagree with what the end consequence is, but there seems to be either an inability to find a *solution*, or an unwillingness to deal with *it* on a crisis basis.

This utterance manifests the anaphoric confusion that is rather typical of impromptu discourse, but such confusions must be unraveled by the interpreter. A nonreferent (*solution*) must be suppressed, so that the appropriate referent (*problem*) can gain prominence. In a gender-unmarked language, the choice of antecedent would be inconsequential; however, in this case the target language (Hebrew) required a feminine-marking for the referent (the target-language equivalent of *problem*) as opposed to the masculine-marking of the grammatically apparent but unintended antecedent, what we have been calling a nonreferent (*solution*). Consider a second example:

Having praised the *crispheart*, we still have some way to go. When *it's* good, *it's* very good, but *rot* through poor handling can still be a problem and if *it* is not grown properly the heart may be missing.

Like the preceding example, in this example, the target language required a feminine pronoun for the intended referent (*crispheart*) and a masculine pronoun for the apparent but unintended nonreferent (*rot*). It appears that the interpreter-as-comprehender may fail — particularly under difficult processing conditions, such as rapid rate of input — to reduce the activation of nonreferents (e.g., *solution* in the first example, and *rot* in the second).

Both of the above utterances were presented to four advanced students of interpreting. All four participants failed to suppress the nonreferents in the first example, and two of the four failed to suppress the nonreferents in the second example. However, these difficulties in attenuating the interference from competing antecedents is not unusual, and serves to underscore our proposed role of suppression in anaphoric reference in both comprehension and interpretation.

Suppressing syntactic interference during comprehension

Gernsbacher and Robertson (forthcoming) investigated another role that suppression plays during comprehension: attenuating the interference caused by parsing a previous syntactic form. Consider a witticism often attributed to Groucho Marks: *Time flies like an arrow; fruit flies like a banana*. Once the phrase *time flies* has been parsed as a noun and verb, it is difficult not to parse the phrase *fruit flies* in the same way.

Gernsbacher and Robertson (forthcoming) examined this hypothesis by preceding sentences containing phrases such as *visiting in-laws* with sentences that required a similar or conflicting syntactic parse. For example, participants first read the sentence, *Washing dishes is a drag*, and then they read the sentence, *Visiting in-laws are, too*. Or participants first read the sentence, *Whining students are a drag*, and then they read the sentence, *Visiting in-laws is, too*. The participants' task was to read each sentence and simply decide whether it was grammatical. Participants were considerably slower and extremely less accurate to judge that a sentence such as *Visiting in-laws are, too* was grammatical after they read the sentence, *Washing dishes is a drag*. Similarly, participants were considerably slower and extremely less accurate to judge that the sentence, *Visiting in-laws is, too* was grammatical after they read the sentence, *Whining students are a drag*. Gernsbacher and Robertson (1998) interpreted these data as suggesting that correctly responding to the second sentence requires attenuating, or suppressing, the interference caused by the syntactic form in the first sentence.

Gernsbacher and Robertson (forthcoming) observed the same effect when they made the second sentences less syntactically dependent on the first sentence, by omitting the ellipses. For example, participants were again slower and extremely inaccurate to judge that the sentence, *Visiting in-laws are a drag, too* was grammatical after they read the *Washing dishes* sentence. And, participants were also slow and inaccurate to judge that the sentence, *Visiting in-laws is a drag, too* was grammatical after they read the *Whining students* sentence. Furthermore, Gernsbacher and Robertson (forthcoming) observed the same effect when they made the second sentences syntactically independent of the first sentence, and the verb in the first sentence was not even marked for number. For example, participants were still very slow and inaccurate to judge that the sentence, *Visiting in-laws are a drag* was grammatical after they read the sentence, *Washing dishes can be a bother*, and

vice-versa for after they read the sentence, *Whining students can be a bother*. This phenomenon underscores the need for suppression to attenuate the interference caused by a previous syntactic form.

Suppressing syntactic interference during interpretation

We propose that interpreters constantly struggle with the interference caused by competing syntactic forms. In interpreting, the competing syntactic forms arise from the potential clash between the source language's grammar and the target language's grammar. When the word order of the source and target languages is parallel, the interpreter will probably prefer to proceed in a more or less left-to-right sequence; in other words, to use the least demanding strategy for the task. Differences in canonical word order, however, may rule out such a strategy. The tradeoff entailed in interpreting between structurally asymmetrical languages is self-evident: opting for shorter lag times involves more anticipation and is liable to incur a greater number of errors (Barik, 1971; Cartellieri, 1983; Cokely, 1986; Jörg, 1995). A benefit of the longer lag lies in the greater likelihood of attenuating previous syntactic or lexical patterns. Longer lag times, on the other hand, may cause some of the input information to be forgotten, as a result of (1) the time that elapses before initiation of output, (2) acoustic interference caused by the source-language message, (3) displacement by the interpreter's own voice. Failure (as well as success) in attenuating interference by previous patterns becomes evident in interpreting, if indeed each of the two successive and seemingly identical forms requires a different target-language equivalent.

