Swiping in Germanic

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Establishing the level of representation or the point in a derivation at which movement takes place has never been a trivial matter, and as such remains an topic of substantial ongoing interest. For overt movement, this question is complicated by the availability in principle of two components in which movement could take place with indistinguishable effects on word order: in the derivation leading to Spell-Out, or in the mapping from Spell-Out to PF. To a great extent, the reasoning brought to bear on this question has been concentrated on A- and A'-movement and their properties; head-movement, in contrast, has remained a distant third. In this paper, I show that a little-studied peculiarity of elliptical wh-questions in Germanic can cast new light on this question, providing evidence that there is indeed head-movement which takes place late in the derivation at PF, after Spell-Out.[*]

The peculiarity in question comes from a range of data found only under sluicing in a subset of the Germanic languages. In particular, it is found in sluices involving certain prepositions, in which the [+wh] object of the preposition appears not after the preposition in the usual head-complement order, but before it, as in (1).

(1)   Peter went to the movies, but I don't know who with.

I will call this kind of exceptional inversion of the usual order of the preposition and its argument *swiping*, for sluiced wh-word inversion with prepositions (in Northern Germanic).

Any examination of swiping or other curiosities of sluicing must, of course, begin with the necessary background on sluicing itself, which is given in section 1 with particular attention to the facts across Germanic. Section 2 lays out the data on swiping and establishes the two generalizations that will be the focus of attention. The analytical challenges raised by these data are taken up in section 3, which explores the ramifications of swiping for our understanding of pied-piping, ellipsis, and head-movement in particular. Section 4 concludes by re-examining the crosslinguistic situation in light of these ramifications and showing that swiping can perhaps shed light on the internal structure of wh-pronouns as well.

1   Background on sluicing

Sluicing is a variety of ellipsis widely found in the world's languages, and illustrated for English in (2) and (3).

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(2)   a.   Jack bought something, but I don't know what.
      b.   Someone called, but I can't tell you who.
      c.   Beth was there, but you'll never guess who else.
(3)   a.   Jack called, but I don't know {when/how/why/where from}.
      b.   Sally's out hunting — guess what!
      c.   A car is parked on the lawn — find out whose.

Analyses of sluicing have varied over the years (see Ross 1969, van Riemsdijk 1978, Levin 1982, Lobeck 1995, Chung, Ladusaw, and McCloskey 1995, Giannakidou and Merchant 1998, Romero 1998, Lasnik 1999, and Merchant to appear), but I will follow Ross 1969 and Merchant to appear in assuming that sluicing consists of the movement of a wh-phrase to specCP in a constituent question followed by the deletion of the sentential portion, given schematically in (4).

(4)   CP
               3
        XP$_{[+wh]}$ 3
        :   C   IP
          g $_{[+wh, +Q]}$ @
          g   ... t ...
        z--------m
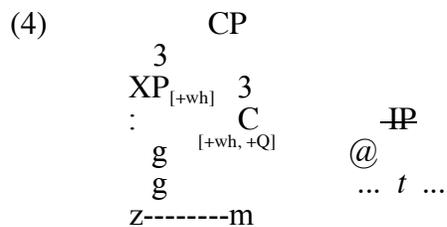
One of the strongest pieces of evidence for adopting such an analysis over analyses that posit no movement and sometimes no structure at all in the ellipsis site, is the close parallel between the availability of stranded prepositions under regular wh-movement (when no ellipsis is involved) and under sluicing. Generally speaking, a language L will allow preposition-stranding under sluicing if and only if L allows preposition-stranding under regular wh-movement.

Thus in languages such as English, Frisian, Swedish, Norwegian, Danish, and Icelandic, which all allow regular argument wh-phrases such as *who* to strand a preposition under wh-movement (the (b) sentences in examples (5)-(10)), we also find the possibility of omitting a preposition that corresponds to a preposition marking the correlate of the wh-phrase in the antecendent to the sluice, as shown in the (a) sentences in (5)-(10).

