Sluicing and the Lexicon: The Point of No Return

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0.   Introduction

Sluicing is the name given by Ross (1969) to the ellipsis construction bracketed in the examples below.[*]

(1) a.   The cats are eating something, but we're not sure [what _].
   b.   The cats are eating, but we're not sure [what _].
   c.   She's talking, but we don't know [to who _].
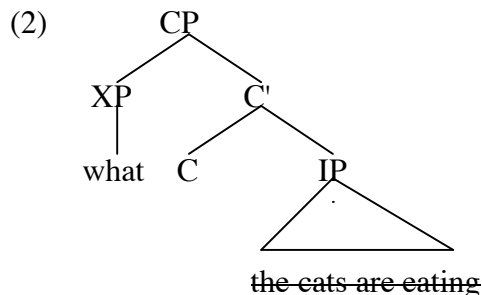   d.   They're going to finish, but I don't know [when/how fast/why _].

In this construction, an interrogative phrase appears stranded where one might have expected to find a complete constituent question. I will refer to the stranded interrogative phrase (e.g. *what* in (1a)) as the *remnant*, and to the missing portion of the constituent question (represented by _) as the *elided IP*. The two combine to form a constituent (in brackets) that I call the *sluice*. The content of the elided IP corresponds to the content of some other sentence in the discourse (e.g. *the cats are eating something* in (1a)), which I call the *antecedent IP*. Notice finally that the antecedent IP sometimes contains overt material corresponding to the remnant (e.g. *something* in (1a)); this overt material I refer to as the *correlate*. The contrast between sluicing constructions in which the remnant has an overt correlate and those in which it does not will be important below.

The most elegant and successful account of sluicing to date is that developed by Merchant (2001, 2003; for other treatments, see e.g. Levin 1982; Chung, Ladusaw, and McCloskey 1995; Romero 1998; Ginzburg and Sag 2000; and Fox and Lasnik 2001). In Merchant's theory, sluicing is derived by PF deletion of a fully articulated IP in which syntactic Wh-movement has occurred, as shown below in (2). The deletion is constrained by a semantic condition which, in essence, requires the nonfocused portions of the antecedent IP and the elided IP to

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entail each other. (See Merchant 2001:26-37 for details.) No other syntactic or semantic conditions are imposed: no syntactic identity, LF isomorphism, or LF copying of the sorts hypothesized in many of the other works just cited.

(2)

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              CP
           /      \
         XP         C'
         |        /    \
       what     C        IP
                        /  \
                       /    \
                  the cats are eating
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Key evidence for Merchant's claim that Wh-movement has applied within the sluice comes from what he calls *form-identity* effects. First, case marking. Ross (1969:253-254) noticed that in German and other languages, DP remnants in sluicing exhibit just the case marking one would expect if they had originated within a fully articulated IP and then undergone Wh-movement. Second, preposition stranding. Drawing on data from numerous languages, Merchant (2001:91-107) shows that exactly those languages that allow a preposition to be stranded by Wh-movement also allow a preposition to be stranded in (the elided IP of) sluicing. I will refer to this as *Merchant's generalization*.

In this paper, I use form-identity effects to argue for a view of the conditions on sluicing that differs significantly from Merchant's. My investigation begins with sluicing in Chamorro, an Austronesian language of the Mariana Islands. I show that the Chamorro version of sluicing conforms broadly to Merchant's theory, but that the class of legal sluices in this language is interestingly smaller than predicted. I then show that, in a surprising but completely analogous way, the class of legal sluices in English and some other Germanic languages is smaller than predicted. These patterns suggest a sharpening of Merchant's generalization and reveal the need for some refinement of his theory. More broadly, they argue that semantics alone does not suffice to guarantee the recoverability of deletion in this ellipsis construction; the lexicon and perhaps syntax play active roles as well. In the revision that I propose, the conditions governing PF deletion in sluicing are not exclusively semantic, but include at least one lexico-syntactic requirement, which I state as a condition on the numeration of the sluice.

1.   Sluicing in Chamorro

Chamorro is a head-initial language with various types of null arguments. Word order in clauses whose predicates are verbs or adjectives is V-initial, but otherwise flexible. There are three morphological cases: unmarked, oblique, and local. The unmarked case is used for subjects (see (3a)), direct objects (3b), and possessors; the oblique case is used for oblique complements, including second objects

of verbs of transfer (3b) and passive agents (3c).[1] (For the key to the morpheme-by-morpheme glosses in the Chamorro examples, see Chung 1998:377-378.)

(3) a. Mamómokkat   si Juan.
        AGR.walk.PROG   Juan
        'Juan is walking.'
   b. Un-na'i   si Antonio ni   lepblo-nña siha.
        AGR-give   Antonio OBL book- agr PL
        'You gave Antonio her books.'
   c. Pära u- ma- bisita i   che'lu- hu palao'an ni famalao'an.
        FUT AGR-PASS-visit the sibling-agr female   OBL women
        'My sister will be visited by the women.'

