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Processing Reverse Sluicing: A Contrast with Processing Filler-Gap Dependencies

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Abstract

This paper investigates the processing differences between sentences containing filler-gap dependencies and sentences with a cataphoric form of ellipsis, reverse sluicing. The two structures look similar on the surface, but differ theoretically both in grammar and constraints governing their distribution. The processing of a sluice occurs at LF where the reader must construct an empty structure containing a variable that must be bound to an indefinite in the antecedent clause. Filler-gap dependencies, on the other hand, are the result of a sentence's syntactic structure. To test for differences in processing, a self-paced reading study was conducted. The experimental sentences, which were minimally different, contained either a reverse sluice or a filler-gap dependency. Additionally, each type of sentence had a version with added lengthening. Reading times for the critical region of reverse sluices decreased after lengthening was added, whereas reading time for the critical region in filler-gap dependencies increased with the added lengthening. These results provide supporting evidence for an integral element of syntactic theory: that movement and ellipsis are two distinct structures.

1. Introduction

Sluicing is a form of ellipsis, which results in an elided phrase whose only remnant is a wh-word or phrase. This structure was originally identified by Ross (1967). In a sentence containing a sluice, such as example (1), the elided material (here represented inside brackets) must be inferred, or filled in, by the listener or reader. This inference process consists of copying some explicit linguistic material from an antecedent clause into the sluiced region (the missing CP that would otherwise follow the wh-phrase).

(1) There's something on the floor, but I'm not sure what [~~is on the floor~~].

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Chung et al. (1995) state that an empty IP structure is created at LF into which the antecedent phrase is copied. Additionally, they argue that there must be an indefinite present in the antecedent clause (called the inner antecedent) corresponding to a variable in the elided clause which the wh-phrase can bind once it is copied into the empty IP structure. The inner antecedent can be either explicit, as in example (2), or implicit, as in example (3).

(2) My neighbor's dog bit someone$_i$, but he didn't tell me who [~~my neighbor's dog bit t_i~~]

(3) I dropped my keys, but I'm not sure where [~~I dropped my keys t_i~~].

As with verb phrase ellipsis, sluicing can readily accept cataphoric antecedents. Thus, like VPE in (4), the sluicing in sentence (5) will be acceptable to most speakers of English.

(4) Just like John did, Sue snuck into the house quietly and carefully.

(5) The homeowner wasn't sure why, but his house had been snuck into the previous night.

I will refer to sluices with cataphoric referents, like (5), as reverse sluicing. The study of instances of reverse sluicing is novel and only rarely mentioned in the literature. See Giannakidou and Merchant (1998) for reverse sluicing in English and Greek; and Coppock (2001) for a brief discussion of reverse sluicing in English.

The purpose of this paper is to explore reverse sluicing and to learn more about how this structure is processed. First, a corpus study will be presented. This study will examine examples of sluicing and reverse sluicing from the Internet. Next, natural occurrences of reverse sluicing in spoken language will be looked at. Reverse sluicing will then be compared to another, similar looking structure: the filler-gap relation. Lastly, an experiment involving the processing of reverse sluices and filler-gap sentences will be presented.

1.1 Corpus Study

An informal corpus search was conducted using the Google search engine in order to find examples of standard and reverse sluices. Six searches were performed using the command in (7). (Another set used search strings equivalent to (6), but since it did not turn up many true sluices, it will not be discussed further.) Each of the searches was conducted with each of several wh-words (who, what, when, where, why, or how).

(6) "but I don't * what."

(7) "I don't * what, but"

The asterisk is a special character that allows the search engine to, as Google says: "'fill in the blank' for you." This allowed the search engine to search for pages containing the search contents and allowed for any word (which was always a verb) that could possibly follow "don't." After each of the searches was performed, the total number of results

returned by Google was recorded. Next, each result from the top 20 results (the first two pages) was analyzed. For each result it was determined if that result contained a sluice or not. If the result was a sluice, it was recorded in a log sorted by wh-word with its features noted. The sluice's type (standard or reverse) as well as if the sluice accepted an argument or adjunct were the features that were recorded (see *Appendix A* for examples of the types of sluices found).

Search strings like (7) returned many results including both forward and reverse sluices. A total of 119 sluices were recorded from the total of 120 search results. Five of the results contained an additional instance of sluicing and three of the results were duplicate results. Both the results that contained two sluices and the duplicate results were added into the totals. Only seven of the results did not contain sluices. Sixty-six of the total sluices (55%) were instances of forward sluicing and 42 (35%) were instances of reverse sluicing. Eleven (9%) of the sluices were ambiguous.

Of the 66 forward sluices, 25 of them (38%) took arguments as inner antecedents and 41 (62%) took adjuncts as inner antecedents. Twelve of the arguments were external, 11 were internal, and two were arguments of noun phrases. Of the 42 reverse sluices, nine of them (21%) took arguments as inner antecedents and 33 (79%) took adjuncts as inner antecedents. Seven of the reverse sluice arguments were external and two were internal.

These results showed that more forward sluices turned up in search results than reverse sluices. They also showed that sluices may prefer to accept adjuncts as the inner antecedent rather than arguments. This may be especially true for reverse sluices. Also of interest is that sluices using the wh-word "who" are typically subjects as opposed to other types of arguments or adjuncts.