(5) English
        a.   Peter was talking with someone, but I don't know (with) who.
        b.   Who was he talking with?
(6) Frisian
        a.   Piet hat mei ien   prutsen, ma ik wyt net (mei) wa.
             Piet has with someone spoken   but I know not with who
        b.   Wa hat Piet mei prutsen?
(7) Swedish
        a.   Peter har talat med någon;   jag vet   inte (med) vem.
             Peter has talked with someone I know not   with who
        b.   Vem har Peter talat med?
(8) Norwegian
        a.   Per har snakket med noen,   men jeg vet ikke (med) hvem.
             Per has talked with someone but I know not   with who
        b.   Hvem har Per snakket med?

(9) Danish
      a.   Peter har snakket med en eller anden, men jeg ved ikke (med) hvem.
              Peter has talked with one or another but I know not with who
      b.   Hvem har Peter snakket med?

(10) Icelandic
      a.   Pétur hefur talaD viD einhvern en ég veit ekki (viD) hvern.
              Peter has spoken with someone but I know not with who
      b.   Hvern hefur Pétur talaD viD?

In other Germanic languages, such as German, Swiss German, Yiddish, and Dutch which generally do not allow preposition-stranding under wh-movement, retention of the preposition under sluicing is obligatory:

(11) German
      a.   Anna hat mit jemandem gesprochen, aber ich weiß nicht, *(mit) wem.
              Anna has with someone spoken but I know not with who
      b.   * Wem hat sie mit gesprochen?

(12) Swiss German (Glarus dialect[1])
      a.   Dr Ruedi hät ds ganz Läbe vumene Land träumt, aber ich wäiss nüd *(vu) welem.
              the Ruedi has the whole life of.a land dreamt, but I know not of which.DAT
              'Ruedi has dreamt his whole life of some country, but I don't know of which.'
      b.   * Welem Land häsch ds ganz Läbe vu träumt?

(13) Yiddish
      a.   Zi hot mit emetsn geredt, ober ikh veys nit *(mit) vemen.
              she has with someone spoken but I know not with who
      b.   * Vemen hot zi mit geredt?

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[1] E. Haeberli (p.c.) informs me that the indicated judgments hold for other dialects of Swiss German as well.

(14) Dutch[2]

      a.   Anna heeft met iemand gesproken, maar ik weet niet ??/?/√ (met) wie.
              Anna has with someone spoken   but   I know not   with who

      b.   */??/? Wie heeft zij mee gesproken?

This correlation is not limited to the Germanic family, of course, though Germanic does almost seem to have a monopoly on productive preposition-stranding under wh-movement. In a number of non-Germanic languages (*viz.* Greek, Russian, Czech, Polish, Slovene, Serbo-Croatian, Bulgarian, French, Catalan, Spanish, Italian, Persian, Hindi, Hebrew, Arabic, and Basque), we find this correlation as well: they allow preposition-stranding neither in non-elliptical wh-questions nor under sluicing (with some qualifications irrelevant here; see Merchant to appear).

The correlation illustrated above finds its most natural explanation in the theory of sluicing that takes it to consist of the usual operation of wh-movement, subject to the usual language-particular constraints, followed by deletion of the IP out of which extraction has taken place. For example, in English, both the derivation represented in (15a) and that in (15b) are allowed: in the first, the option of pied-piping has been taken[3], while in the second, the option of stranding the preposition has been taken. Both result in grammatical outputs, just as in their non-elliptical counterparts.

(15)   Peter was talking with someone, but I don't know

      a.   [with who]$_1$ [$_{IP}$ ~~he was talking t_1~~].

      b.   who$_2$ [$_{IP}$ ~~he was talking [with t_2~~]].