Chamorro also has Wh-movement and Wh-Agreement, both of which are illustrated in (4). Notice that DPs that have undergone Wh-movement always surface in the unmarked case, no matter what case they would have borne originally within the clause.

(4) a. Hayi mamómokkat   gi   kantu-n tasi?
        who? WH[NOM].AGR.walk.PROG LOC side- L sea
        'Who is walking on the beach?'
   b. Hafa un-na'i   si Dolores?
        what? WH[OBJ].AGR-give   Dolores
        'What did you give Dolores?'
   c. Hayi   siha na famalao'an pära u- b*in*isita   i   che'lu-hu   palao'an?
        who? PL   L women   FUT AGR -PASS.visit the sibling-AGR female
        'Which women is my sister going to be visited by?'

 Consider now the Chamorro version of sluicing, which is exemplified below.

(5) a. Guäha   taotao mamómokkat   gi   kantu-n tasi, lao ti
        AGR.exist person WH[NOM].AGR.walk.PROG LOC side- L sea, but not
        in-   tingu' [hayi _].
        AGR-know who?
        'There was someone walking on the beach, but we don't know who.'
   b. Hagu pära un- hanao — lao [pära manu   _]?
        you   FUT AGR-go   but to   where?
        'You're going — but to where?'
   c. Malägu' na   utafan-hita mañ-   otchu, lao [ngai'an _]?
        AGR.want COMP AGR- us   INFIN.AGR-eat   but when?
        'He wants to eat with us, but when?'

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[1] Thanks to Manuel F. Borja, Maria P. Mafnas, Maria T. Quinata, and Anicia Q. Tomokane for their judgments and commentary on the Chamorro examples.

Here, an interrogative phrase appears stranded where one might have expected to find a complete constituent question. Sometimes the remnant has an overt correlate in the antecedent IP (see (5a)); other times it does not (5b-c). The remnant is linked to the interior of the ellipsis by a dependency that can hold across an apparent distance (see (5c)) and can also cross island boundaries, as shown in the naturally occurring example (6). In short, this construction has exactly the syntactic profile associated crosslinguistically with sluicing.

(6)   Ha- hunguk ädyu na bois taotao i   um-   ä'apatti,
       AGR-hear   that L voice person the WH[NOM]-divide.w.ea.other.PROG
       ti   ha- tungu' [hafa _].
       not AGR-know what?
       'He heard these voices of people who were dividing (something) up, he
       didn't know what.'

To what extent does sluicing in Chamorro conform to the expectations of Merchant's theory? The fit initially seems quite good. Like many other languages, Chamorro does not permit overt prepositions to be stranded by Wh-movement; see (7).

(7) a. Ginin hayi na   un- risibi   ennao na katta?
        from who? COMP AGR-receive that   L letter
        'From whom did you receive that letter?'
   b. *Hayi un- risibi   i   katta ginin?
        who? AGR-receive the letter from
        ('Who did you receive the letter from?')

Merchant's generalization therefore predicts that Chamorro should not permit overt prepositions to be stranded in (the elided IP of) sluicing. This prediction is realized. Pied-piping of prepositions is allowed in sluicing, but preposition stranding is not, as can be seen from a comparison of (8) and (9). (*Fulanu* 'someone or other' in these examples is a proper name used to refer to unknown individuals.)

(8) a. Ma- risibi   i   katta ginin as Fulanu, lao ti in- tingu' [ginin
        AGR-receive the letter from OBL So.and.so but not AGR-know from
        hayi magi _].
        who? to.here
        'They got a letter from someone or other, but we don't know from who.'
   b. Si Joe ha- hunguk i   istoria ginin guahu, lao ti hu- tungu' [ginin
          Joe AGR-hear   the story from me   but not AGR-know from
        kuantu   más na taotao _].
        how.many? more L person
        'Joe heard the story from me, but I don't know from how many others.'

(9) a. ??Ma- risibi   i   katta ginin as Fulanu,   lao ti   ma- tungu' [hayi _].
       AGR-receive the letter from OBL So.and.so but not AGR-know   who?
     ('They got a letter from someone or other, but they don't know who.')

  b. *Si Joe ha- hunguk i   istoria ginin guahu, lao ti hu-tungu'
       Joe AGR-hear   the story from me   but not AGR-know
    [kuantu   más na   taotao _].
    how.many? more L   person
    ('Joe heard the story from me, but I don't know how many others.')

Further, Merchant's theory does not require that syntactic identity or LF iso-morphism hold between the antecedent IP and the elided IP. It therefore permits sluicing even when the two IPs differ in their lexical content—a permissiveness that seems right for Chamorro. When the oblique object of an intransitive verb undergoes Wh-movement, e.g., the verb does not surface in its ordinary form but instead must be inflected for Wh-Agreement; see (10). Despite the fact that this special inflection causes a lexical mismatch between the verb of the elided IP and the verb of the antecedent IP in examples like (11), ellipsis is possible.

 (10) a. Hafa   na lingguahi kuentótos-ña?
     what? L language WH[OBL].speak-AGR.PROG
     'What language does he speak?'

   b. *Hafa na lingguahi k*um*ékuentus?
     what? L   language AGR.speak.PROG
    ('What language does he speak?')

