

Remarks on Sluicing

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Abstract

Sluicing is widely regarded as requiring an analysis via deletion operations. We examine critically and reassess the motivation for a deletion analysis of Sluicing, offering cross-linguistic and language-internal evidence in support of a fundamentally semantic constructional alternative like the one proposed by Ginzburg and Sag (2000).

1 Introduction

Sluicing, one of the most discussed ellipsis phenomena in natural languages, presents interesting challenges for nontransformational theories of grammar like HPSG. The *wh*-expression isolated in Sluicing (the Sluicing ‘remnant’), which may function as either a main or embedded interrogative clause, typically appears with a corresponding element in the immediate linguistic context (the ‘correlate’), as illustrated in (1)–(2):

- (1) a. **Someone** left the room yesterday, but I don’t know **who**.
b. **Someone** left the room yesterday. I wonder **who**.
- (2) A: **Someone** left the room yesterday.
B: **Who**?

But Sluicing remnants sometimes appear without correlates, a phenomenon dubbed ‘sprouting’ by Chung et al. (1995):

- (3) a. They gave away the farm, but I don’t know **to whom**.
b. They gave away the farm. I don’t know **to whom**.
- (4) A: They gave away the farm.
B: **To whom**?

There are three theories of Sluicing that have been discussed in the literature. The first of these is the **Deletion** theory (Ross 1969, Sag 1976, Merchant 2001), where a transformational operation deletes a redundant *S* (or *IP*) that immediately follows an interrogative *wh*-expression that has been fronted, as sketched in (5):

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- (5) a. ...but I don't know [_{CP} [+Q] [_{IP} Kim likes **[who]**]]. \rightsquigarrow *Wh-Movement*
 b. ...but I don't know [_{CP} [+Q] **who**_i] [_{IP} Kim likes ___i]]. \rightsquigarrow *Sluicing*
 c. ...but I don't know [_{CP} [+Q] **who**_i] [_{IP} e]].

(where deletion of IP is possible just in case '[someone i [Kim likes i]]' is 'e-GIVEN'.)

In the second approach to Sluicing, usually referred to as 'LF Copying',¹ LF (LOGICAL FORM) is taken to be a level of syntactic representation that contributes to the determination of linguistic meaning. In LF-Copying theories, the antecedent clause provides an LF representation that is copied into the skeletal LF of the remnant structure, as indicated in (6):

- (6) **[Someone x]** [_{IP} x left the room yesterday] .
 but I don't know [_{CP} **who** x] [_{IP} e]]. \rightsquigarrow
 but I don't know [_{CP} **who** x] [_{IP} x left the room yesterday]].

Finally, there is a 'Direct Interpretation' approach to Sluicing,² where the remnant clause is generated 'as is' and assigned an interpretation on the basis of the surrounding context. In the GS00 analysis, which is the basis for the analysis we adopt here, Sluicing remnant clauses are licensed by a construction that fits into a broader family of ellipsis constructions, including those responsible for sentence fragment and short answers to *wh*-questions and others that license reprise uses of Sluicing and non-*wh* fragments. This construction, which can be informally rendered as a 'S \rightarrow XP[*wh*]' production, is discussed further in section 8 below.

As of this writing, there seems to be broad agreement among ellipsis researchers that some version of Merchant's deletion theory must be correct for Sluicing, if not for ellipsis phenomena in general. This conclusion, if correct, could be deeply troubling for researchers in HPSG, since the transformational operations (movement, deletion) that are essential to Merchant's theory seem broadly inconsistent with HPSG theory. Indeed, they are an anathema to any theory based squarely on principles of linguistic models as solutions to sets of constraints, i.e. the foundations of model-theoretic grammar.

In this paper, we sketch a line of argument (which we develop in more detail elsewhere) to the effect that:

1. Merchant's particular assumptions about the nature of the redundancy precondition for Sluicing are problematic, but can be corrected by appeal to the identity condition proposed in Sag and Hankamer (1984).

¹See Williams 1977 and Chung, Ladusaw, & McCloskey 1995, among others.

²See Ginzburg and Sag 2000 (henceforth GS00) and Culicover & Jackendoff 2005.

2. The arguments in the literature for deletion-based theories of Sluicing are flawed, including, for example, Merchant's 'P-Stranding Universal'.
3. There is syntactic and semantic evidence against deletion-based theories of Sluicing, but consistent with Direct Interpretation models.
4. A minor update of GS00's proposal in order to incorporate incremental context restrictions can explain new data that is inconsistent with competing models.

The proposal we adopt, based on GS00, but cast within a construction-based conception of HPSG that is also known as SIGN-BASED CONSTRUCTION GRAMMAR (SBCG), provides a principled account of the wide range of data we examine.

2 The Semantic Basis of Ellipsis

Ellipsis is fundamentally semantic in nature: the content of an elliptical utterance is determined by the content of an appropriate linguistic antecedent. Deletion provides a seemingly simple account of the interpretation of elliptical utterances. But what is the identity condition licensing ellipsis? The syntactic form of the remnant and the antecedent may differ in ellipsis, as Sag (1976) observed for VP-Ellipsis and Merchant (2001) for Sluicing:

- (7) a. Kim doesn't want anything, but Lee does ~~want something~~.
- b. These people have gall bladders, but I don't ~~have a gall bladder~~.
- c. I went home when they wouldn't ~~go home~~.
- d. I can't play quarterback. I don't even know how ~~to play quarterback~~.
- e. I remember meeting him, but I don't remember when ~~I met him~~.

Facts like these are reconciled with ellipsis theory by Sag and Hankamer (1984), who discuss further related VP-Ellipsis data like (8):

- (8) A: Do you think they'll like **him**_C?
B: Of course they will . [= $\lambda x[like(x, C)]$]
- (9) A: Do you think they'll like **me**?
B: Of course they will . [= $\lambda x[like(x, A)]$; $\neq \lambda x[like(x, B)]$]

Sag and Hankamer offer a purely semantic identity condition as part of their treatment of VP-Ellipsis, which is sketched in (10):³

³Sag and Hankamer were following Sag (1976) in assuming that gaps could not be rebound in ellipsis, an assumption that is now known to be false. We will continue to make this simplifying assumption, though nothing hinges on it.