In a language such as German on the other hand, which does not allow preposition-stranding, wh-movement must pied-pipe a selecting preposition.[4] This yields (16a) as the only

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[2] The situation in Dutch appears to be the most fluid of the languages examined here, which is reflected in the variety of stigmata used in both in the (a) and (b) examples in (14), representing the variety of responses received from informants. Many informants (6 of 10) accepted the sluiced version without the preposition (all accepted it with the preposition); some informants (2 of 10) also accepted preposition-stranding in the non-elliptical question in (14b), though the correspondence was less than perfect (normative factors perhaps influencing the judgment in non-elliptical test cases).

    In general Dutch appears to be a transition case, allowing preposition-stranding in a wider range of cases than German, for example, but in a more restricted set than Frisian. Normatively rejected preposition-stranding under A'-movement is attested even in carefully edited literature; compare the examples in (i) (from J. J. Voskuil, *Meneer Beerta: Het Bureau I*, Van Oorschot, Amsterdam, 1996, p. 65):

      (i)   Onrechtvaardigheid wind ik me over op.
              injustice   work I REFL about up
              'Injustice, I get worked up about.'

From the same work comes the following bare sluiced wh-phrase whose correlate is in a PP (*op. cit.*, p. 31):

      (ii)   De jongen leek   op iemand, maar hij kon niet bedenken wie.
             the boy   seemed on someone but   he could not think   who
             'The boy looked like someone, but he couldn't think who.'

    So given the fluidity of the situation in current Dutch usage, the variety of judgments found for the sluicing examples does not seem entirely unexpected.

[3] A small caveat applies to the English data here: in the (rather restrcited and unnatural, highly normative, primarily written) register that allows pied-piping, the accusative form *whom* is preferred, hence the example in the text with the preposition might have for some speakers the slight feeling of a register clash, which I abstract away from.

[4] The only exception to this comes from R-pronouns (also in Dutch and Swiss German), which can strand prepositions under wh-movement. These, however, can never be the sole remnant under sluicing, as seen in (i),

possibility; the wh-movement in (16b) violates whatever constraint it is that rules out preposition-stranding in non-elliptical structures in German.

(16) Anna hat mit jemandem gesprochen, aber ich weiß nicht,
Anna has with someone spoken   but I   know not
    a.   [mit wem]$_1$ [$_{IP}$ ~~sie t_1 gesprochen hat~~].
        with who   she   spoken   has
    b.   * wem$_2$ [$_{IP}$ ~~sie [mit t_2] gesprochen hat~~].
         who   she with   spoken   has
'Anna spoke with someone, but I don't know with who.'

While this state of affairs is expected under the approach to sluicing adopted here, it does have the perhaps slightly disappointing result that sluicing can shed little interesting light on the mechanisms that regulate preposition-stranding cross-linguistically, a topic of long-standing debate (see Takami 1992 for a recent overview). Only one minor conclusion relevant to this debate can be drawn from this range of facts: whatever requires pied-piping of prepositions is not solely a constraint operative at the PF interface on the stranded item (as mooted in a generalized form by Chomsky 1995): since in (16b) the illicitly stranded preposition *mit* is deleted via ellipsis, it cannot trigger a PF interface crash.

The force of these data from preposition-stranding under sluicing in the Germanic languages is to lend strong support to the approach adopted here, that sluicing is the result of wh-movement followed by deletion of IP at PF.

2   The empirical extent of swiping

Swiping, though rarely discussed, has not entirely escaped notice in the literature. Ross 1969, for example, in his original investigation of sluicing, noted the phenomenon, and other researchers since have remarked on it (see section 3.1 below). But examples have been few and far between, and nothing like a sustained empirical investigation has ever been carried out to my knowledge. In this section, therefore, I lay out the fundamental facts and establish the two generalizations which will form the basis for the theorizing in the following section.

The two major descriptive questions that arise with respect to swiping are the following:

    1. With what kinds of wh-phrases does swiping occur?
    2. In what environments does swiping occur?

These questions will be taken up in the following two sections respectively. I begin, however, with a brief overview of the basic facts, giving some historical and cross-linguistic context. Swiping in English is illustrated in the following examples.