1.2 Natural Occurances in Spoken Language

Sluices as they occur in spoken language were also recorded. In terms of the spoken language, hearing a reverse sluice is somewhat rare. Over a period of one month, 16 sluices were recorded (see *Appendix B* for the recorded sluices). Of these sluices, ten (63%) were instances of forward sluicing and six (31%) were instances of reverse sluicing. One of the occurrences (6%) was an ambiguous instance. Of the forward sluices recorded, four (40%) took arguments as inner antecedents and six (60%) took adjuncts as inner antecedents. All of the reverse sluices took adjuncts as inner antecedents.

The reverse sluices that were recorded occurred only with the wh-word "why." The great majority of these instances seemed to involve reverse sluicing as a hedge of some sort, as in (8)

(8) I don't know why, but I'm still kind of confused about clitics.

In most cases, the speaker is not actually inquiring about why something happened. It seems to work as an aside, possibly signaling some type of doubt or lack of confidence. It's as if the speaker is trying to say "This might make me seem weird, but. . . "

Overall, the distribution of sluices in spoken language seem to parallel the results of the online corpus study. Forward sluices occurred the majority of the time (Online: 55%,

Spoken: 63%), reverse sluices occurred slightly more than a third of the time (Online 35%, Spoken 33%), and occasionally ambiguous sluices occurred (Online 9%, Spoken 6%). In the forward cases, the distribution of adjuncts to arguments seems to be 60-40 (Online: 62% adjuncts – 38% arguments, Spoken: 60% adjuncts – 40% arguments). In both studies, the majority of cases of reverse sluicing accepted adjuncts as the inner antecedent; however, the correlation between the two studies was off. Online, 21% took arguments as inner antecedents and 79% took adjuncts while in the spoken study 100% took adjuncts as inner antecedents.

At first, this difference may look a bit disconcerting. However, it may provide some insight into the usage of reverse sluicing in spoken language as opposed to usage in written language. In the spoken study, the only wh-word heard in a reverse sluice was "why." Perhaps the fact that "why" must take an adjunct combined with its use as a hedge means that it is more readily available to a speaker and means it can be easily used. As far as writing (or typing) is concerned, the writer or typist has more time to plan what he is planning to say which may explain why more complicated sluices start to appear.

1.3 Reverse Sluicing and Filler-Gap Dependencies: Comparison and Contrast

A reverse sluice can look very similar to another structure, a standard wh-question, which has a filler-gap relationship. This comparison is illustrated in (9).

(9) a. I'm not sure who my Uncle is getting engaged to.
b. I'm not sure who, but my Uncle is getting engaged to someone.

The filler-gap in (9a) and the reverse sluice in (9b) give the reader/listener similar information although this happens in subtly different ways. Both sentences convey the information that the speaker has an uncle who is getting married to some unknown person. In both examples the existence of the uncle is presupposed; however, in (9b) it is asserted that the uncle is getting married while it is presupposed in (9a). On the surface reverse sluices and wh-questions look quite similar, but further exploration shows that they are quite different; both in their grammar and in the constraints that apply to them.

The grammatical properties of reverse sluicing are very similar to that of normal sluices. Corresponding to the theory presented earlier by Chung et al., when the sluice site of a reverse sluice is reached, the reader must build an empty IP at LF and hold it in memory until it can be filled once the antecedent is reached in the sentence. Another account of how sluicing works is presented by Merchant (2001). This account proposes that the syntax of sluicing involves wh-movement followed by a deletion that occurs at PF through a mechanism of not pronouncing the elided IP. Thus, when a speaker sluices, his utterance has the structure of a usual clause, but this structure is not pronounced. This account also states that the condition for this deletion is semantic identity with the antecedent as opposed to a syntactic identity condition.

Filler-gap dependencies are created as a result of wh-movement. Wh-movement is a phenomenon that occurs in many, but not all languages, where the wh-word is extracted out of the phrase where it would normally appear. Syntactically, this process involves the

movement of the wh-word to Spec-CP and, depending on the language, may include an additional I-C movement.

It has often been demonstrated in the literature that sluicing is able to repair island violations (Ross (1969), Lasnik (2000), Merchant (2001), Grebenyova (2006)). This is demonstrated in (10): (10a) is ungrammatical; however, if the phrase after the wh-word is sluiced (as in (10b)), the sentence suddenly becomes grammatical. Notice that this hold true for a reverse sluice as well, demonstrated in (10c).

(10) a. *She knows a man who bought something but I'm not sure what she knows a man who bought t.
b. She knows a man who bought something but I'm not sure what [~~she knows a man who bought t~~]
c. I'm not sure what, but she knows a man who bought something.

On the other hand, filler-gap constructions do not have this ability to violate islands, which can be seen in (10a). The contrasts presented above suggest that there is very likely a difference in processing between filler-gap structures and sluices, including reverse sluices.