(10) Delete VP_e in S_e only if:

1. c_e is the Kaplan-context of S_e ,
2. c_a is the Kaplan-context of some sentence S_a not subsequent to S_e in discourse, and
3. there is some VP_a in S_a s.t. for all assignments f ,
 $[[VP_e]]^{c_e f} = [[VP_a]]^{c_a f}$.

The deletion theory of VP-Ellipsis offered by Merchant (2001) is similar, but weaker:

- (11) a. An expression E counts as *e-GIVEN* iff E has a salient antecedent A and, modulo \exists -type shifting,
1. A entails F-clo(E), and
 2. E entails F-clo(A)
- b. Focus condition on VP-ellipsis:
 VP_e can be deleted only if VP_e is *e-GIVEN*.

In particular, his approach weakens the identity condition from identity of sense (the meaning of a linguistic expression fixed in a given context, as shown in (10)), to a condition requiring that the deletion target be ‘*e-GIVEN*’, where this notion is defined as in (11a).

If we ‘update’ Merchant’s (2001) analysis so that it is consistent with the data discussed in Sag and Hankamer (1984), we arrive at the modified theory of Sluicing shown in (12):

- (12) a. A VP_e can be deleted only if VP_e is *e-GIVEN*.
- b. A VP_e can be deleted only if there is a (salient) VP_a in the surrounding context s.t. for all assignments f :
1. $[[F-clo(VP_e)]]^{c_e f} \vdash [[F-clo(VP_a)]]^{c_a f}$ and
 2. $[[F-clo(VP_a)]]^{c_a f} \vdash [[F-clo(VP_e)]]^{c_e f}$.
- c. i.e. only if $[[F-clo(VP_e)]]^{c_e f} = [[F-clo(VP_a)]]^{c_a f}$

In familiar cases like (13), Merchant’s analysis would then license ellipsis:

- (13) Kim will visit Lee, and then Sandy will ~~visit Lee~~.
 $\exists\text{-clo}(VP_a) = F\text{-clo}(VP_a) = \exists x.x \text{ visit Lee.}$
 $\exists\text{-clo}(VP_e) = F\text{-clo}(VP_e) = \exists x.x \text{ visit Lee.}$

Mutual entailment holds, so VP-ellipsis is possible.

But a serious problem for Merchant’s *e-GIVEN* identity condition has been isolated by Hartman (2009), who observes the ‘Relational Opposites Puzzle’ exemplified in (14):

(14) *John will beat someone at chess, and then Mary will ~~lose to someone at chess~~.

Here the predicate in the antecedent (*beat*) and the predicate in the ellipsis site (*lose*) are relational opposites. Because of this, the following facts hold:

- (15) a. $\exists\text{-clo}(\text{VP}_a) = \text{F-clo}(\text{VP}_a)$
= $\exists x.x$ will beat someone at chess.

 $\exists\text{-clo}(\text{VP}_e) = \text{F-clo}(\text{VP}_e)$
= $\exists x.x$ will lose to someone at chess.
- b. VP_a and VP_e satisfy mutual entailment modulo \exists -type shifting. (If someone will beat someone at chess, then someone will lose to someone at chess, and vice versa.)

Thus in (15), VP_e is *e*-GIVEN, which would license ellipsis in (14) under Merchant's proposal. But ellipsis in (14) is clearly impossible.

This Relational Opposites Puzzle is problematic for Merchant's (2001) account of VP-Ellipsis, but Sag & Hankamer's (1984)'s semantic theory of VP-Ellipsis solves the puzzle straightforwardly. Since only the VP sense is relevant to the possibility of deletion, the in-context mutual entailment of the existential closures of distinct VP-senses is simply irrelevant to determining the possibility of deletion.

It should also be noted that the facts considered in this section are problematic for LF-Copying theories of ellipsis, e.g. the VP-Ellipsis theory of Williams (1977) and the theories of Sluicing developed in Chung et al. (1995, 2011)... Copying a piece of LF into a new syntactic context will lead to its being semantically interpreted in the new context. Hence LF-Copying theories, without some arbitrary and otherwise unmotivated codicil, also predict the wrong interaction of ellipsis and indexical interpretation. This point will prove to be relevant later, when we consider the direct interpretation theory of Sluicing in more detail.

3 Arguments against Deletion

There are two powerful arguments against deletion-based theories of Sluicing whose significance has, in our view, been insufficiently appreciated.

Sluices without Sources: As has been argued by GS00 and Culicover and Jackendoff (2005), there are numerous examples to be found which have no plausible source in a deletion-based analysis of Sluicing:

- (16) a. What floor? Where to? How many more? What else? WTF?

- b. Guess who!,⁴ ...
- c. A: Would you like a drink? B: Yeah, how about scotch?
- d. A: I saw it. B: You saw WHAT? [Nonechoic Reprise Use]

Merchant (2004) seeks to rebutt this argument by correctly pointing out that the question of what should be regarded as Sluicing, as opposed to an instance of some other kind of nonsentential utterance, is indeed complex (for discussion, see GS00, Stanley 2000, Merchant 2004, Culicover and Jackendoff 2005, and Stainton 2006). However, if even one example of this kind is an instance of Sluicing, then the deletion-based analysis, at least in any current form, will be hard-pressed to accommodate it.