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because the wh-R-pronoun cannot be focused in this environment for independent reasons (i.e., in (i), the stress must fall on *von*, not on *wo*, though either stress is possible in other environments; see Gussenhoven 1983, Reis 1985, Hoekstra 1995), which conflicts with the requirement imposed by sluicing that the operator, not the preposition, bear primary focus (due to the interaction of the presence of the correlate preposition in the antecedent and the identity condition on sluicing); see Merchant to appear: ch. 2 for more data and discussion.

    (i)   Kepler hat von etwas   geträumt, aber ich weiß nicht, { wovon / *wo }.
            Kepler has of something dreamt   but I   know not   whereof where
            'Kepler dreamt of something, but I don't know what.'

(17) a. Lois was talking, but I don't know who to.
      b. They were arguing; God only knows what about.
      c. This opera was written by someone in the 19th century, but we're not sure who by. [Chung *et al.* 1995: (4d)]
      d. He was shouting, but it was impossible to tell who at.
      e. A: She got a package in the mail. B: Really? Who from?
      f. He'll be at the Red Room, but I don't know when till.
      g. Bees are getting into the house, but we can't figure out where from.
      h. He sold his farm and moved away, but no-one knows where to.
      i. Abby quit and got a new job — guess what as!
      j. She bought a robe, but God knows who for.
      k. Howard shares the apartment with someone, but I have no idea who with. [Rosen 1976: (16)]
      l. She fixed it, but she wouldn't let us in on what with.
      m. Gordon thought the information had been leaked, but he wouldn't say who to.
      n. The tapes indicate that Gordon thought the information had been leaked, but they don't indicate who by.
      o. Lisa wants Bart to get involved, but what in isn't exactly clear.
      p. Tests indicate the megalith was constructed, but not what of.
      q. Although we don't yet know who from, we know she received a package last Monday with instructions on bomb assembly.

Furthermore, speakers accept the following swipes to varying degrees, with judgments best for (18a), slightly worse for (18b), and worst of all, though still marginally possible, for (18c). (These gradations hold for speakers who accept all three; some speakers reject all three, still others accept only (18a), and still others accept only (18a) and (18b), yielding an inter-speaker implicational hierarchy that maps directly onto intra-speaker variability.)

(18) a. % He's been living in Arizona, but I don't know how long for.
      b. % She bought it all right, but don't even ask how much for!
      c. % There's a lot of cities on her list, so she'll be traveling a lot, but I don't know how many to.

An attested example is given in the recent American comic strip below (published 22 June 2000 in the Minneapolis *Star-Tribune*):

But swiping is not a phenomenon limited to recent, perhaps casual, American speech; it is attested also in the careful, British upper-class speech of the characters of Austen, for example:

(19) 'But I will quiz you with a great deal of pleasure, if you will tell me what about.'
[Jane Austen (1775-1817), *Mansfield Park*, ch. 5]

Although the previous literature on swiping has dealt with it only in its English manifestation, it is also found in a proper subset of the other preposition-stranding Germanic languages (though not in the non-preposition-stranding Germanic languages, nor to my knowledge outside of Germanic at all). In particular, it is found in Danish and in some varieties of Norwegian (determination of which varieties will have to await further research; of four Norwegian informants, two rejected (20b) while two accepted it).

(20) a.   Per er gået   i biografen, men jeg ved   ikke hvem med.   [Danish]
     b.   % Per gikk   på kino,   men jeg veit ikke hvem med. [Norwegian]
          Per is gone/went to cinema   but I   know not who with
          'Per went to the movies but I don't know who with.'

Swiping is not, however, found in Swedish, Icelandic, or Frisian.