It is generally agreed upon that filler-gap dependencies are syntactic in nature and place a burden on the sentence processor and thus on the listener or reader's working memory. The literature on processing filler-gap sentences is huge. (See Fodor (1989), for a review.) Essentially, the reader must hold the filler in memory while processing the rest of the sentence until the gap is reached. One theory on where the complexity of processing filler-gap structures stems from is the Active Filler Strategy (Frazier and d'Arcais (1989)). They claim that while processing a filler-gap sentence, a reader will be actively searching for a gap in which to place the filler while processing the sentence. Evidence for this theory can be seen through increased processing load at sites of false gaps as well as reanalysis after a false gap is rejected. Another, more recent theory, called Dependency Locality Theory was proposed by Gibson (2000). In his theory, he argues that the length of syntactic dependencies influences the processing complexity of a sentence, because integrating a constituent into the syntactic representation is more difficult across larger distances. This integration cost is higher when a dependency spans newer discourse referents than when it spans discourse-old material.

Few empirical studies have been conducted on the processing of sluiced sentences (see Frazier and Clifton (1998)) and none to my knowledge have looked at the processing of reverse sluices. The study presented in this paper will compare the processing of filler-gap and reverse sluice structures in an attempt to learn more about how people process these structures. The processing of sentences such as those given in (11) will be investigated.

(11) a. I'm not sure what, but my friend typed something on my old computer in the basement.
b. I'm not sure what, but my friend who always did her work late at night typed something on my old computer in the basement.
c. I'm not sure what my friend typed on my old computer in the basement.
d. I'm not sure what my friend who always did her work late at night typed on my old computer in the basement.

The comparison of the structures in (11) is interesting because, despite their surface similarity, they are the result of distinct grammatical mechanisms. The filler-gap sentences are the result of processes occurring at the surface syntax while the sluices are the result of processes occurring at LF. These structures may interact differently when lengthening material is added between the interrogative and the variable (i.e. the inner antecedent in the sluices and the trace in filler-gap sentences).

Sentences (11a) and (11b) have reverse sluices while (11c) and (11d) contain filler-gap relations. The (b) and (d) versions are lengthened versions of the reverse sluice and filler-gap sentences respectively. The hypothesis here is that the increase in processing resources required for the long sluice sentences (11b) relative to the short sluice sentences (11a) will be smaller than the increase in processing resources required for the long filler-gap sentences (11d) relative to the short filler-gap sentences (11c). The theory behind this is that in the filler-gap examples, readers will have to cope with the increased number of discourse referents added by the lengthening between the filler and the gap and the larger syntactic structure resulting from this addition. Therefore, the processing resources used by the reader in the lengthened filler-gap sentences will be increased. However, in the sentences involving reverse sluices, the dependency between the inner antecedent and the variable exists at LF, where it does not interact with the shape of the parse tree. By hypothesis, lengthening of the dependence in terms of the surface syntax will not contribute as much to processing complexity in the sluiced examples. Instead, all the reader will be required to do is build a blank IP and hold it in memory while processing the rest of the sentence. While this may cause an overall increase in processing cost in contrast with the filler-gap sentences, there should be no effect caused by lengthening a sentence containing a reverse sluice. Presumably, the reader should not be under any pressure to fill the blank IP created and will instead deal with that when the time comes and the main verb of the sentence is reached.

2. Experiment

2.1 Subjects

Forty-eight native speakers of English from the University of Massachusetts in Amherst participated in this study. The data from the completed experiment is presented below.

2.2 Materials

Twenty-four sets of experimental sentences were constructed. Each set contained four versions of the sentence (see (12)). Versions (a) and (b) were reverse sluices while versions (c) and (d) were filler-gap sentences.

(12) a. I can't remember what, but the fisherman fitted something to his boat upon arriving at Old Crystal Lake.
b. I can't remember what but the fisherman who always wore the bright orange hat fitted something to his boat upon arriving at Old Crystal Lake.

c. I can't remember what the fisherman fitted to his boat upon arriving at Old Crystal Lake.
d. I can't remember what the fisherman who always wore the bright orange hat fitted to his boat upon arriving at Old Crystal Lake.

Each of the sentences used one of three chosen wh-words (who, what, or where). Ten of the twenty-four sentences used "who," six used "what," and eight used "where." Additionally, seventeen of the sentences used arguments as sluiced material, while the remaining seven used adjuncts.

Each set of reverse sluices and filler-gap sentences was further broken down into short (versions (a) and (c)) and long examples (versions (b) and (d)). In order to change the length of sentences, linguistic material consisting of at least six words were added to the short versions to create the longer versions. Filler-gap sentences were always two words shorter than the corresponding sluicing sentences because they lack the word but and contain a gap as opposed to the indefinite noun phrase used in the sluice.

Three methods of lengthening were devised each corresponding to the type of linguistic material that was added. Each of the methods was applied to eight experimental sentences. Identical linguistic material was added for each filler-gap and reverse sluice sentence. For one group of eight sentences, an appositive was added. Half of the appositive sentences were noun phrase appositives, while the other half were relative clause appositives. For the next group of eight sentences, a restrictive relative clause was added. For the third group of eight sentences, a combination of prenominal modifiers, postnominal modifiers, or embedded clauses were added. There were two sentences with prenominal modifiers, two sentences with two prenominal modifiers, two sentences with both pre- and postnominal modifiers, and two sentences with a prenominal modifier and an embedded clause.