(11)   K*um*ékuentus   pälu finu'   China na lingguahi, lao ti   ta-   tungu'
    AGR.speak.PROG some language China L language   but not AGR-know
    [hafa na klasi-n lingguahi _].
    what? L type-L language
    'He speaks some Asian language, but we don't know what kind of lan-guage.'

Finally, Merchant's theory—like all approaches to sluicing since Ross's (1969)—enables sluicing to repair island violations. It therefore permits sluicing when the remnant has an overt correlate that cannot, for whatever reason, undergo Wh-movement. Chamorro evidently has constructions of this sort. In Chamorro, direct objects of transitive verbs can routinely undergo Wh-movement (see (12a)), but oblique objects of the corresponding antipassive verbs cannot (12b). If we treat this inability as an island effect, it becomes significant that sluicing is possible in examples like (13).

(12) a. Hafa   na klasi-n mannuk pineksäsai-   ña   si Juan?
     what? L   type-L chicken WH[OBJ].raise-AGR.PROG   Juan
     'What kind of chickens is Juan raising?'

b. ?*Hafa   na klasi-n mannuk mam-   ómoksai   si Juan?
   what? L   type-L chicken AGR.AP-raise.PROG   Juan
   ('What kind of chickens is Juan raising?')

(13)   Mam- ómoksai   si Juan mannuk, lao ti   in- tingu' [hafa   na klasi _].
       AGR.AP-raise.PROG   Juan chicken but not AGR-know what? L type
       'Juan is raising chickens, but we don't know what kind.'

Assuming that the elided IP in (13) contains an antipassive verb, the well-formedness of ellipsis here follows from the fact that sluicing can repair island violations. (On the other hand, if the elided IP contains the corresponding transitive verb, then (13) appears to illustrate once again that sluicing does not require strict lexical identity.)

2.   Two Mysteries

So far, so good. But we must now confront two patterns that are mysterious from the standpoint of Merchant's theory.

First, sluices of types (11) and (13) are judged ill-formed or incomplete when the remnant has no overt correlate in the antecedent IP. Consider the examples below, which resemble (11) and (13) except that the remnant corresponds to an implicit argument in the antecedent IP. In (14), the remnant is the oblique object of an intransitive verb; in (15), the remnant is the oblique object of an antipassive verb. Sluicing is severely degraded in both sorts of examples—why?

(14) a. ??Ma'a'ñao, lao ti   hu- tungu' [hafa _].
        AGR.afraid   but not AGR-know   what?
        ('He's afraid, but I don't know what.')
   b. ??I neni gumígimin,   lao ti   hu- tungu' [hafa _].
       the baby AGR.drink.PROG but not AGR-know what?
       ('The baby's drinking, but I don't know what.')

(15) a. ??Man-   préprensa si Dolores, lao ti   hu- tungu' [hafa _].
        AGR.AP-iron.PROG   Dolores but not AGR-know what?
        ('Dolores is ironing, but I don't know what.')
   b. ??Man-änaitai   gui', lao ti   hu- tungu' [hafa _].
       AGR.AP-read.PROG he   but not AGR-know   what?
       ('He's reading, but I don't know what.')

Second, Chamorro permits certain possessors to undergo Wh-movement when the D that heads the entire possessive DP is null (see Chung 1998:282-283, 296-297). Unsurprisingly, sluicing is possible when the remnant is a possessor; this is shown in (16).

(16)a. Guäha   malingu   patgun taotao, lao ti hu- tungu' [hayi _].
      AGR.exist WH[NOM].AGR.lost child   person but not AGR-know   who?
      'Some person's child is lost, but I don't know whose.'

   b. Ha- sangani yu' na   guiya atungo'-ña si Fulanu,   lao ti ha- sangan
      AGR-tell   me COMP she   friend-AGR   So.and.so but not AGR-say
      [hayi na Fulanu   _].
      who? L So.and.so
      'She told me she was somebody's fiancée, but she didn't say which some-
      body.'

What is surprising is that sluicing of possessors is impossible when the remnant has no overt correlate in the antecedent IP. The examples in (17) are completely ungrammatical—why?

(17) a. *Mañ- akki si Juan lepblu, lao ti   in- tingu' [hayi _].
      AGR.AP-steal   Juan book   but not AGR-know   who?
      ('Juan stole a book, but I don't know whose.')

   b. *Guäha   patgun matai,   ya hu- tungu' i   pätgun, lao ti
      AGR.exist child   WH[NOM].AGR.die and AGR-know the child   but not
      hu- tungu' [hayi na taotao _].
      AGR-know   who? L person
      ('A child died, and I know the child, but I don't know which person's.')

   c. *Nigap   ma-   sodda' paine-nña, lao kao un- tungu' [hayi _]?
      yesterday AGR.Pass-find   comb-AGR but Q   AGR-know   who?
      ('Yesterday a comb was found, but do you know whose?')

Casting the net wide in an attempt to understand these mysteries, I turn next to Germanic.