(21) a.   * Per gick   på   bio,   men jag vet inte vem med.   [Swedish]
     b.   * Pétur fór   í   bíó,   en ég veit ekki hverjum meD.[Icelandic]
     c.   * Per is   nei de bioskoop gien, mar ik wyt net wa mei.   [Frisian]
          Per   went/is to the cinema   gone but I know not who with
          'Per went to the movies, but I don't know who with.'

This cross-linguistic distribution will be taken up again in section 4 below. For now, we return to the two important empirical questions about swiping that began this section: with what kinds of wh-phrases does swiping occur and in what environments?[5] The next two sections

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[5] A third relevant question, but one which I will not attempt to address here, concerns the kinds of prepositions that swiping occurs with; it appears on brief inspection that most 'simplex' prepositions can occur in swiping, while many 'complex' ones cannot. At a first approximation, for example, swiping appears to be allowed with *about, after, as, at, by, for, from, in, near(?), of, on, till, to, under(?)*, and *with*, but not with *above, because of, before, between, despite / in spite of, during, instead of, into, on top of, regarding*, or *underneath*. As Marcel den Dikken

answer these questions respectively, and lay the empirical groundwork for the analysis that follows.

2.1   The range of wh-elements in swiping

The variety of wh-expressions that occurs in swiping in English at least is quite limited. We have, in fact, already seen examples of every kind possible. All other types of wh-phrases lead to ungrammaticality, as seen in (22) and (23).[6]

(22)   a.   * She bought a robe for one of her nephews, but God knows which (one) for.
       b.   * They were arguing about animals, but we couldn't figure out what kind about.
       c.   * This opera was written by an Italian composer in the 19th century, but we're not sure which (composer / one) by.
       d.   * He was shouting to one of the freshmen Republican senators supporting the bomber program, but it was impossible to tell exactly which (senator) to.
       e.   * He'll be at the Red Room, but I don't know what time till.
       f.   * She's driving, but God knows what town to.
       g.   * She fixed it, but she wouldn't let us in on what tool with.
       h.   * They were riding in somebody's car, but I don't know whose in.
       i.   * He's renting an apartment with a rich guy, and wait till you hear how rich (of a guy) with!
(23)   a.   * He's been living in Arizona, but I don't know how much time for.
       b.   * She bought it all right, but don't even ask how much money for!
       c.   * She's going to a lot of States, but I don't know how many cities to.

The data in (17), (18), (22), and (23) are summarized in Table 1.

(p.c.) points out, this distribution might very well lend support to the analysis presented here, if complex prepositions prohibit incorporation on independent grounds, and if the 'simplex' vs. 'complex' distinction can be independently motivated.

[6] I do not give full data for [-wh] elements selected by prepositions as in (i) and (ii), displaced or in situ, in elliptical environments or not: in no such case is the inversion characteristic of swiping found.
         (i)   a.   * Andy bought a present {[Beth for] / [her for] / [himself for]}.
                  b.   * {[Beth for] / [her for] / [himself for]} Andy bought a present.
         (ii)   a.   * Andy voted for Gore and Beth [Nader for].
                  b.   * Andy voted for Bush because Beth did [Nader for].

Swiping possible	Swiping impossible
who	* which
	* which one
	* which composer
	* whose
	* how rich
	* how rich of a guy
what	* what kind
when	* what time
where	* what town
% how long	* how much time
% how much	* how much money
% how many	* how many cities

TABLE 1: *Possible and impossible wh-elements in swiping*

It is fairly simple to state the generalization concerning wh-expressions in swiping, which I codify in the following condition.

(24)   THE MINIMALITY CONDITION:
       Only 'minimal' wh-operators occur in swiping

'Minimal' here means heads (X^0s). We notice that they are all monomorphemic (the last three presumably subject to varying degrees of reanalysis across speakers, as reflected in the gradations in speaker judgments noted above).[7] All complex (polymorphemic, phrasal: XP) wh-operators, on the other hand, are in the right column. This leaves *which* and *whose*; the former is a head on all analyses, while the latter at least on some. I return to their status below.