Island Amnesty: The deletion-based analysis of Sluicing crucially involves the application of *wh*-fronting prior to deletion. Since the hallmark property of *wh*-fronting that has taken center-stage in thousands of pages and several decades of syntactic research is their being subject to island constraints, the natural prediction would of course be that Sluicing obeys island constraints. But it is well known, ever since Ross's (1969) discussion, that this is not the case:

- (17) a. Bo talked to the people who discovered **something**, but we don't know what (*Bo talked to the people who discovered). [CNPC/Subjacency]
- b. Terry wrote an article about Lee and a book about **someone else from East Texas**, but we don't know who (*Terry wrote an article about Lee and a book about) [CSC (Element Constraint)]
- c. He wants a detailed list, but I don't know how detailed (*he wants a list). [Left Branch Condition]

This obvious wild misprediction of deletion-based accounts has led researchers to propose (often with little or no independent motivation) non-Sluicing analyses for examples that otherwise share all relevant properties with uncontroversial instances of Sluicing. Other researchers (see, e.g. Merchant 2001, 2004) have attempted to rework the entire account of island constraints so as to circumvent the Sluicing dilemma, e.g. by localizing these constraints at the level of phonetic form (PF). We note in passing that the empirically correct observation about the Sluicing data, that they obey none of the grammatically imposed constraints on filler-gap dependencies, follows immediately from a direct theory like that of GS00, where Sluicing remnants are generated without appeal to filler-gap constructions. There

⁴It is interesting to note that this example, which is the title of Ross's (1969) seminal article on Sluicing, is an allusion to the introduction to the Woody Woodpecker cartoon show (available at http://www.youtube.com/watch?v=apLe_iB0V_U), where (16b) appears without a linguistic antecedent. Hence the example is a counterexample to deletion-based theories of Sluicing.

are a variety of interacting factors, of course, including considerations of complexity, pragmatic plausibility, and prosody, some of which are discussed below.

Thus the deletion-based approach of Sluicing has an air of implausibility from the outset, which makes it somewhat surprising that this approach has become the analysis of choice within the syntactic community. In the next two sections, we consider putative arguments providing independent support for deletion, arguing that the relevant data in fact support the opposite conclusion.

4 Case Matching Effects

The first and oldest argument for a deletion-based analysis of Sluicing was made by Ross (1969) in his discussion of German contrasts like the following:

- (18) a. Er will jemandem schmeicheln, aber sie wissen nicht, wem/*wen.
he wants someone.D to.flatter but they know not who.D/who.A
'He wants to flatter someone, but they don't know who.'
- b. Er meinte, er hätte geholfen, aber wir wüssten nicht, wem/*wen.
he thought he had helped but we knew not who.D/who.A
'He claims he had helped, but we couldn't say who'

The argument is simply that the verb has to be there at an underlying level in order to assign case to the remnant prior to deletion. In Merchant's theory, the Sluicing transformation does not require syntactic identity between the deletion target and its antecedent. Rather, case matching is explained indirectly by assuming derivations where case marking feeds *WH*-Movement, which feeds Sluicing. That is, E-Givenness must be mediated by verb identity, which has object case identity as a side effect.

The indirect analysis of case matching, where the identity condition is purely semantic, works for German because the elided verb governs a unique case. However, if there were a language with a verb whose object allowed a case alternation, then the prediction of the deletion-based analysis is clear: the remnant object and its correlate should be able to realize distinct cases.

Hungarian is such a language. As examples like the following show, the verb *segít* 'help' allows either a dative or an accusative object:⁵

- (19) Mari segített egy fiúnak/fiut
Mary helped.IND a boy.D/boy.A
'Mary helped some boy.'

But Sluicing examples like the following, which exhibit the critical case mismatch, are unquestionably ungrammatical, unlike their non-elliptical counterparts, which

⁵This importance of this test case for evaluating indirect theories of ellipsis was first pointed out by Polly Jacobson (see Jacobson 2009 and various earlier oral presentations).

are merely degraded, presumably due to parallelism pressures on repeated expressions in contexts such as these:⁶

- (20) a. Mari segített egy fiúnak de nem tudom, hogy kinek/*kit
 Mary helped.IND a boy.D but not I-know.DEF Q who.D/who.A
- b. Mari segített egy fiút de nem tudom, hogy kit/*kinek
 Mary helped.IND a boy.A but not I-know.DEF Q who.A/who.D
 ‘Mary helped a boy, but I don’t know who’

In sum, case matching in Sluicing is not an indirect effect, as entailed by the deletion-based analysis. Rather, a grammatical constraint must dictate directly that there be identity of (category and) case between the remnant and its correlate.

5 The P-Stranding Universal

In numerous publications, Merchant has defended a universal generalization that he calls the P-Stranding Generalization (PSG):

- (21) A Language *L* will allow preposition-stranding under Sluicing just in case *L* allows preposition stranding under regular *WH*-Movement. (Merchant 2001, 107)

In support of PSG, Merchant argues that human languages are bifurcated as shown in (22):

(22) Preposition-Stranding Languages

English:

Peter was talking with someone, but I don’t know (with) who.

Who was he talking with?

Frisian, Swedish, Norwegian, Danish, Icelandic

(23) Non-Preposition-Stranding Languages

German:

Anna hat mit jemandem gesprochen, aber ich weiss nicht *(mit) wem.

Anna has with someone.D spoken, but I know not *(with) whom.D

*Wem hat sie mit gesprochen?

Greek, Yiddish, Czech, Russian, Slovene, Polish, Bulgarian, Persian, Serbo-Croatian, Hebrew, Moroccan Arabic, Basque.

⁶Special thanks to Polly Jacobson, Donka Farkás, Jula Horvath, and (indirectly) Zoltán Szabó, for their help in sorting out the Hungarian data.

The PSG follows in a deletion-based theory that assumes derivations where *WH*-Movement feeds Sluicing. By contrast, the PSG is potentially problematic for theories, like those of GS00 and Culicover and Jackendoff 2005, where the analysis of Sluicing does not involve a filler-gap dependency, and hence the behavior of the two phenomena are not predicted to be correlated.