3.   Sluicing in English and Other Preposition-Stranding Languages

It seems not to have been noticed before that sluicing in English can strand a preposition in the elided IP only when the remnant has an overt correlate in the antecedent IP.[2] When the remnant has no overt correlate, preposition stranding is impossible. Consider the examples below, in which the remnant corresponds to an implicit argument. (These are cases of what Chung, Ladusaw, and McCloskey (1995) call *sprouting*.)

(18) a. They're jealous, but it's unclear of who.
   b. Joe was murdered, but we don't know by who.

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[2] The observation is prefigured by Merchant's (2002:306) suggestion that *She fixed it, but God only knows what* violates "the conditions on deletion" because there is no antecedent within the antecedent IP to license deletion of the preposition *with* in the sluice. (Thanks to Jason Merchant for bringing this to my attention.)

   c. Last night he was very afraid, but he couldn't tell us of what.
   d. Mary was flirting, but they wouldn't say with who.
   e. We're donating our car, but it's unclear to which organization.
   f. U.N. is transforming itself, but into what is unclear. (*New York Times* 2/28/04)
   g. She phoned home, but they weren't sure from which city.

(19) a. *They're jealous, but it's unclear who(m).
   b. *Joe was murdered, but we don't know who(m).
   c. *Last night he was very afraid, but he couldn't tell us what.
   d. *Mary was flirting, but they wouldn't say who(m).
   e. *We're donating our car, but it's unclear which organization.
   f. *U.N. is transforming itself, but what is unclear.
   g. *She phoned home, but they weren't sure which city.

In these examples, the preposition can be pied-piped (18) but not stranded (19). Importantly, stranding is prohibited even when the preposition is utterly devoid of semantic content (e.g. *of*)—a fact that strongly suggests that the semantics is not responsible for this pattern. The generalization seems to be that in English, sluicing can strand a preposition when the remnant has an overt correlate (i.e. in cases of what Chung, Ladusaw, and McCloskey call *merger*), but not otherwise.

    Is the contrast in (18-19) a language-specific peculiarity of English? The answer is no. Inspection of some of the other preposition-stranding languages examined by Merchant (2001) makes this abundantly clear.

    Danish, for instance, exhibits just the same restriction: sluicing can strand a preposition when, and only when, the remnant has an overt correlate in the antecedent IP. When the remnant has an overt correlate, pied-piping or stranding is allowed (although pied-piping is marked in colloquial Danish).[3]

(20) a. Peter råber til en eller anden, men jeg ved   ikke (til) hvem.
     Peter shouts to one or   other, but I   know not (to) who.
   b. Peter er jaloux på en eller anden, men jeg ved   ikke (på) hvem.
     Peter is jealous on one or   other, but I   know not (on) who.

But when the remnant has no overt correlate—when it corresponds to an implicit argument in the antecedent IP,—the preposition can be pied-piped, but not stranded. Compare (21) with (22).

(21) a. Peter råber,   men jeg ved   ikke til hvem.
     Peter shouts, but I   know not to who.
   b. Peter er jaloux, men jeg ved   ikke på hvem.
     Peter is jealous, but I   know not on who.

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[3] Thanks to Line Mikkelsen for her judgments and commentary on the Danish examples.

(22) a. *Peter råber, men jeg ved ikke hvem.
        (Peter shouts, but I   know not who.)
    b. *Peter er jaloux, men jeg ved ikke hvem.
        (Peter is jealous, but I   know not who.)

Norwegian works similarly: sluicing can strand a preposition when the remnant has an overt correlate in the antecedent IP, but not otherwise. In the examples in (23), the remnant has an overt correlate, and the preposition can be pied-piped or stranded (although pied-piping is viewed as formal or even archaic).[4]

(23) a. Per har snakket med noen,   men jeg vet   ikke (med) hvem.
        Per has spoken with someone, but I   know not (with) who.
    b. Per er sjalu   på noen,   men jeg vet   ikke (på) hvem.
        Per is jealous on someone, but I   know not (on) who.

In the examples in (24-25), the remnant does not have an overt correlate, and pied-piping is possible, but stranding is not.

(24) a. Per spilte   en duett, men jeg vet   ikke med hvem.
        Per was playing a duet, but I   know not with who.
    b. Per er sjalu,   men jeg vet   ikke på hvem.
        Per is jealous, but I   know not   on who.

(25) a. *Per spilte   en duett, men jeg vet   ikke hvem.
        (Per was playing a duet, but I   know not who.)
    b. *Per er sjalu,   men jeg vet   ikke hvem.
        (Per is jealous, but I   know not   who.)

Returning to sluicing in English, notice that the ban on preposition stranding when the remnant lacks an overt correlate holds not only for PPs that are arguments of the verb, but also for PPs that occur internal to DP. The pattern, in other words, is fully general.

(26) a. She's reading a novel, but I don't know by who.
    b. She's reading something, but I don't know by who.
    c. She's eating a pizza, but I don't know from which restaurant.
    d. He's a father, all right, but we don't know of which children.