2.2   *In what environments does swiping occur?*

Swiping, as codified in the acronym itself, occurs only in sluicing. The following examples show that the wh-preposition inversion found in swiping is not possible in any of the other environments in which prepositions select wh-elements: nonelliptical questions, embedded or matrix (a-b), in situ (c), in embedded questions with VP-ellipsis (d), in (*wh-*) pseudoclefts (e), in (*it-*)clefts (f), in headed relative clauses, finite (g) or infinitival (h), or in free relatives (i).

(25)   a.   * I don't know [who to] Lois was talking.
       b.   * [Who to] was Lois talking?
       c.   * Who talked [who to] [what about]?
       d.   * We know when she spoke, but we don't know [what about] she did.
       e.   * [What about] she was talking was *Buddenbrooks*.
       f.   * It was Thomas Mann [who about] she was speaking.
       g.   * I finally met the guy [who about] she won't shut up.
       h.   * The officer [who to] to make such complaints is out of the office today.
       i.   * I always hate [who with] he goes out.

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[7] The wh-elements *how* and *why* do not occur in swiping, since they are never selected by a preposition.

This generalization is equally simple to state:

(26)   THE SLUICING CONDITION:
       Swiping only occurs in sluicing

       This condition, and its minimality companion above, form the major explicanda for any theory of swiping.

3   Accounting for swiping

We are now in a position to consider the theoretical import of the data established so far. After reviewing all extant accounts of swiping, I argue that the most satisfactory approach to swiping assimilates it to a kind of head-movement at PF, yielding a better data fit than the alternatives, and capturing the minimality and sluicing conditions in a straightforward way.

3.1   Previous accounts

The earliest account of swiping is that of Ross 1969, who himself recognized its unsatisfying *ad hoc* character (Rosen 1976, who follows Ross in all essentials, calls it a 'feeble expedient'). Ross proposed a transformation that would delete a variable string; the portion of interest here is given in (27) in current notation.

(27)   ... $[_{CP}$ XP$^{[+wh]}$ $[_{IP}$ X - (P) - Y] ...
             1   2   3   4 $\Rightarrow_{OPT}$
             1   0   3   0

       This account suffers from three shortcomings. First, it must countenance non-constituent deletion, an otherwise undesirable and perhaps unattested option. Second, it offers no account of the minimality condition: since it is sensitive only to a stranded preposition, not to the nature of the moved wh-element, all of the sentences in (22) and (23) above can be generated (Rosen 1976:209 fn 1 notes this problem, but leaves it as an unresolved difficulty). Third, though least damaging, without further qualification it predicts that any language that allows P-stranding should also allow swiping, a predication falsified by Frisian and Swedish (of course, the force of this objection is somewhat blunted pending a more complete understanding of what exactly regulates the distribution of swiping cross-linguistically to begin with).
       An alternative account to Ross's is that proposed in van Riemsdijk 1978 (followed by Lobeck 1995 and Chung *et al.* 1995 as well[8]), which assimilates swiping to R-pronoun inversion in German and Dutch. As is well known, in these languages certain pronouns (known as R-pronouns) appear before their selecting preposition (van Riemsdijk argues persuasively that they are in specPP); examples are given below.

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[8] The structural part of van Riemsdijk's analysis (namely, that the wh-element is in specPP) seems to be endorsed in Culicover 1999 as well, though Culicover argues in general that swiping is '*sui generis*', and that the PP is exhaustively dominated by a CP node ("radically violating standard X'-theory", p. 138).

(28) a. Womit   wolltest du es tun?   [German]
      b. Waarmee wou   je het doen?   [Dutch]
          Wherewith wanted   you it do
          'What did you want to do it with?'