Consider the following example from an actual conference presentation:

In the past, there has been some rather unpleasant criticism of our distribution system, but I think I can safely say the problem's been solved. We've already sent copies of the tape and the leaflet to our Friends Association in London, to our Miami chapter, to our consulates in several parts of the former Soviet Union and of course to the Foreign Ministry. To do otherwise now would be extremely counter-productive.

A recording of the interpreter's output reveals that the fifth *to* initially triggers the same morpheme (the target-language prepositional equivalent of *to*) as the first. However, since the preposition *to* and the infinitival particle *to* are not homologous in Hebrew as they are in English, the interpreter subsequently

self-corrects her output, to produce the syntactically appropriate target-language form [back-translated as]: *If we do otherwise now, it would be extremely counter-productive.*

The same conference presentation also included the following example:

Thinking over the way this session has gone so far, and recalling how successful we've been in the past, I'd say it's been far from satisfactory. Timing has been problematic. The target-language syntax does not allow for the postposing of the participial subject.

Thus the interpreter, adopting an anticipatory strategy, produces [the target-language equivalent of]: *When I think. When I remember.* Her initial failure to suppress syntactic interference manifests itself in her double-take on the subsequent gerund *Timing*, which is initially rendered as (the Hebrew equivalent of): *When I-*. This is followed by an abrupt pause and a self-correction to the target-language equivalent of the nominalized *Timing*.

Suppressing literal expressions during comprehension

According to Glucksberg and Keysar (1990), understanding a metaphor such as *Lawyers are sharks*, involves enhancing attributes of the metaphor's vehicle (e.g., *sharks*) that are common to the metaphor's topic (e.g., *lawyers*). So, after comprehending the metaphor, *Lawyers are sharks*, the facts that sharks are tenacious, fierce, and aggressive, among other attributes should be enhanced in comprehenders' minds. Gernsbacher, Keysar, and Robertson (in press) augmented Glucksberg and Keysar's (1990) theory by proposing that understanding a metaphor also involves suppressing the attributes that are not appropriate to (or concordant with) a metaphorical interpretation. So, for example, to understand the metaphor, *Lawyers are sharks*, attributes such as sharks being good swimmers, having fins, and living in the ocean, should be suppressed.

Gernsbacher et al. (in press) tested both of these hypotheses by asking participants to read a statement that might be metaphorical such as *Lawyers are sharks*, and then confirm the verity of a property statement such as, *Sharks are tenacious*. In Gernsbacher et al.'s first experiment, they used as a control condition statements that contained the same vehicle but a literal topic, such as *Hammerheads are sharks*. Gernsbacher et al. found striking evidence that comprehending a metaphor such as *Lawyers are sharks* leads to

both the enhancement of the attributes that are appropriate to the metaphorical interpretation and the suppression of attributes that are inappropriate to the metaphorical interpretation. For instance, participants were faster to verify the statement, *Sharks are tenacious* after they read the metaphor, *Lawyers are sharks* than after they read the control statement, *Hammerheads are sharks*. This finding supports the hypothesis that comprehending a metaphor involves enhancing attributes that are appropriate to the metaphorical interpretation. In contrast, participants were considerably slower to verify the statement, *Sharks are good swimmers* after they read the metaphor, *Lawyers are sharks*, than after they read the control statement, *Hammerheads are sharks*. This finding supports the hypothesis that comprehending a metaphor involves suppressing attributes that are inappropriate to the metaphorical interpretation.

In a second experiment, Gernsbacher et al. (in press) observed identical results when instead of using a literal statement as a baseline (control), they used a nonsensical one. For example, they presented the nonsense statement, *Notebooks are sharks* as a baseline comparison for the metaphorical statement, *Lawyers are sharks*. Again, they found striking evidence to support the hypothesis that comprehending a metaphor leads to both the enhancement of attributes that are appropriate to the metaphorical interpretation and suppression of attributes that are inappropriate to the metaphorical interpretation. For example, again, participants were faster to verify the statement, *Sharks are tenacious* after they read the metaphor, *Lawyers are sharks* than after they read the nonsense statement, *Notebooks are sharks*. And conversely, participants were again considerably slower to verify the statement, *Sharks are good swimmers*, after they read the metaphor, *Lawyers are sharks* than after they read the nonsense statement, *Notebooks are sharks*. Therefore, both experiments demonstrated that comprehending a metaphor involves both enhancing the attributes that are relevant to the metaphorical interpretation and more intriguingly, suppressing the attributes that are not relevant to the metaphorical interpretation.