(27) a. *She's reading a novel, but I don't know who.
    b. *She's reading something, but I don't know who.

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[4] Thanks to Kristine Bentzen and Marit R. Westergaard for their judgments and commentary on the Norwegian examples, and to Peter Svenonius for his help.

    c. *She's eating a pizza, but I don't know which restaurant.

    d. *He's a father, all right, but we don't know which children.

These observations reveal that Merchant's generalization must be sharpened a bit: it holds for cases of merger but not sprouting. To restate the point, exactly those languages that allow a preposition to be stranded by Wh-movement also allow a preposition to be stranded in (the elided IP of) sluicing, *as long as the remnant has an overt correlate in the antecedent IP*. Otherwise, preposition stranding in sluicing is forbidden.

The broader theoretical import of this sharpening of Merchant's generalization I take to be the following. The choice between pied-piping and preposition stranding is not normally thought to have semantic (truth-conditional) consequences. Therefore, the sluices in example pairs such as (18a) and (19a), and so forth, ought to be semantically equivalent. The fact that one sluice in each pair is well-formed, whereas the other is not, poses a challenge for Merchant's theory and—more broadly—for any account of sluicing in which the ellipsis is constrained by semantic (entailment) conditions alone.

4.   The Beginnings of a Proposal

How can Merchant's account of sluicing be revised and extended to handle the Germanic contrasts just seen? The question is a hard one, because the results of previous research have left us a fairly tight space within which to maneuver.

Even in its revised form, Merchant's generalization continues to be strong evidence that the sluice is a fully articulated syntactic structure in which Wh-movement has occurred. There are also good reasons (detailed in Merchant 2001:19-25) for not returning to an account of sluicing that relies on syntactic identity, LF copying, or LF isomorphism. So I will continue to hold that sluicing is derived by PF deletion, and that the conditions on deletion fall short of full-blown syntactic or LF identity.

Romero (1998) has proposed that deaccenting, VP ellipsis, and sluicing must all meet the same background condition: essentially, the antecedent must entail the nonfocused portion of the reduced constituent. Maintaining this for sluicing commits us to (at least) one half of Merchant's mutual entailment condition.

At the same time, it is now evident that the mutual entailment condition is too weak. It fails to distinguish the well-formed sluices in (18), (21), and (24), which have an overt preposition in the remnant, from the ungrammatical sluices in (19), (22), and (25), which do not.

I have already asserted that this contrast cannot be attributed to the semantics. Could it be attributed instead to the pragmatics?[5] Fox (1999) has proposed that ellipsis, like deaccenting, must have an antecedent sentence that is either present in the discourse or else accommodated. In his system, accommodation can occur only when the sentence that hosts the ellipsis displays what he calls *accommoda-*

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[5] Thanks to Line Mikkelsen and Danny Fox for raising this possibility.

tion-seeking material—pronounced, nonfocused material that is absent from any potential antecedent sentence in the discourse. The system raises an interesting possibility with respect to the sluicing constructions of section 3, all of which are cases of sprouting. Suppose that accommodation were *required* in order for these sluices to satisfy Merchant's mutual entailment condition. Then the impossibility of preposition stranding in (19), (22), and (25) might well follow from Fox's proposal. Pied-piping would be necessary so that the preposition could serve as the pronounced, nonfocused signal that accommodation should occur.

However, accommodation cannot be the whole story. There are indeed cases of sprouting in which the mutual entailment condition can be satisfied only via accommodation of an implicit argument in the antecedent IP. One unusually clear case, provided at BLS by George Bergman, is (28).

(28) a. He finished the project, but we don't know with whose help.
     b. *He finished the project, but we don't know whose help.

But there are also cases of sprouting in which the mutual entailment condition is satisfied without any accommodation, because the antecedent IP already contains the relevant implicit argument. In (19a) and (19d), for instance, the antecedent IP contains a predicate that selects two arguments (*jealous*, *flirt*); in (19b), a passive verb (*murdered*); and in (27d), a relational noun (*father*). Tellingly, preposition stranding is just as ungrammatical in these examples as in (28b).

The message seems to be that we must look beyond semantics and pragmatics to account for the contrasts in section 3. I claim that the missing piece of the puzzle is supplied by the lexicon. Specifically, I propose that in addition to satisfying some version of Merchant's semantic condition, sluicing must satisfy a lexico-syntactic requirement that falls short of LF isomorphism. This requirement I state in terms of the Minimalist notion of numeration, as follows.

(29)   Every lexical item in the numeration of the sluice that ends up (only) in the elided IP must be identical to an item in the numeration of the antecedent CP.

Requirement (29) ensures that the ellipsis in sluicing involves no 'return to the lexicon', to borrow a phrase of Chung, Ladusaw, and McCloskey's (1995:263). It does so by demanding that except for the moved interrogative phrase, the lexical items from which the sluice is constructed must be a subset of the lexical items from which the antecedent CP is constructed. In stating this requirement I assume further that lexical items are not fully inflected words but rather bundles of features, some of which may be unvalued, so that certain inflectional features can be ignored in the computation of lexical identity (as in (11)). I return later to some consequences of stating (29) in terms of numerations and lexical identity.