The appositive condition used "who" and "where" in three sentences each and "what" in two sentences. Six of the appositive sentences used arguments as sluiced material and the remaining two used adjuncts. The restrictive relative clause condition used the same distribution of wh-words as the appositive conditions, but contained five argument sentences and three adjunct sentences. In the mixed condition "who" was used in four sentences and "what" and "where" were used each in two sentences. It contained the same distribution of arguments and adjuncts as the appositive condition did. All of the materials appear in *Appendix C*.

Each sentence was divided into presentation regions as indicated by the forward slash marks in (13). Line breaks were also added to each sentence before the last two presentation regions represented by the characters \n also illustrated in (13).

(13) I can't remember what,/ but the fisherman/ who always wore the bright orange hat/ fitted something to his boat/\n upon arriving/ at Old Crystal Lake.

The short versions were split into five regions and the long versions into six regions. This was done in a fashion so that every region in a long or short sluiced sentence corresponded to a similar region in the long or short filler-gap sentence. The first and last two regions of the sentence were constructed to be exactly the same within each set of experimental

sentences. The first region consisted of the phrase that contained the wh-word used for the sluice or the filler-gap. The wh-word was always the last word of the region. The last two regions of each sentence contained adjunct information that served to add two spill-over regions to each sentence. The critical region in each sentence is the third-to-last region. The verb is present in this region in all versions of each sentence. In the sluicing versions this region contains the indefinite noun phrase and in filler-gap versions this region contains the gap. The extra region in the long examples contained lengthening material.

The experimental sentence sets were divided into four lists in a counterbalanced design. Comprehension questions with two possible answers were prepared for each of the experimental sentence sets. This experiment was then added to a self-paced reading study created with E-Prime (ver. 1.2) that contained three additional self-paced reading experiments with a variety of sentence types. Each experiment contained four versions with a total of seventy-eight experimental items between them. There were also forty-eight filler sentences.

2.3 Procedure

Participants were seated in front of a CRT monitor connected to a PC. Participants were instructed to read the sentences as quickly as possible while still understanding their meaning. The participants were also given a short practice session in order to familiarize them with the experimental process. Sentences were presented phrase by phrase, as indicated in (13). Each subject saw the sentences in a different random order. The participants pulled a trigger to advance to the next phrase of a sentence at which time the previous phrase disappeared. After the last section of the sentence, the participant was presented either with a comprehension question corresponding to the previous sentence or with a new sentence. To answer the comprehension question the participant pulled whichever one of two triggers that corresponded to the answer to the question. The answers to the comprehension question as well as the timing between trigger pulls were recorded.

2.4 Results

Due to an unfortunate counterbalancing error, eight sentences containing adjuncts had to be removed because not every participant received a version of the sentence; therefore, the means calculated do not include reading times from these sentences. The mean reading times in ms are presented in *Table 0.1*. Means from the critical region (region four) showed that the signed difference (long minus short) between long and short filler-gap sentences was 117ms greater than the difference between long and short sentences with reverse sluicing. Additionally, there was a crossover present in the sluices which showed that the critical region in long sluice sentences were read 31ms quicker than in sentences with short sluices.

Initial analysis on the data showed that this trend was not significant. Further analysis showed that participants had increased difficulty in the second region of the appositive sentences. The reason for this was that the appositives presented the reader with a comma at the end of the second region in long examples; this was unlike sentences with restrictive

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Region	*1*	*2*	*3*	***4***	*5*	*6*
Short Sluice (SSl)	944	845		1228	818	812
Long Sluice (LSl)	915	980	1550	1197	816	791
Difference (LSl-SSl)	-29	136	1550	**-31**	-2	-22
Short Filler-Gap (SFG)	855	653		923	774	789
Long Filler-Gap (LFG)	854	937	1543	1009	765	771
Difference (LFG-SFG)	-1	284	1543	**86**	-10	-18

Table 0.1: Average reading times in ms for each region for appositive, restrictive relative clause, and mixed sets of sentences. Region three contains the lengthening added to long sentences and was, therefore, not presenting the short sentences. Region 4 is the critical region containing the main (and first occurring) VP of the sentence.

relative clauses and mixed cases. This is illustrated in (14) and (15). The sentence in (14) is from the appositive group and contains an extra comma, which is not present in (15).

(14) I have no clue what,/ but my roommate,/ the messiest guy in the house,/ left something/ way in the back/ of the fridge

(15) I don't remember what,/ but the hunter/ I met at the big lodge by the lake/ shot something this morning/ after thinking/ that he'd have no luck.

Long times were recorded in region two of the appositive cases. Very plausibly, the reason for these long times was that readers were confused by the presence of an aside directly after entering a subordinate clause. For this reason, the data were also analyzed without the appositive cases.

Table 0.2 reflects the data as they are without the appositives. These data showed that the differences are even further apart; the difference between the long and short sluices was 164ms greater than the difference between the long and short sluices. The crossover in the sluices was partly due to long sluices being read 80ms faster than short sluices.