Under this approach, English swiping is simply a parochial version of R-pronoun inversion. As interesting as the parallel to R-pronouns is, however, this analysis suffers from a number of shortcomings. Again there is little hope of capturing the minimality condition by applying usual analyses of R-pronoun inversion in Dutch and German to the English and Scandinavian cases (see section 4.2): the R-pronouns are distinguished by a feature [+R], not by 'minimality' in the sense needed here. In other words, it is mysterious why swiping in English and Scandinavian should allow a wider range of operators than occur as R-pronouns in Dutch and German. Likewise, there is no account of the sluicing condition — R-pronouns are not limited to ellipsis environments in Dutch and German, and it is unclear how the sluicing condition could be captured.

Finally, Richards 1997:167-168 suggests that swiping is a case of stranding in an intermediate specFP:

(29)   CP
             3
         DP_1 3
              C   FP
                   3
                 PP_2 3
              !   F   ~~IP~~
                 t_1 #
                              ... t_2 ...

This account, based on a number of principles regulating which element in a chain is pronounced, supports an ingenious explanation of the sluicing condition: essentially, this stranding in an intermediate specifier is possible only because the lower trace t_2 is inside an ellipsis site (roughly, the hypothesized algorithms that determine pronunciation will crash if t_2 must be considered as well as t_1 and DP_1; ellipsis of a constituent containing t_2 avoids this conflict).

As appealing as this aspect of the analysis is, we are again left with no account of the minimality condition: there is no reason not to expect both phrasal and 'minimal' wh-expressions to be extractable from the PP in specFP in (29). Furthermore, allowing preposition-stranding in intermediate landing sites raises a different specter of 'Postal's problem' (Postal 1972), the problem of ruling out examples like (30), given successive-cyclic movement:

(30)   * Who$_1$ do you think [$_{CP}$ [$_{PP}$ for t_1]$_2$ [$_{IP}$ she bought it t_2]]?

Most commonly, the solution to Postal's problem has been sought in the conditions on preposition-stranding in general: Kayne 1981 and Hornstein and Weinberg 1981 pursue conceptually similar analyses in which a stranded preposition must incorporate into or be 'reanalyzed' with a governing V or possess certain government properties. If these analyses are

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on the right track, then examples like (30) will be ruled out independently (though see Takami 1992 and Baltin and Postal 1993 for criticism of the 'reanalysis' approach).

Even if Richards' approach to (30) is adopted, however, Postal's problem reemerges when ellipsis targets a consituent containing the origin site for movement, as in (31).

(31)   a.   We need to know which bills Wellstone said he'd vote for, and
            * which bills$_1$ he said [$_{CP}$ [$_{PP}$ for t_1]$_2$ [$_{IP}$ he wouldn't [$_{VP}$ vote t_2]]].
       b.   * Wellstone voted for more bills than Op_1 he said [$_{CP}$ [$_{PP}$ for t_1]$_2$ [$_{IP}$ he would [$_{VP}$ vote t_2]]].

A swiping incarnation of this problem also arises. Although wh-extraction is allowed out of VP-ellipsis sites (especially under certain conditions of contrast, satisfied here; see Hardt 1993 for discussion), nevertheless wh-phrase inversion remains impossible in such cases, as we saw above in (25d), repeated here.

(32)   * We know when she spoke, but we don't know [what about] she did.
       (cf. We know which BOOKS she read, but we don't know which MAGAZINES she did.)

Parallel to the reasoning above, the ellipsis of the VP containing the trace of the moved PP should have the effect of voiding the PF crash otherwise caused by such structures; PP movement to specFP creates a legitimate PF object on this theory, because t_{PP} is elided.

Finally, since this account rests on additional functional structure in the clausal architecture, we would like to find independent evidence for the existence of the posited FP, or at least some explication of its role besides hosting the intermediate movement necessary for swiping.

In sum, all extant accounts of swiping stumble on the minimality condition, the sluicing condition, or both.

3.2   Swiping as head movement at PF

In this section, I propose to analyze swiping as involving head movement of the wh-word to its selecting preposition. Such head movement accounts directly for the minimality condition, and is discussed in section 3.2.1. I then show in section 3.2.2 that the sluicing condition can be captured if this head movement occurs at PF, after Spell-Out and after elliptical deletion.