How does the lexico-syntactic requirement work together with Merchant's semantic condition to account for the Germanic contrasts of interest here? To see

the proposal in action, consider first the contrast between pied-piping and preposition stranding in cases of sprouting, such as (18-19). At the end of the syntactic derivation, an example like (18a) will have the representation sketched in (30), in which the sluice is surrounded by the outer brackets and the trace or lower copy of the moved interrogative phrase is symbolized by a dash.

(30)   They're jealous, but it's unclear [of who [they're jealous —]].

Here, the mutual entailment condition holds. Further, of the items in the numeration of the sluice—namely, *of, who, they, be*, and *jealous*—three end up only in the elided IP (*they, be, jealous*), and each of these is identical to an item in the numeration of the antecedent CP. So sluicing is well-formed.

In contrast, at the end of the derivation, an example like (19a) will have the representation sketched in (31).

(31)   They're jealous, but it's unclear [who [they're jealous of —]].

Here, there is an item in the numeration of the sluice—namely, *of*—that ends up (only) in the elided IP, but is not identical to an item in the numeration of the antecedent CP. Sluicing is therefore ungrammatical.

Now, what happens in cases of merger, such as (32a)? At the end of the derivation, this example will look like (32b).

(32) a. They're jealous of someone, but it's unclear who.
    b. They're jealous of someone, but it's unclear [who [they're jealous of —]].

Here, just as in (30), the mutual entailment condition holds, and every item in the numeration of the sluice satisfies the lexico-syntactic requirement. Crucially, the presence of *someone* in the antecedent IP is not problematic, because the lexico-syntactic requirement is not bidirectional: no constraint is imposed on items in the numeration of the *antecedent* CP, only on items in the numeration of the sluice.

In short, Merchant's semantic condition and the lexico-syntactic requirement succeed in deriving the contrasts discussed in section 3. Importantly, these conditions also work together to account for other empirical patterns in which preposition stranding plays no role. Consider the examples of sluicing below.

(33) a. She read something, but we're not sure by which author.
    b.   ?*She read, but we're not sure by which author.

(33a) and (33b) clearly differ in grammaticality, even though their remnants are identical—both contain a pied-piped preposition—and their antecedent IPs are semantically equivalent. The difference, I claim, can be traced to the fact that the remnant *by which author* must have originated in the elided IP as a modifier of NP. When this NP is instantiated as *something*, the sluice in (33a) satisfies both

the semantic condition and the lexico-syntactic requirement, as (34a) shows. But the sluice in (33b) fails the lexico-syntactic requirement, because *something* is not identical to any item in the numeration of the antecedent CP. See (34b).

(34) a. She read something, but we're not sure [by which author [she read [something —]]].
   b. She read, but we're not sure [by which author [she read [something —]]].

5.   **Back to Sluicing in Chamorro**

Let me now return to Chamorro and show that the proposal just presented can solve the two sluicing mysteries presented in section 2.

   First, why is sluicing of oblique objects degraded when the remnant has no overt correlate?

   In Chung (1998), I used binding facts to argue that Chamorro DPs in the oblique case, including complements of intransitive predicates and antipassive verbs, are actually objects of null prepositions. I also argued that these null prepositions can be stranded by Wh-movement. The result is that at the end of the syntactic derivation, a case of merger like (13) (repeated below) will have the representation sketched in (35), where © represents the null preposition.

 (13)   Mam- ómoksai si Juan mannuk, lao ti   in-   tingu' [hafa na klasi _].
         AGR.AP-raise.PROG   Juan chicken   but not AGR-know what? L   type
         'Juan is raising chickens, but we don't know what kind.'

(35)   Mam- ómoksai   si Juan © mannuk, lao ti   in-   tingu' [hafa na klasi
         AGR.AP-raise.PROG   Juan   chicken but not AGR-know what? L type
         [mam- ómoksai   si Juan © —]].
         AGR.AP-raise.PROG   Juan

Both the mutual entailment condition and the lexico-syntactic requirement are met. On the other hand, at the end of the derivation, a case of sprouting like (15a) will have the representation sketched in (36).

(15) a. ??Man- préprensa si Dolores, lao ti   hu- tungu' [hafa   _].
         AGR.AP-iron.PROG   Dolores but not AGR-know   what?
         ('Dolores is ironing, but I don't know what.')

(36)   Man-   préprensa si Dolores, lao ti   hu- tungu' [hafa [man-   préprensa
         AGR.AP-iron.PROG   Dolores but not AGR-know what? AGR.AP-iron.PROG
         si Dolores © —]].
           Dolores

(36) is problematic for a familiar reason: the (null) preposition in the numeration of the sluice ends up (only) in the elided IP, but is not identical to any item in the

numeration of the antecedent CP. Therefore, sluicing is ill-formed. The situation is completely analogous for the other examples in (14-15). (Crucially, evidence from morphological case argues that the null oblique preposition cannot be pied-piped, so it can end up only in the elided IP, never in the remnant.)