Region	*1*	*2*	*3*	***4***	*5*	*6*
Short Sluice (SSl)	1001	878		1288	753	866
Long Sluice (LSl)	970	1083	1471	1208	778	848
Difference (LSl-SSl)	-32	205	1471	**-80**	24	-18
Short Filler-Gap (SFG)	886	638		975	733	800
Long Filler-Gap (LFG)	891	984	1528	1060	706	829
Difference (LFG-SFG)	5	347	1528	**84**	-26	29

Table 0.2: Average reading times in ms for each region for restrictive relative clause and mixed sets of data only.

A two-by-two ANOVA was performed again, this time using the data from only the

restrictive relative clauses and mixed sets. The analysis showed a significant effect of type (filler-gap or sluice) but not of length on reading times in region four [$F_{length}(1,47) = .002$, p = ns; $F_{type}(1,47) = 26.887$, $p < .001$] and also showed a significant interaction between length and type [$F_{length\ x\ type}(1,47) = 5.715$, $p < .03$]. These results showed that critical regions of sentences containing reverse sluices took longer to read than the critical regions of filler-gap sentences. Crucially, the increase in reading times of the critical regions from short filler-gap to long filler-gap sentences was greater than the increase of reading times from short to long sluiced sentences, which actually decreased. This interaction is pictured in *Figure 0.1*.

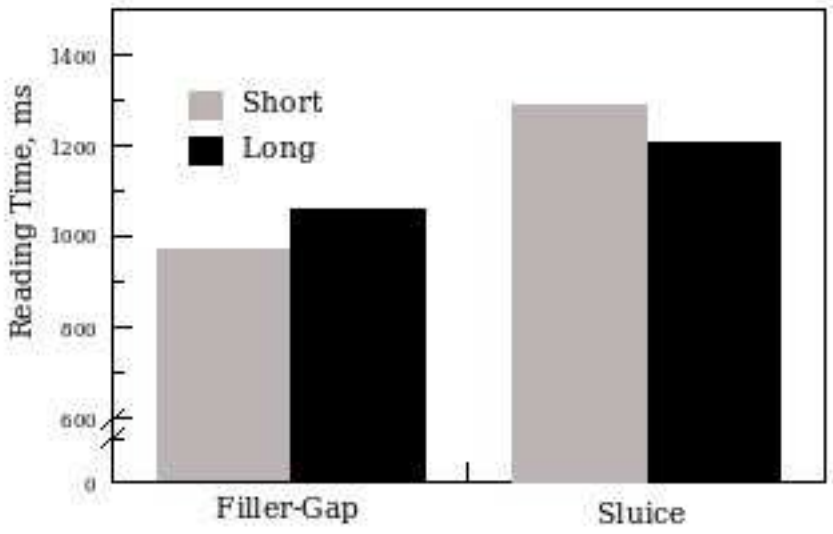

Figure 0.1: Average reading time in ms for the critical region of each of the conditions.

3. Discussion

Data from all three sets of experimental sentences hinted that reverse sluices are processed differently from filler-gap sentences; however, the differences were not significant. As it turns out, unexpected processing difficulties caused by commas in the appositive cases overshadowed the expected processing difficulties from manipulations of length and type in the experiment. However, when the data were analyzed without the appositive cases, significant differences in the processing of filler-gap and reverse sluice sentences arose. Overall, the reverse sluices were more difficult to process than the filler-gap counterexam-

ples. The reason for this difference results from how the reader parses a reverse sluice. The reader constructs the empty IP upon reaching the conjunction "but," realizing that the current phrase has ended and something has been elided. Upon reaching the beginning of the next phrase, the reader identifies this as the "antecedent." As soon as the reader can identify a complete IP from the following overt material, the reader copies that IP from the antecedent into the blank structure. The reader will not copy the lengthening material along with the rest of the IP because it is not necessary. This identification of the minimal IP and the copy procedure are done in the critical region of these sentences. Next, the indefinite is identified from the copied material, and it is bound. This process of copying and binding the variable creates a good deal of processing complexity causing the spike in reading times in the critical region. The rest of the sentence is then parsed and remaining elements may be copied into the IP structure. None of the experimental sentences here contained other possibilities for an indefinite, but in such a situation the reader may have to reanalyze the sentence to find the actual indefinite. If no indefinite is encountered at all, a position for the variable is sprouted and bound.

Because the reader does not copy lengthening material into the blank IP, the critical regions of the examples containing lengthening are no harder to process than their counterparts without lengthening. On the contrary, the critical regions of sentences with lengthening had lower average reading times than their short counterparts. In the examples without lengthening, right after the reader builds the blank IP and identifies the antecedent, the critical region is reached. All of this happening at once may account for the longer times experienced in these critical regions. In the sentences with lengthening, the regions containing the additional material may give the reader a short break before the critical region.

In the filler-gap sentences, the added lengthening increases the processing difficulty for readers. This is because in filler-gap sentences, the reader must cope with the surface syntax in processing. Therefore, lengthening results in a larger the syntactic structure as well as an increased number of discourse referents both of which account for the increase in processing difficulty experienced by readers in filler-gap cases.