The literature abounds with challenges to the PSG. Potentially problematic data have been noted in all the following languages: English (Chung et al. 1995, Fortin 2007), Spanish (Vicente 2006, 2008, Rodrigues et al. 2009), Polish (Szczegielniak 2008, Nykiel and Sag 2009), Czech (Caha 2011), Bahasa Indonesia (Fortin 2007), Amis (Wei 2011), Serbo-Croatian (Stjepanović 2008), Farsi (Toosarvandani 2008), and Brazilian Portuguese (Almeida and Yoshida 2007, Lasnik 2007, Rodrigues et al. 2009). Some researchers (e.g. Vicente 2008, Rodrigues et al. 2009, Szczegielniak 2008, van Craenenbroeck 2010) have tried to reconcile these data with the PSG by proposing that the relevant examples in a particular language are not derived via Sluicing, but rather through a process of ‘Pseudo-Sluicing’ (Merchant, 2001), an independent deletion transformation formulated to derive the Sluicing-output doppelgangers from a different source, e.g. a cleft or cleft-like clause such as (24):

(24) Kim spoke to someone, but I don’t know who ~~it was~~.

The details of this alternative analysis, as well as its independent motivation (beyond the observation that the cleft construction allows NP pivots in languages that don’t allow P-stranding), are seldom supplied.

Other researchers (e.g. Stjepanović 2008) have tried to salvage the PSG by invoking a P-Deletion Transformation whose existence would give rise to derivations like the following:

- (25) a. ..., but we didn’t know [[+Q] they spoke [to *whom_i]]._i~>*
- b. ..., but we didn’t know [[to *whom_i]] they spoke to _i].~>*
- c. ..., but we didn’t know [[to *whom_i]] ~~they spoke to~~].~>*
- d. ..., but we didn’t know [[~~to~~ *whom_i]].*

P-Deletion would be specific to the output of the Sluicing transformation and, as far as we are aware, is not independently motivated in any language. If the P-Deletion proposal is accepted under these circumstances, then it is plain that any set of data could be made consistent with the PSG. That is, without independent motivation for P-Deletion, e.g. its existence in some context other than Sluicing, the PSG becomes devoid of empirical content. Thus, as Rodrigues et al. (2009) observe in their discussion of putative Spanish Pseudo-Sluicing: ‘The strongest implication of this analysis is that all languages that appear to violate this generalization [= the PSG - IAS/JN] should be reducible to a pseudosluicing analysis.’

However, we argue in section 7 that there is at least one language – Polish – whose interrogative-clause, Sluicing-like ellipsis would have to be treated as Pseudo-Sluicing if the PSG is assumed, cannot be so treated. Before turning to the Polish data, we must enter into a small digression about the interaction of Sluicing and phrasal complexity.

6 Sluicing and Phrasal Complexity

It is quite likely that the pattern of preposition omission under Sluicing is modulated by both the phrasal complexity of the correlate and that of the remnant *wh*-expression. Phrasal complexity is an alternative to the intuitive sounding but delphic notion of ‘D(iscourse)-linking’ introduced by Pesetsky (1987). Pesetsky offered D-linking as an explanation of differences in the behavior of interrogative *which*-NP phrases (D-linked) and bare interrogative pronouns (usually non-D-linked) with regard to Superiority effects (*Which book did which student read?* is more acceptable than *What did who read?*)

Which-NP phrases have been shown to improve the acceptability of multiple *wh*-interrogatives. However, Hofmeister and colleagues⁷ have argued that the difference between these two types of *wh*-phrase is a special case of a much broader and independently motivated phenomenon. *Which*-NP phrases, since they are more complex than bare interrogative pronouns, facilitate the processing of filler-gap dependencies at the point where a filler must be retrieved from working memory and integrated into the sentence interpretation. This effect produces characteristic reading time differences, correlated with variation in the overall acceptability level of relevant sentences.

We hypothesized that there are two reasons why preposition omission in Sluicing is sensitive to differences in the phrasal complexity of correlates and remnants. First, given that Sluicing is an anaphoric construction, we expect remnants to reflect the degree of accessibility of their correlates, following the predictions of Accessibility Theory (Ariel 1990, 2001). Accessibility Theory highlights the role of (potential) antecedents and anaphors in the process of retrieving linguistic material from memory. As speakers access and re-access utterances in the discourse they have processed, they mark them according to how accessible (prominent or salient) they perceive them to be. Using forms richer in lexical information signals and serves to retrieve low-accessibility antecedents. On the other hand, such forms may themselves become accessible antecedents as discourse evolves.

For Sluicing, the phrasal complexity of both a *wh*-phrase and its correlate increase with the amount of lexical information they encode. A more complex NP becomes a more accessible correlate, which is in turn reflected by the form of a remnant, which is typically a *which*-NP phrase where the head NP is usually absent

⁷See Hofmeister 2007, 2009, Hofmeister et al. 2007, Hofmeister and Sag 2010, and Hofmeister et al. 2011.

due to the repeated name penalty.⁸ We make the further prediction that in case the correlate is a PP here, the preposition is not required in the remnant. If, however, a less complex phrase (e.g. an indefinite pronoun) serves as the correlate, it is retrieved using a more explicit form of the remnant. This is done, we propose, by including a preposition in such a remnant in order to compensate for the low degree of accessibility of the phrase's correlate.

The second reason why we explore the effect of complexity under Sluicing is that the complexity of the correlate may play a role similar to the complexity of the filler in filler-gap constructions. The mediating effect of increased complexity in Superiority violations and extractions from islands is evident in English and much cross-linguistic data (Hofmeister et al. 2007, Hofmeister 2009, Hofmeister et al. 2011). This is because complex phrases are understood as providing more specific semantic and syntactic information, and thus receive stronger mental representations that are more accessible for subsequent reference. This provides a means of explaining *which N/who* contrasts not by syntactic constraints, but by appeal to memory retrieval.