Notice that if all this is so, we expect sluicing to be allowed in examples of type (15a) when the verb of the antecedent IP is not antipassive, but transitive. This prediction is borne out. Consider (37), which differs from (15a) only in that the verb is transitive and the antecedent IP is—for irrelevant reasons—embedded in a null-headed relative clause. Here, sluicing is perfectly fine.

(37)   Guäha   [ha-   préprensa si Dolores], lao ti   hu- tungu' [hafa _].
         AGR.exist WH[OBJ].AGR-iron.Prog   Dolores but not AGR-know what?
         'There's something Dolores is ironing, but I don't know what.'

Given that at the end of the derivation, (37) has the representation in (38), both the mutual entailment condition and the lexico-syntactic condition are met. This is what we expect.

(38)   Guäha   [ha-   préprensa si Dolores], lao ti hu- tungu' [hafa
         AGR.exist WH[OBJ].AGR-iron.Prog   Dolores but not AGR-know what?
         [ha-   préprensa si Dolores —]].
         WH[OBJ].AGR-iron.PROG   Dolores

Second, why is sluicing of possessors degraded when the remnant has no overt correlate?

Since Abney (1987), it has been widely held that possessive DPs in English have a D different from the D's of nonpossessive DPs. Suppose we assume that Chamorro draws a similar distinction: D's that Case-license a possessor have a different featural make-up from other D's. Then the well-formedness of a case of merger like (16a) reflects the fact that at the end of the derivation, the (null) D in the elided IP is identical to the (null) D in the antecedent IP: both bear the feature that Case-licenses a possessor, represented below as ™ .

(16) a. Guäha   malingu   patgun taotao, lao ti hu- tungu' [hayi _].
        AGR.exist WH[NOM].AGR.lost child person but not AGR-know who?
        Some person's child is lost, but I don't know whose.

(39)   Guäha   malingu   [[™] patgun taotao], lao ti hu- tungu'
         AGR.exist WH[NOM].AGR.lost   child person but not AGR-know
         [hayi [guäha   malingu   [[™] patgun —]]].
         who? AGR.exist WH[NOM].AGR.lost   child

On the other hand, the ungrammaticality of a case of sprouting like (17b) follows from the fact that the (null) D in the elided IP is not identical to the (null) D in the

antecedent IP, because the latter does not bear the feature that Case-licenses a possessor. See (40). (Independent evidence establishes that possessive DPs in Chamorro cannot be pied-piped, and that NP ellipsis in this language cannot strand possessors. These considerations conspire to make it impossible for the null D that heads the possessive DP in (17b) to end up in the remnant.)

(17) b. *Guäha   patgun matai,   ya hu- tungu' i   pätgun, lao ti
          AGR.exist child   WH[NOM].AGR.die and AGR-know the child   but not
          hu-   tungu' [hayi na taotao _].
          AGR-know   who? L person
          ('A child died, and I know the child, but I don't know which person's.')

(40)   Guäha   [[ ] patgun] matai,   ya hu- tungu' i   pätgun, lao ti
          AGR.exist   child   WH[NOM].AGR.die and AGR-know the child   but not
          hu- tungu' [hayi na taotao [guäha   [[™] patgun —] matai]].
          AGR-know who? L person AGR.exist   child   WH[NOM].AGR.die

In short, Merchant's semantic condition and the lexico-syntactic requirement work together to solve both mysteries. This is a very encouraging result—one that strengthens the case that the conditions governing the recoverability of deletion in sluicing are not exclusively semantic.

6.   Revisiting the Semantic Condition

Now that the lexico-syntactic requirement has been motivated, it might be worth indulging in some speculation about how far it can be pushed. There is undeniably some overlap between requirement (29) and Merchant's mutual entailment condition. Are both strictly necessary?

    The answer, I suspect, depends on how one conceives of numerations. If the numeration of a sentence (or of some phase of a sentence) is viewed as an un-structured collection of lexical items that can be combined in multiple ways, then the mutual entailment condition is needed to rule out 'crazy' cases of sluicing—cases in which some lexical item in the elided IP is licensed by an obviously wrong item in the antecedent CP. Consider the representations in (41).

(41) a. Joe said something or other to Zelda, but I don't know [what [Joe said —
        to Zelda or Zelda said — to Joe]].
    b. The butler claimed to the chef that he served the soup, but I'm not sure
        [which guests [the butler claimed that he served the soup to —]].

If sluicing were to occur here, the lexico-syntactic requirement would be satisfied; each item in the (unstructured) numeration of the sluice that ends up only in the bracketed IP would be identical to some item in the (unstructured) numeration of the preceding CP. The point is that we do not want deletion to occur. Though (42a) is well-formed, it is not equivalent to (41a); and (42b) is ungrammatical.

(42) a. Joe said something or other to Zelda, but I don't know what.
    b. *The butler claimed to the chef that he served the soup, but I'm not sure which guests.