The current results provide evidence for a fundamental principle of syntactic theory which states that movement and ellipsis are two distinct syntactic structures each one with its own set of dependencies. This distinction has a clear impact on the processing of sentences containing these structures. Here, intervening material added lengthening between a variable and an operator binding that variable. This lengthening complicated filler-gap processing but not the processing of the superficially similar ellipsis sentences.

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Appendix

A. Types of Sluices Found Online

(1) Forward - Argument (Subject)
"I know there is something wrong, I don't know what but something, I hope she knows what it might be"

(2) Forward - Argument (Object)
"There was a slough or a creek leading out of it on the other side that went miles away, I don't know where, but it didn't go to the river."

(3) Forward - Argument (of NP)
"Eddie Adams (the guy who was shot was indeed a Viet Cong soldier. He had just been involved in the murder of some civilians, I don't recall who but I seem to

remember it was a friend's family members, close to the officer which was why the officer shot him. That man went on to live in the California and ran a grocery store, of all things. I got this from the photographer, Eddie Adams, whom I knew prior to his death a few years ago)."

(4) Forward - Adjunct
"I have got to figure a way to get The Jerk out of there. I don't know how, but I will."

(5) Reverse - Argument (Subject)
"I don't know what but something's changed with him."

(6) Reverse - Adjunct
"This book was different.because of the who elsewhere thing with people growing younger and stuff. I don t know why but this book almost made me cry because it was like love that couldn't happen because they grew younger. And its takes alot to make me cry with a book or movie. But this is a great book and anybody who needs a book or wants a book should give this book a chance. I did!!"

(7) Ambiguous
"oh wow! this is ace. thanks gil...now digger, what about dates?!?! i don't mind when but i have some spare holiday kicking around i need to use up by end of april, otherwise later in the year is equally cool with me"

B. Record of Sluices Observed in Spoken Language

Forward Sluices

-Can you get it so the picture never shows?
-I'm sure you can, but I don't know how.

-What is it, some kind of mind control serum?
-Yeah, what?!

-I want to do something nice for her. I'm not really sure exactly what.

-We were at someone's wedding, but I don't know who's.

-There's still one person we're looking for.
-Who might that be?
-Yeah who?

That's something I've seen before.... from where?

-[about middle school] I went back there, I don't remember why...

-Man, that's heavy, and I don't know why. [about heavy trash barrel, full of water]

-What are you doing?
-Laughing
-Yes. I saw that. Why?

-You look tired.
-Yeah, I don't know why.

Reverse Sluices

-I don't know why, but I'd like to learn it.
-I don't know why, but I'm still kind of confused about clitics.
-For some reason, and I have no idea why, Brandy always wanted to hang out with me.

-I don't know why, it's probably because my family has a history of cancer, but they used to take us to get our moles checked out.

-I don't know why, but I'm really tired today.

Ambiguous

-One of our employees, forgive me I don't know who, brewed some coffee.

C. Experimental Materials

Version A - Short Sluice
Version B - Long Sluice
Version C - Short Filler-Gap
Version D - Long Filler-Gap

Type of Lengthening Material Added
NP - Noun Phrase Appositive
RC - Appositive Relative Clause
RRC - Restrictive Relative Clause
Prenom - Prenominal Modifier
Postnom - Postnominal Modifier
Embedded - Embedded Clause

Sluice Material
Arg - Argument as Sluice Material
Adj - Adjunct as Sluice Material

Appositives

(1) NP - Arg

a. I have no clue what,/ but my roommate/ left something/\n way in the back/ of the fridge.
b. I have no clue what,/ but my roommate,/ the messiest guy in the house,/ left something/\n way in the back/ of the fridge
c. I have no clue what/ my roommate/ left/\n way in the back/ of the fridge.
d. I have no clue what/ my roommate,/ the messiest guy in the house,/ left/\n way in the back/ of the fridge.

(2) NP - Arg

a. I couldn't tell what,/ but Anne/ burned something/\n during her first day/ on the job.
b. I couldn't tell what,/ but Anne,/ the inexperienced new chef at Bertucci's,/ burned something/\n during her first day/ on the job.
c. I couldn't tell what/ Anne/ burned/\n during her first day/ on the job.
d. I couldn't tell what/ Anne,/ the inexperienced new chef at Bertucci's,/ burned/\n during her first day/ on the job.

(3) RC -Arg

a. I don't know what,/ but my brother/ picked up something for dinner/\n after he stopped/ to get gas.
b. I don't know what,/ but my brother,/ who has never gone shopping in his life,/ picked up something for dinner/\n after he stopped/ to get gas
c. I don't know what/ my brother/ picked up for dinner/\n after he stopped/ to get gas.
d. I don't know what/ my brother,/ who has never gone shopping in his life,/ picked up for dinner/\n after he stopped/ to get gas.

(4) RC - Arg

a. I don't know to whom,/ but the king/ relinquished command of the castle to someone/\n when he became too old/ to rule.
b. I don't know to whom,/ but the king,/ nearly dead from a dangerous illness,/ relinquished command of the castle to someone/\n when he became too old/ to rule.
c. I don't know to whom/ the king/ relinquished command of the castle to/\n when he became too old/ to rule.
d. I don't know to whom/ the king,/ nearly dead from a dangerous illness,/ relinquished command of the castle to/\n when he became too old/ to rule.