Building on this research, we may treat both examples with simple correlates and those with complex correlates as grammatical (i.e. allowed by the grammar), accounting for the variable acceptability of such examples in terms of independently motivated aspects of memory and retrieval, rather than grammar. The difference between Sluicing and filler-gap constructions is that when a remnant is encountered in Sluicing, its correlate is retrieved rather than the remnant itself. (By contrast, when a gap is encountered, what is retrieved is the very dislocated *wh*-phrase that was processed earlier). A more complex correlate should be easier to retrieve, because it provides more specific semantic and syntactic information than a less complex correlate. On this view of Sluicing, there is no grammatical connection between preposition stranding in *wh*-extraction and preposition omission in Sluicing remnants. The proposal we are defending here is reminiscent of the remark made in passing by Frazier and Clifton (2011: 43) that 'perhaps activating the antecedent is easier with a D-linked interrogative [...] The D-linked interrogative may simply serve as a better retrieval cue'. This is part of the story, but not the whole story. In addition, when the antecedent is firmly established in memory by a complex correlate, as in (26a), P-omission is facilitated as well. We predict that the same should be true in the case of more complex prepositions, as in (26b):

- (26) a. Kim had lunch yesterday with someone she claims was a member of the original Virginia Tea Party organization, but I still don't know *who(m)*.
~~she had lunch with yesterday.~~ (\geq I still don't know with whom.)
- b. The dog ran right up to someone, but I don't know *who(m)*. ~~the dog ran~~

⁸The repeated name penalty refers to the processing difficulty of accessing prominent antecedents by means of too explicit an anaphor. For more information, see Almor (1999), Garrod et al. (1994), Gordon et al. (1993, 1999, 2004) and Swaab et al. (2004).

~~right up to.~~ (\geq I don't know (right) up to whom.)

We are currently exploring predictions such as these in a number of languages (see also the next section).

7 Polish and the P-Stranding Generalization

Sluiced phrases (remnants) without prepositions in Polish cannot be derived from cleft-like structures analogous to those that Rodrigues et al. (2009) posit as the source for prepositionless remnants in Spanish and Brazilian Portuguese. As shown in (27), the case of the Polish Sluicing remnant must correspond to the case of the correlate, which is genitive in (27):

- (27) Adam regularnie dostaje prezenty od kogoś/ jakiejś dziewczyny,
Adam regularly gets presents from someone.G/ some girl.G
ale nie wiem kogo/ jakiej.
but not I.know who.G/ which.G

'Adam regularly gets presents from someone/some girl, but I don't know who/which (girl).'

But an NP pivot in the analogue of the structure assumed by Rodrigues et al. must bear instrumental case in Polish, as illustrated in (28). While the undeleted version is fine in (28), the deleted one, producing the instrumental remnant, is not.

- (28) Adam regularnie dostaje prezenty od kogoś/jakiejś dziewczyny, ale nie
Adam regularly gets presents from someone.G/some girl.G, but not
wiem kim (*jest osoba/dziewczyna od której Adam dostaje prezenty.)
I.know who.I (*is person.N/girl.N from whom.G Adam gets presents)

'Adam regularly gets presents from someone/some girl, but I don't know who is the person/girl Adam regularly gets presents from.'

Any proposal that posits Pseudo-Sluicing from cleft-like sources must be carefully examined for this kind of obvious misprediction.

An alternative cleft structure is proposed by Szczegielniak (2008) as a way of accounting for an observed difference in acceptability between prepositionless *which*-NP phrases and their non-complex counterparts (bare interrogative pronouns). The underlying cleft structure he assumes for a *which*-NP remnant clause is shown in (29):

- (29) Adam regularnie dostaje prezenty od jakiejś dziewczyny, ale nie wiem
Adam regularly gets presents from some girl.G but not I.know
jakiej.G ~~to od dziewczyny Adam regularnie dostaje prezenty.~~
which.G ~~it from girl.G Adam regularly gets presents~~

'Adam regularly gets presents from some girl, but I don't know which (girl) it is that Adam regularly gets presents from.'

Szczegielniak's (2008) argument is that *which*-NP remnants are the only phrases that allow preposition omission in Polish, and that this is due to the fact that in the cleft sources, prepositions are stranded rather than pied-piped with the *which*-NPs. While Szczegielniak offers some support for his analysis, he fails to demonstrate that the proposed underlying cleft structure is fully acceptable in Polish (see Nykiel, under revision, for experimental evidence showing that it is not).

Another reason to doubt Szczegielniak's analysis is that it does not appear to offer any possibility of deriving prepositionless *which*-NP phrases where the NPs are present. This is because of the impossibility of P-stranding in Polish. For example, Szczegielniak's analysis is inconsistent with contrasts like the following, where a well-formed instance of Sluicing would have to be derived from a completely ungrammatical structure, as indicated:

- (30) Adam regularnie dostaje prezenty od jakiejś dziewczyny,
 Adam regularly gets presents from some girl.G
 ale nie wiem jakiej dziewczyny (*to od Adam regularnie dostaje prezenty.)
 but not I.know which girl.G (*it from Adam regularly gets presents)
 'Adam regularly gets presents from some girl, but I don't know which girl
 it is that Adam regularly gets presents from.'

While we agree that phrasal complexity is involved in preposition omission in Sluicing, we assume that its involvement follows from the encoding and retrieval of linguistic signs from memory, as discussed in the previous section. We conducted several acceptability judgment experiments testing the interaction of Sluicing and phrasal complexity, whose results we now discuss briefly.⁹

We found that the possibility of preposition omission is a graded phenomenon in Polish. It is sensitive to manipulations of the phrasal complexity of a PP correlate for a given remnant. Either the preposition or the prepositional object can be the target of such manipulations. For correlates containing multisyllabic prepositions, remnants without prepositions are marginally different from their counterparts with prepositions.

- (31) Anna poszła zamiast kogoś, ale nie pamiętam (zamiast) kogo.
 Anna went instead of someone.G but not I.remember (instead of) who.G
 'Anna went instead of somebody, but I don't remember who.'

Similarly, when we have an NP correlate and a *which*-NP phrase remnant (matching in complexity) acceptability is unaffected by P-omission in the remnant clause:

- (32) Anna pracowała nad jakimś projektem,
 Anna worked on a project.I
 ale nie pamiętam (nad) jakim (projektem)
 but not I.remember (on) what (project).I

⁹Space limitations prevent us from providing detail here regarding the design of the experiments and statistical analysis of the results.