Suppressing Literal Expressions during Interpretation

When confronted with a metaphor for which the interpreter has a readily accessible, semantically equivalent target-language counterpart, the inter-

preter may well produce this counterpart (often a calque), particularly in the case of lexicalized, highly familiar metaphors (e.g., *brilliant*, *brainstorming*, *brainwashing*). In the case of less-worn or syntactically more complex metaphors, however, too much time may be required in searching for an appropriate target-language metaphor. Assuming that the interpreter has understood the metaphor, s/he may resort to one of three solutions: (1) find a semantically appropriate target-language metaphor, (2) produce a lexically equivalent but semantically deviant target-language metaphor (a calque-like form), (3) demetaphorize by producing a paraphrase.

While no systematic study has been conducted into shifts in metaphoricity during interpreting, interpreters' outputs appear to reveal a high proportion of calque-like equivalents. Various factors may account for this finding; among them, failure to perceive the metaphorical meaning; a greater tendency toward bottom-up, lexical-level processing; a possibly conscious strategy designed to save the time and effort required to produce a well-formed and semantically appropriate paraphrase.

Consider the following two utterances, produced by the same speaker and dealt with by the same interpreter. Confronted with the utterance, *You might get away with a dog and pony show for a while, but ultimately you've got to show results*, the interpreter produced a literal, word-by-word target-language rendering. Questioned afterwards, the interpreter admitted to being unfamiliar with the metaphor, but explained that she "didn't have time to worry about it." Confronted with the utterance, *In all candor, Jewish educational leadership has long been handicapped by the quality of its voluntary leadership. Jewish educational leadership has been characterized by what in Chicago we would call a persistent anemia of clout*, the interpreter admitted to being unfamiliar with the metaphor, but added that she had "understood the general idea." Asked to comment in retrospect on her literal rendering, she noted that "it sounds weird, but I didn't have time to explain it." As is often the case, a literal rendering may still roughly convey the metaphorical meaning without necessarily having been processed as such; however, their existence underscores our proposal of the need for suppression for these literal renderings in order to capture the fuller semantic flavor intended.

The saliency of the non-metaphorical rendering in these examples may be accounted for, at least in part, by the low frequency of the metaphor. In the following examples, on the other hand, failure to suppress the literal rendering occurs even though the metaphor is frequent, is collocationally restricted

(and hence more predictable), and has a stock equivalent in the target language (Hebrew). A recorded text used in an interpreter training course included the following sentence: *The lifting of the travel ban is a great relief for the Lebanese*. Rendering the metaphorical collocation *lift + ban* requires suppressing (the literal equivalent of) *lift* and retrieving its target-language counterpart metaphor: *remove + ban*. While there is no reason to assume that the students failed to comprehend the source-language segment, the saliency of the literal reading of *lift* led to a deviant rendering in four of the nine students' outputs. To cite another example from the same text: *We're liable to miss the boat*. On a simple post-test, the target-language equivalent, *miss the train*, was readily elicited from all nine students; yet, five of them had failed to suppress the literal rendering.

Suppressing erroneously drawn inferences during comprehension

When most of us hear or read that *George became too bored to finish the history book*, we infer that George is reading a very boring book. However if we later hear or read that *George had already spent five years writing it*, we must revise our initially drawn inference because it was inappropriate. Brownell, Potter, Bihrlé, and Gardner (1986) found that right-hemisphere damaged patients had a whale of a time revising such inferences. They concluded that right-hemisphere damaged patients' difficulty arose because they were unable to "let go of" the initial inferences that they drew. Perhaps revising such an inference is difficult because the revision requires suppressing the initially drawn inference. Thus, another role that suppression might play is to attenuate the interference caused by a previously drawn, but erroneous, inference.