(5) NP - Arg

a. I forget who,/ but Jerry/ introduced us to someone/\n on our first day/ of college classes.
b. I forget who,/ but Jerry,/ a popular guy at his school,/ introduced us to someone/\n on our first day/ of college classes.

c. I forget who/ Jerry/ introduced us to/\n on our first day/ of college classes.
d. I forget who/ Jerry,/ a popular guy at his school,/ introduced us to/\n on our first day/ of college classes.

(6) RC - Adj

a. I don't know where,/ but the teacher/ left my book somewhere/\n after she borrowed it/ for the weekend.
b. I don't know where,/ but the teacher,/ becoming increasingly senile in her old age,/ left my book somewhere/\n after she borrowed it/ for the weekend.
c. I don't know where/ the teacher/ left my book/\n after she borrowed it/ for the weekend.
d. I don't know where/ the teacher,/ becoming increasingly senile in her old age,/ left my book/\n after she borrowed it/ for the weekend .

(7) NP - Arg

a. I couldn't tell you where,/ but Beowulf/ traveled somewhere/\n in order to kill/ Grendel's mother.
b. I couldn't tell you where,/ but Beowulf,/ glorious and powerful hero of the Gheats,/ traveled somewhere/\n in order to kill/ Grendel's mother.
c. I couldn't tell you where/ Beowulf/ traveled/\n in order to kill/ Grendel's mother.
d. I couldn't tell you where/ Beowulf,/ glorious and powerful hero of the Gheats,/ traveled/\n in order to kill/ Grendel's mother.

(8) RC - Adj

a. I forget where,/ but the child/ hid his bottle somewhere/\n while she was getting ready/ for work.
b. I forget where,/ but the child,/ who loved nothing more than to annoy his mother,/ hid his bottle somewhere/\n while she was getting ready/ for work
c. I forget where/ the child/ hid his bottle/\n while she was getting ready/ for work
d. I forget where/ the child,/ who loved nothing more than to annoy his mother,/ hid his bottle/\n while she was getting ready/ for work

Restrictive Relative Clause

(9) RRC - Arg

a. I can't remember what,/ but the fisherman/ fitted something to his boat/\n upon arriving/ at Old Crystal Lake.
b. I can't remember what,/ but the fisherman/ who always wore the bright orange hat/ fitted something to his boat/\n upon arriving/ at Old Crystal Lake.
c. I can't remember what/ the fisherman/ fitted to his boat/\n upon arriving/ at Old Crystal Lake.
d. I can't remember what/ the fisherman/ who always wore the bright orange hat/ fitted to his boat/\n upon arriving/ at Old Crystal Lake.

(10) RRC - Arg

a. I'm not sure what,/ but my friend/ typed something/\n on my old computer/ in the basement.
b. I'm not sure what,/ but my friend/ who always did her work late at night/ typed something/\n on my old computer/ in the basement.
c. I'm not sure what/ my friend/ typed/\n on my old computer/ in the basement.
d. I'm not sure what/ my friend/ who always did her work late at night/ typed/\n on my old computer/ in the basement.

(11) RRC - Arg

a. I don't remember what,/ but the hunter/ shot something this morning/\n after thinking/ that he'd have no luck.
b. I don't remember what,/ but the hunter/ I met at the big lodge by the lake/ shot something this morning/\n after thinking/ that he'd have no luck.
c. I don't remember what/ the hunter/ shot this morning/\n after thinking/ that he'd have no luck.
d. I don't remember what/ the hunter/ I met at the big lodge by the lake/ shot this morning/\n after thinking/ that he'd have no luck.

(12) RRC - Arg

a. I couldn't tell you who,/ but the manager/ was able to direct us to someone in accounting/\n to help us/ with our tax return.
b. I couldn't tell you who,/ but the manager/ who worked at the concrete factory in Springfield/ was able to direct us to someone in accounting/\n to help us/ with our tax return.
c. I couldn't tell you who/ the manager/ was able to direct us to in accounting/\n to help us/ with our tax return.
d. I couldn't tell you who/ the manager/ who worked at the concrete factory in Springfield/ was able to direct us to in accounting/\n to help us/ with our tax return.

(13) RRC - Arg

a. I forget who,/ but the band/ invited someone to an after-party/\n in the basement/ of their grungy house.
b. I forget who,/ but the band/ that got its name from a bad pun/ invited someone to an after-party/\n in the basement/ of their grungy house.
c. I forget who/ the band/ invited to an after-party/\n in the basement/ of their grungy house.
d. I forget who/ the band/ that got its name from a bad pun/ invited to an after-party/\n in the basement/ of their grungy house.

(14) RRC - Adj

a. I forget where,/ but my Oregon Trail character/ died of dysentery somewhere/\n after all six of his oxen/ drowned.
b. I forget where,/ but my Oregon Trail character/ that almost led the group to

glory/ died of dysentery somewhere/\n after all six of his oxen/ drowned.

c. I forget where/ my Oregon Trail character/ died of dysentery/\n after all six of his oxen/ drowned.
d. I forget where/ my Oregon Trail character/ that almost led our group to glory/ died of dysentery/\n after all six of his oxen/ drowned.