‘Anna worked on a project, but I don’t remember what (project).’

If phrasal complexity is decreased such that correlates contain monosyllabic prepositions, omission of such prepositions from the remnants significantly lowers acceptability scores:

- (33) Anna poszła do kogoś, ale nie pamiętam (do) kogo.
Anna went to somebody.G but not I remember (to) who.G
‘Anna went to somebody, but I don’t remember who.’

For non-complex correlates – indefinite pronouns paired with bare interrogative pronouns – preposition omission, too, is degraded:

- (34) Anna pracowała nad czymś, ale nie pamiętam (nad) czym
Anna worked on something.I but not I remember (on) what.I
‘Anna worked on something, but I don’t remember what.’

One might propose that an increase in phrasal complexity has a mitigating effect on an otherwise categorical violation, and that preposition omission is one of these. As a way of verifying whether this is so, we manipulated the phrasal complexity of remnant *wh*-phrases in a related construction, sprouting. Here, there are no overt correlates and preposition omission is categorically unacceptable. We found no difference in acceptability between *which*-NP phrases (35) and bare interrogative pronouns (36):

- (35) Ekspedient się zdenerwował, ale nie wiem *(na) którego klienta.
assistant REFL got angry but not I.know *(with) which customer.A
‘The assistant got angry, but I don’t know with which customer.’
- (36) Ekspedient się zdenerwował, ale nie wiem *(na) kogo.
assistant REFL got angry but not I.know *(with) who.A
‘The assistant got angry, but I don’t know with who.’

This result shows that an increase in the phrasal complexity of the remnant fails to improve the acceptability of a categorical violation. Hence, preposition omission in Sluicing, unlike preposition omission in sprouting, cannot be a categorical violation for its sensitivity to manipulations of phrasal complexity.

Given our assumption, formulated in the previous section, that the effect of phrasal complexity is distributed between the correlate and the remnant, we conducted another experiment. Here, some items instantiated cataphoric Sluicing, e.g. (37), where the order of correlate and remnant was reversed such that the remnant preceded its correlate. Cataphoric Sluicing was compared with the baseline – regular (anaphoric) Sluicing, where correlates preceded remnants, as in (38):

(37) Nie wiem (przeciw) komu, ale większość posłów głosowała
not I know (against) who.D but majority congressmen.G voted
przeciw komuś.
against someone.D

‘I don’t know who, but the majority of the congressmen voted against someone.’

(38) Większość posłów głosowała przeciw komuś,
majority congressmen.G voted against someone.D
ale nie wiem (przeciw) komu.
but not I.know (against) who.D

‘The majority of the congressmen voted against someone, but I don’t know who.’

Preposition omission was significantly degraded in cataphoric Sluicing as compared to (1) anaphoric Sluicing and (2) preposition retention in both anaphoric and cataphoric Sluicing. We attribute this result to the fact that a correlate processed prior to a remnant creates a mental representation whose accessibility determines the form of the remnant following that correlate. If a correlate follows a remnant, we expect a degradation in the acceptability of preposition omission due to the difficulty of resolving the remnant before the correlate is encountered. Intuitively, including prepositions in remnants preceding their correlates reduces some of the ambiguity associated with such phrases, which, if prepositionless, could serve as either verbal or prepositional objects in Polish.

In light of these considerations, we conclude that the grammar of Polish should not impose any restriction against the possibility of P-omission in Sluicing – the observed pattern of graded acceptability can be described, even explained, in terms of independently motivated considerations of differential processing complexity. Thus, even if it is possible to find independently motivated, adequate alternative analyses of all the apparent counterexamples to PSG from the other languages cited above (which, as far as we know is not the case), there is at least one language that stands as a true counterexample to the PSG and to the consequences of PSG noted by Rodrigues et al. (2009). Since the PSG is entailed by the ‘movement followed by deletion’ analysis standardly assumed in current discussions, we believe this provides more than sufficient motivation for considering non-transformational, construction-based alternatives like the one proposed by GS00.

8 The GS00 Analysis

Space limitations prevent us from embarking upon an extensive discussion of the GS00 analysis of Sluicing and the revisions to it that we feel are called for. However, it is worth commenting on how that analysis, as it stands, deals with the various issues we have raised in this paper.

The Basics: GS00’s Sluicing Construction is formulated as in (39):

$$(39) \left[\begin{array}{l} \text{SYN} \quad S \\ \text{SEM} \quad \lambda \Sigma \Phi \\ \text{CNTXT} \quad \left[\begin{array}{l} \text{SAL-UTT} \quad \left\{ \begin{array}{l} \text{SYN} \quad [\text{CAT } X] \\ \text{SEM} \quad [\text{IND } i] \end{array} \right\} \\ \text{MAX-QUD} \quad \lambda \{ \} \Phi \end{array} \right] \end{array} \right] \rightarrow \left[\begin{array}{l} \text{SYN} \quad [\text{CAT } X] \\ \text{SEM} \quad [\text{IND } i] \\ \text{STORE} \quad \Sigma \end{array} \right]$$

where Σ is a nonempty set of parameters.

According to (39), the ‘Maximal-Question-Under-Discussion’ (MAX-QUD) in the dialogue¹⁰ provides the basis for an interpretation of the remnant clause. In addition, there must be a match re. both syntactic category (CAT) and semantic index (IND) between the remnant and the correlate (identified as the salient utterance (SAL-UTT) associated with the MAX-QUD in the immediate context), as indicated.