Gernsbacher, Nelson and Robertson (forthcoming) empirically tested this hypothesis, by investigating whether revising such inferences was difficult, not just for right-hemisphere damaged patients but for "normal" college-aged adults. Gernsbacher et al. (forthcoming) constructed 40 two-sentence vignettes, similar to the *George became too bored to finish the history book*. *He had already spent five years writing it* example (other stimuli included *Jeff got a ticket after parking his car. As he headed into the movie theater, he handed the ticket to the usher; Sarah drove frantically all the way to the Emergency Room. She was already running 15 minutes late for her shift that*

evening; Jack painted the boat a bright red. Then he painted the ocean a deep blue and the sun a bright orange). Gernsbacher et al. measured how long participants needed to read the inference-revising second sentence (e.g., *He had already spent five years writing it*), after they read the inference-inviting premise sentence (e.g., *George became too bored to finish the history book*). Gernsbacher et al. compared how long participants needed to read the inference-revising second sentence (e.g., *He had already spent five years writing it*), after they read the inference-inviting premise sentence or after they read a control premise sentence, which was a sentence that did not invite the inference; indeed it explicitly stated a different situation (e.g., *George became too bored to finish writing the history book; Jeff bought a ticket after parking his car; Sarah drove frantically all the way to her job at the Emergency Room; In the painting, Jack painted the boat a bright red*). Gernsbacher et al. found that participants required substantially longer to read the second sentence (e.g., *He had already spent five years writing it*), after they read the experimental (inference-inviting) premise sentence (e.g., *George became too bored to finish the history book*) than after they read the control (inference-noninviting) premise sentence (e.g., *George became too bored to finish writing the history book*). Gernsbacher et al. interpreted participants' greater latency as reflecting their difficulty in suppressing a previously — but erroneously — drawn inference.

Furthermore, Gernsbacher et al. (forthcoming) found that members of a particular population, less-skilled comprehenders — who have previously been identified to have difficulty quickly employing suppression (Gernsbacher, 1993; Gernsbacher & Faust, 1991a; Gernsbacher & Faust, 1995; Gernsbacher & Robertson, 1995; Gernsbacher, Varner, & Faust, 1990) — were substantially slower to reject a test word that was related to the erroneously drawn inference, even after they read the inference-revising second sentence. For example, members of this group of participants took longer to reject the test word "read" after they read the inference-revising sentence, *He had already spent five years writing it*.

Suppressing erroneously drawn inferences during interpretation

Because languages differ in their use of cohesive devices, it is not surprising that achieving appropriate collocations in the target-language text is one of

the major problems an interpreter faces (Hatim & Mason, 1990), particularly when a full understanding of the semantic links between the items in the collocational chain requires inferential reasoning. The on-line processing of such links is all the more challenging, in that it entails the mobilization of bridging assumptions and the attenuation of surface forms which prove irrelevant to the unfolding semantic network.

A mere few seconds after launching her speech, the speaker of the example below introduced an intricate collocational chain revolving on the low-frequency word *rig*. The fact that delivery of the text had just begun meant that the interpreter had little access to information that might have proven crucial to drawing inferences with respect to the register, the extra-textual context, or the speaker's intention (Pöchhacker, 1995).

There's one thing I'd like to correct and that is I'm down as the Brigade Foundation. I am in fact the **Rigade** Foundation. I say I called it **Rig** because I was hoping to encourage the **oil** people to give a little bit back to the countries that they take the **oil** from.

Anyone listening to the speech in English must have inferred the semantic connection between *Rigade*, *rig* and *oil* through a bridging assumption. It was up to the interpreter to make this semantic connection explicit, if the collocational chain was to be retained. The mere accessibility of contextual or, in this case, simple lexical information was not enough to guarantee its retrieval. Whether or not the participants themselves (13 advanced students of interpreting) had perceived the full import of the cohesive chain, none of them retained it (Shlesinger, 1995). It should be noted that twelve of the thirteen students were familiar with the word *rig* and were able to explain it. Again these examples support our proposed need for suppression in simultaneous interpretation.

Acknowledgments

Preparation of this manuscript was supported by grants from the National Institutes of Health (RO1 NS 29926) and the Army Research Institute (DASW0194-K-0004, DASW0196-K-0013 and DAAG55-97-1-0224) awarded to Morton Ann Gernsbacher.

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Notes

1. Then again, given the generally high awareness among interpreters of this particular pitfall - i.e. of the need to avoid potentially false cognates - a strategy is often adopted whereby such forms are deliberately suppressed, even when there is no semantic need to avoid them (Gile, 1995). This practice represents a conscious precaution against slipping into form-based equivalencies.
2. As in all speech perception, so too in interpreting, the evidence strongly underlines the importance of the top-down mode within the perception process (cf. Voss, 1984), and the final decoding of ambiguous or incongruous phonetic input must utilize considerable semantic information (cf. Bond & Garnes, 1980:170).
3. Slower or impaired processing of items as a function of difficulty in the processing of preceding items (cf. Just, Carpenter, & Woolley, 1982).

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