(15) RRC - Adj

a. I don't know where,/ but the fugitive/ fled somewhere/\n after stealing/ his wife's brand new car.
b. I don't know where,/ but the fugitive/ who killed two of his family members/ fled somewhere/\n after stealing/ his wife's brand new car.
c. I don't know where,/ the fugitive/ fled/\n after stealing/ his wife's brand new car.
d. I don't know where,/ the fugitive/ who killed two of his family members/ fled/\n after stealing/ his wife's brand new car.

(16) RRC - Adj

a. I forget where,/ but the janitor/ told me to set this box down somewhere/\n after the last period of school/ ended.
b. I forget where,/ but the janitor/ that the school hired 2 months ago/ told me to set this box down somewhere/\n after the last period of school/ ended.
c. I forget where/ the janitor/ told me to set this box down/\n after the last period of school/ ended.
d. I forget where/ the janitor/ that the school hired 2 months ago/ told me to set this box down/\n after the last period of school/ ended.

Mixed

(17) Prenom + Postnom - Arg

a. I can't tell what,/ but that redneck/ has strapped something/\n on the roof/ of his old truck.
b. I can't tell what,/ but that crazy old redneck/ from the next town over/ has strapped something/\n on the roof/ of his old truck.
c. I can't tell what/ that redneck/ has strapped/\n on the roof/ of his old truck.
d. I can't tell what/ that crazy old redneck/ from the next town over/ has strapped/\n on the roof/ of his old truck.

(18) Prenom and Embedded - Arg

a. I can't remember what,/ but my Mother/ would always nag me to eat something/\n when I woke up/ in the morning.
b. I can't remember what,/ but my now deceased Mother/ who was a health freak/ would always nag me to eat something/\n when I woke up/ in the morning.
c. I can't remember what/ my Mother/ would always nag me to eat/\n when I woke up/ in the morning.

d. I can't remember what/ my now deceased Mother/ who was a health freak/ would always nag me to eat/\n when I woke up/ in the morning.

(19) Prenom - Arg

a. Sean wasn't sure what,/ but his group/ had to write something for their class/\n before they could leave/ for break.
b. Sean wasn't sure what,/ but his senior year/ applied methods of psychology group/ had to write something for their class/\n before they could leave/ for break.
c. Sean wasn't sure what/ his group/ had to write for their class/\n before they could leave/ for break.
d. Sean wasn't sure what/ his senior year/ applied methods of psychology group/ had to write for their class/\n before they could leave/ for break.

(20) Prenom + Prenom - Arg

a. Sean didn't tell me what,/ but the anthropologist/ found something/\n during the last month/ of his journey.
b. Sean didn't tell me what,/ but the well known American anthropologist/ at the burial site in Central America/ found something/\n during the last month/ of his journey.
c. Sean didn't tell me what/ the anthropologist/ found/\n during the last month/ of his journey
d. Sean didn't tell me what/ the well known American anthropologist/ at the burial site in Central America/ found/\n during the last month/ of his journey.

(21) Prenom - Arg

a. I forgot who,/ but the doctor/ asked someone a question/\n about a surgery/ he had never performed.
b. I forget who,/ but the extremely young/ but highly esteemed medical doctor/ asked someone a question/\n about a surgery/ he had never performed.
c. I forget who/ the doctor/ asked a question/\n about a surgery/ he had never performed.
d. I forget who/ the extremely young/ but highly esteemed medical doctor/ asked a question/\n about a surgery/ he had never performed.

(22) Prenom + Postnom - Arg

a. Ben couldn't remember who,/ but his neighbor/ yelled at someone/\n for stepping on/ her perfectly cut lawn.
b. Ben couldn't remember who,/ but his disgusting old neighbor/ living across the street/ yelled at someone/\n for stepping on/ her perfectly cut lawn.
c. Ben couldn't remember who/ his neighbor/ yelled at/\n for stepping on/ her perfectly cut lawn.
d. Ben couldn't remember who/ his disgusting old neighbor/ living across the street/ yelled at/\n for stepping on/ her perfectly cut lawn.

(23) Prenom + Prenom - Adj

a. Hannah forgot where,/ but Sally/ left the car somewhere/\n when she arrived/ at the new mall.
b. Hannah forgot where,/ but her rather negligent friend/ Sally/ left the brand new sports car somewhere/\n when she arrived/ at the new mall.
c. Hannah forgot where/ Sally/ left the car/\n when she arrived/ at the new mall.
d. Hannah forgot where/ her rather negligent friend/ Sally/ left the brand new sports car/\n when she arrived/ at the new mall.

(24) Prenom + Embedded - Adj

a. I can't remember where,/ but the fisherman/ caught the 10 foot fish somewhere/\n at the beginning/ of the fishing derby..
b. I can't remember where,/ but the old fisherman/ that we met yesterday afternoon/ caught the 10 foot fish somewhere/\n at the beginning/ of the fishing derby.
c. I can't remember where/ the fisherman/ caught the 10 foot fish/\n at the beginning/ of the fishing derby.
d. I can't remember where/ the old fisherman/ that we met yesterday afternoon/ caught the 10 foot fish/\n at the beginning/ of the fishing derby.