The Semantic Identity Condition: Since this analysis defines the interpretation of a Sluiced clause in terms of the MAX-QUD, it provides a fundamentally semantic/pragmatic account of Sluicing. Since there is no syntactic identity condition, we are not surprised to find examples of Sluicing where there is no clear antecedent clause. Though the form of the prior dialogue is a powerful force in shaping the questions under discussion in a dialogue, it is possible for the immediate extralinguistic context to affect these as well, as indicated by some of the examples in (16) above. The immediacy of the relevant context, whether linguistically expressed or not, also follows from the GS00 account of Sluicing, since the value of MAX-QUD, the basis for the interpretation of the Sluiced clause, is constantly being updated as a dialogue progresses. Moreover, since the MAX-QUD is part of the Dialogue Game Board, where the objective facts of the dialogue are recorded (see Ginzburg 2011), it follows that the denotation of any given referring expression is grounded objectively, rather than from the perspective of any single dialogue participant. This provides an immediate account of the constraints on indexical resolution in ellipsis observed by Sag and Hankamer (1984) which we discussed in section 2 above. Our earlier discussion was in terms of VP-Ellipsis, but as examples like (40) make clear, exactly the same constraints apply in Sluicing:

(40) A: Someone is following me.

B: I wonder who __. [__ = is following A; ≠ is following B].

Case Matching Effects: The category of the Sluicing remnant must match that of the correlate (encoded as the SAL-UTT in (39)). Thus all the problems of cleft-based analyses reviewed in section 5 are avoided, as is the problem of restrictions on Sluicing that are observed when a verb’s object allows multiple case realizations, as we saw in Hungarian. Since the category identity requirement directly

¹⁰GS00, building on previous work by Ginzburg, Hull, Keenan and others, argue that questions are propositional abstracts.

relates the Sluicing remnant and its correlate, and since the CASE feature specification is part of the CATEGORY value, this analysis correctly enforces remnant-correlate case identity, which, as we saw, posed difficulties for indirect analyses (like Merchant's) of case matching in Sluicing.

Island Amnesty and the PSG: Ross (1969) noted that in order for a deletion-based analysis of Sluicing to work, *wh*-movement would have to apply in violation of island constraints. This problem also plagues Merchant's deletion analysis, which must transform the theory of syntactic islands to be about PF representations, not the syntactic representations that are directly manipulated by movement operations. The direct theory of GS00, by contrast, solves this problem simply: the remnants are directly generated; no island-sensitive operations are involved. Similarly, the fact that there is no cross-linguistic correlation of P-stranding and the possibility of P-omission in Sluicing is explained by the GS00 account, where the remnant clause involves no filler-gap dependency and hence no expectation that properties of *wh*-movement will be projected into the grammar of Sluicing. On the deletion-based analysis of Sluicing, however, the absence of this correlation, given the impossibility of generalizing the Pseudo-Sluicing analysis to the full range of counterexamples, remains an unexplained problem.

9 Conclusion

In this paper, we have reassessed the data that have been offered and widely accepted as evidence for a deletion-based analysis of Sluicing. We have reexamined the identity condition involved in deletion in general, arguing against Merchant's *e*-GIVENNESS condition in favor of the contextualized identity of sense condition proposed by Sag and Hankamer (1984). We have also expanded the range of data relevant to the discussion of case-matching effects in Sluicing, arguing against an indirect account of the sort embraced by deletion-based approaches. In addition, we have called into question Merchant's P-Stranding Generalization and reassessed the importance of the island amnesty effect that has exercised so many researchers since Ross discovered it.

Sluicing is a fundamentally semantic phenomenon whose remnant constituents are directly generated without extraction or deletion. Sluicing lends itself very nicely to a construction-based account of the sort developed by GS00, which, as we have indicated, and intend to show in more detail elsewhere, provides a satisfying account of its syntactic and semantic properties which avoids all the problems raised here for analyses based on movement and deletion.

References

- Almeida, Diogo, and Masaya Yoshida. 2007. A Problem for the Preposition Stranding Generalization. *Linguistic Inquiry* 38 : 349–362.

- Almor, A., 1999. Noun-phrase anaphora and focus: the informational load hypothesis. *Psychological Review* 106 :748–765.
- Ariel, M. 1990. *Accessing Noun Phrase Antecedents*. Lon-NY: Routledge.
- Ariel, Mira. 2001. Accessibility theory: An overview. In T. Sanders, J. Schilperoord, and W. Spooren (eds.), *Text Representation: Linguistic and Psycholinguistic Aspects*, 29–87. Amsterdam: John Benjamins.
- Caha, Pavel. 2011. Case in Adpositional Phrases. Ms, CASTL, Tromsø.
- Chung, Sandra, William Ladusaw, and James McCloskey. 1995. Sluicing and Logical Form. *Natural Language Semantics* 3 :239–282.
- Chung, Sandra, William Ladusaw, and James McCloskey. 2011. Sluicing(:) Between Structure and Inference. In R. Gutierrez-Bravo et al. (eds.), *Representing Language: Essays in Honor of Judith Aissen*, 31–50. California Digital Library eScholarship Repository. Linguistic Research Center, UCSC.
- van Craenenbroeck, Jeroen. 2010. Invisible Last Resort – A Note on Clefts as the Underlying Source for Sluicing. *Lingua* 120 :1714–1726.
- Culicover, Peter and Ray Jackendoff. 2005. *Simpler Syntax*. New York: OUP.
- Fortin, Catherine. 2007. *Indonesian Sluicing and Verb Phrase Ellipsis: Description and Explanation in a Minimalist Framework*. Doctoral dissertation, University of Michigan, Ann Arbor.
- Frazier, Lyn, Clifton, Charles Jr. 2011. D-linking and Memory Retrieval: The annoying Case of Sluicing. In J. A. Harris and M. Grant (eds.), *University of Massachusetts Occasional Papers in Linguistics* 38 :37–52.
- Garrod, S., Freudenthal, D., Boyle, E.A., 1994. The Role of Different Types of Anaphor in the On-Line Resolution of Sentences in a Discourse. *Journal of Memory and Language* 33 :39–68.
- Ginzburg, Jonathan and Ivan A. Sag. 2000. *Interrogative Investigations: The Form, Meaning, and Use of English Interrogatives*. Stanford: CSLI Publications. [Distributed by University of Chicago Press]
- Ginzburg, Jonathan. To appear. *The Interactive Stance: Meaning for Conversation*. OUP
- Gordon, P.C., Grosz, B.J., and Gilliom, L.A. 1993. Pronouns, Names, and the Centering of Attention in Discourse. *Cognitive Science* 17 :311–347.
- Gordon, P.C., Hendrick, R., Ledoux, K., and Yang, C.L. 1999. Processing of Reference and the Structure of Language: An Analysis of Complex Noun Phrases. *Language and Cognitive Processes* 14 :353–379.