In such situations, one would need to appeal to the mutual entailment condition to call off deletion. Notice that a weaker semantic condition, such as Romero's (1998) background condition (see section 4), would not be enough to prevent deletion from occurring.[6]

On the other hand, suppose the numeration of a sentence (or of some phase of a sentence) could be viewed as a highly structured collection of lexical items that must be combined deterministically, in exactly one way.[7] Then 'crazy' cases of sluicing would not satisfy the lexico-syntactic requirement after all, because the lexical items in the elided IP are not combined with one another in the same way as their analogues in the antecedent CP. More generally, the lexico-syntactic requirement would guarantee that except for traces of the moved interrogative phrase, the elided IP would be homomorphic to the antecedent IP. This would be a very interesting state of affairs, for the following reason. Given that the semantics interprets what the syntax provides, one possible side effect of syntactic homomorphism could be that the nonfocused portions of the antecedent IP and the elided IP entail each other. But, as far as requirement (29) is concerned, mutual entailment is not inevitable. This arguably matches well with the observed facts. In English, for instance, mutual entailment holds transparently in sluicing examples like (1a-b), (18), (26d), and (32), but not at all in (28) unless accommodation is invoked. I am not prepared to pursue this second view of numerations further. But in a world where such a view can be fleshed out, requirement (29) might well make the mutual entailment condition redundant.

7.   On Lexical Identity

By way of conclusion, I would like to point out a further consequence of the lexico-syntactic requirement. If we continue to hold that lexical items are not fully inflected words but rather bundles of features, requirement (29) can capture the generalization that sluicing does not tolerate voice mismatches or other argument structure alternations.

For instance, assuming that passive verbs have a different featural make-up from the corresponding active verbs, the lexico-syntactic requirement accounts for the ungrammaticality of the English sluice below (noted in Merchant 2001:35).

(43)   *Someone arrested Alex, but we don't know [by who _].

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[6] Thanks to Lauri Karttunen for helping me see this point and drawing my attention to examples of the type (41a).

[7] Thanks to Jim McCloskey for suggesting this possibility.

The lexico-syntactic requirement also accounts for the fact that Chamorro sluices like (44) are ill-formed on the interpretation shown.

(44)   ??Pära ufan-ma- gächa', lao ti   in-   tingu' [hayi _].
          [FUT AGR-PASS-catch   but not AGR-know who?
         ('They'll be caught, but we don't know who [will catch them].')

Sluices like (44) have two possible derivations. In the first, the remnant is a passive agent that has undergone Wh-movement (legally; see (4c)), stranding the null preposition ©, whose absence in the antecedent CP renders the sluice ill-formed. In the second, the remnant is a transitive subject that has undergone Wh-movement (again, legally). Assuming that the transitive verb in the elided IP is featurally distinct from its passive counterpart in the antecedent IP, sluicing is not permitted here, either.

Further, as Jason Merchant observes, if causative verbs are featurally distinct from the corresponding inchoatives, requirement (29) accounts for the fact that sluicing in Greek is sensitive to the causative-inchoative alternation.

How robust is the generalization that sluicing does not tolerate mismatches in argument structure? The only empirical challenge to this that I am aware of (so far) comes from Malagasy, the Austronesian language of Madagascar. Malagasy has been analyzed as a VOS language with an elaborate 'voice' system and a subjects-only restriction on Wh-movement (see Keenan 1976 and many others since). In a discussion of sluicing in Malagasy, Potsdam (2003) shows that it is possible for a 'passive' verb in the elided IP of the sluice to correspond to an 'active' verb in the antecedent IP. (A further complication, ignored here, is that the left-edge interrogative phrases in Malagasy questions have been analyzed as the predicates of cleft constructions; see Potsdam and Paul 2004.)

If the 'active' and 'passive' verbs of Malagasy do indeed instantiate distinct voices, sluicing in this language is potentially troublesome for the proposal outlined here. At the very least, it raises the unwelcome possibility that argument structure mismatches might be tolerated by sluicing in some languages but not others. Fortunately, there is another path we can pursue. In a far-reaching investigation of Malagasy clause structure, Pearson (2005) argues that the Malagasy subject is actually an A'-element and the so-called "voice" system does not encode argument structure alternations at all. Suppose we follow the spirit (though not the details) of Pearson's reanalysis and treat "active" and "passive" morphology in Malagasy not as voice morphology, but rather as the inflectional morphology resulting from Wh-Agreement. Then Potsdam's sluicing examples can be given the same account as the Chamorro sluicing example (11). In both cases, the verbs of the antecedent and elided IPs are identical in the numeration, because they are not yet valued for the feature that Wh-Agreement spells out.

8. Summary

I have argued that the recoverability of deletion in sluicing cannot be ensured by semantic conditions alone. Some reference to the lexicon and perhaps syntax is needed as well. Much remains to be determined, including the precise details of the mix of semantic and lexico-syntactic conditions on sluicing, how much can be made to follow from numerations, and whether entailment conditions on sluicing are necessary in the end. Meanwhile, the patterns discussed here can be seen as giving new life to Hankamer and Sag's (1976) distinction between deep and surface anaphora.

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