- Gordon, P.C., Camblin, C.C., and Swaab, T.Y. 2004. On-Line Measures of Coreferential Processing. In M. Carreiras and C. Clifton (eds.), *The On-line Study of Sentence Comprehension: Eyetracking, ERP, and Beyond*, 139–150. New York, NY: Psychology Press.
- Hartman, Jeremy. 2009. When E-GIVENness Over-predicts Identity. Paper presented at the Fourth Brussels Conference on Generative Linguistics (BCGL 4) Ellipsis Workshop. Hogeschool-Universiteit Brussel.
- Hofmeister, Philip. 2007. *Representational Complexity and Memory Retrieval in Language Comprehension*. Stanford, CA: Stanford University dissertation.
- Hofmeister, Philip. 2009. Representational Complexity and Memory Retrieval in Language Comprehension. Poster presented at The CUNY Sentence Processing Conference.
- Hofmeister, Philip, T. Florian Jaeger, Ivan A. Sag, Inbal Arnon, and Neal Snider. 2007. Locality and Accessibility in *WH*-Questions. In Sam Featherston and Wolfgang Sternefeld (eds.), *Roots: Linguistics in Search of its Evidential Base*, 185–206. Berlin: de Gruyter.
- Hofmeister, Philip and Ivan A. Sag. 2010. Cognitive Constraints and Island Effects. *Language* 86(2) :366–415.
- Hofmeister, Philip, T. Florian Jaeger, Inbal Arnon, Ivan A. Sag, and Neal Snider. 2011. The Source Ambiguity Problem: Distinguishing the Effects of Grammar and Processing on Acceptability Judgments. *Language and Cognitive Processes*.
- Jacobson, Pauline. 2009. The Short Answer. And What it Answers. Invited talk: 16th International Conference on Head-Driven Phrase Structure Grammar, Göttingen.
- Lasnik, Howard. 2007. On Ellipsis: The PF Approach to Missing Constituents. In A. Conroy, C. Jing, C. Nakao and E. Takahashi (eds.), *University of Maryland Working Papers in Linguistics* 15: 1430–153. College Park, MD.
- Merchant, Jason. 2001. *The Syntax of Silence: Sluicing, Islands, and Identity in Ellipsis*. Oxford/New York: Oxford University Press.
- Merchant, Jason. 2004. Fragments and Ellipsis. *Linguistics and Philosophy* 27 : 661–738.
- Nykiel, Joanna. Under revision. Clefts and Preposition Omission under Sluicing. *Lingua*.
- Nykiel, Joanna, and Ivan A. Sag. 2009. Sluicing and Stranding. Paper presented at the Annual Meeting of the LSA. San Francisco, CA.

- Pesetsky, David. 1987. *Wh-In-Situ: Movement and Unselective Binding*. In E. Reuland and A.G. ter Meulen (eds.), *The representation of (in)definiteness*, 98–129. Cambridge, Mass. : The MIT Press.
- Rodrigues, Cilene, Andrew Nevins, and Luis Vicente. 2009. Cleaving the Interactions between Sluicing and Preposition Stranding. In L. Wetzels and J. van der Weijer (eds.), *Romance Languages and Linguistic Theory 2006*, 175–198. John Benjamins, Amsterdam.
- Ross, John R. 1969. Guess Who?. In Robert Binnick, Alice Davison, Georgia Green, and Jerry Morgan (eds.), *Papers from the 5th Regional Meeting of the Chicago Linguistic Society*, pp. 252–286. Chicago: CLS.
- Sag, Ivan A. 1976 *Deletion and Logical Form*. Doctoral dissertation, MIT. [Published in 1979 by Garland Press, New York].
- Sag, Ivan A., and Jorge Hankamer. 1984. Toward a Theory of Anaphoric Processing. *Linguistics and Philosophy* 7: 325–345. [Reprinted in Asa Kasher, ed. (1998), *Pragmatics – Critical Concepts, Volume III*. London and New York: Routledge. Pp. 118–138.]
- Stainton, Robert. 2006. *Words and thoughts*. Oxford: Clarendon Press.
- Stanley Jason. 2000. Context and Logical Form. *Linguistics and Philosophy* 23 :391–434.
- Stjepanović, Sandra. 2008. P-Stranding under Sluicing in a Non-P-Stranding Language? *Linguistic Inquiry* 37(1) :179–190.
- Szczepielniak, Adam. 2008. Islands in Sluicing in Polish. In Natasha Abner and Jason Bishop (eds.), *Proceedings of the 27th West Coast Conference on Formal Linguistics*, Cascadilla Proceedings Project, 404–412. Somerville, MA, USA.
- Swaab, T.Y., Camblin, C.C., Gordon, P.C., 2004. Reversed Lexical Repetition Effects in Language Processing. *J. of Cognitive Neuroscience* 16 :715–726.
- Toosarvandani, Maziar. 2008. *Wh-Movement and the Syntax of Sluicing*. *Journal of Linguistics* 44 :677–722.
- Vicente, Luis. 2006. Negative Short Replies in Spanish. Ms., U. of Leiden.
- Vicente, Luis. 2008. Syntactic Isomorphism and Non-Isomorphism under Ellipsis. Ms. UCSC.
- Wei, Ting-Chi. 2011. Parallelism in Amis Sluicing. *Concentric: Studies in Linguistics* 37(1) :1–44.
- Williams, Edwin. 1977. Discourse and Logical Form. *Linguistic Inquiry* 8 :101–139.