3.2.1   Head movement and the minimality condition

Recall from Table 1 above that the set of elements that occur in swiping are exactly those that are heads (*who, what, when,* and *where* being the core cases; *how long, how much,* and *how many* being subject to variable reanalysis as heads). If swiping is head movement of the wh-word to its selecting P, we expect exactly this group to be able to 'incorporate' into P, as in the derivation of (33b) from (33a). (Here and below I represent the wh-pronominals as Ds, without projection: I assume that they are here 'minimal maximal' elements, like clitics, in Chomsky's 1995:249 terms.)

(33) a.   PP
                      2   -->   b.   PP
              to$_P$ who$_D$ 3
                                                                who$_D$+to$_P$ t_{who}

By using head movement to derive the observed inversion, we correctly rule out the possibility that phrases will participate in swiping, since structure preservation rules out XP-movement to an X^0 as in (34).

(34) a.   PP
                      2   b.   *   PP
              to$_P$ DP   -_>   3
                          3   !   DP+to$_P$ $t_{which\ one}$
              which$_D$ {one$_N$ / composer$_N$ }   which one

Likewise, we can now see why *which* does not occur in swiping, despite the fact that it is a head. Unlike the wh-pronouns, *which* must select a complement (which may be null due to NP-ellipsis; see Lobeck 1995). As such, head-movement of *which* to P as in (35a,b) would result in D-excorporation, disallowed in English (see Baker 1995). Compare also (35c), disallowed for the same reason.

(35) a.   PP
                      2   b.   *   PP
              to$_P$ DP   -_>   3
                      2   which$_D$+to$_P$ DP
              which$_D$ ~~N~~   2
                                                                    t_{which} ~~N~~

      c.   * She's driving (to some town), but God knows what to town.

The account extends as well to the absence of *whose* in swiping, under any analysis of this element. If *whose* is analyzed as consisting of *who* in the specifier of a DP headed by the genitive *'s* (i.e., [$_{DP}$ who ['s$_D$ [$_{NP}$ ...]]), then its absence in swiping is explained by structure preservation as in (34). If instead *whose* is analyzed as a wh-pronoun (and hence potentially a head) in the genitive case (*who*$_{GEN}$, assigned genitive case by a null D$_{GEN}$ as in Abney 1987), then the derivation (36a,b) will be ruled out by whatever rules out possessor raising in English in general. Compare again the overt counterpart in (36c).

(36) a.   PP
                      2   b.   *   PP
              to$_P$ DP   -_>   3
                      2   whose+to$_P$ DP
              whose 2   2
                      D$_{GEN}$ ~~N~~ t_{whose} 2
                                                                          D$_{GEN}$ ~~N~~

      c.   * They were riding in somebody's car, but I don't know whose in car.

The advantage of this account is that by positing head movement as the mechanism that drives the inversion found in swiping, we account directly for the minimality condition. But if the only evidence for treating the wh-pronouns as heads were from swiping, we might be uneasy. Fortunately, however, there is independent evidence that these elements can behave like heads.

This evidence comes from the behavior of modifiers which attach either to heads or to phrases, but not to both.

One kind of modifier of heads is the series of elements used to mark 'aggressive non-D-linking' such as *the hell, on earth*, etc. (see Pesetsky 1987:111 (40a) and Den Dikken and Giannakidou to appear for English, and Hoekstra 1993 for Frisian).[9] These markers attach only to heads as in (37), never to phrases as in (38).[10]

(37)   a.   Who the hell was he talking to?
                What the hell was he talking about?
                {When/where/why} the hell was he talking?
       b.   What the hell book was he reading!?
       c.   What the hell kind of a doctor is she, anyhow!?
(38)   a.   * What book the hell was he reading!?
       b.   * What kind the hell of a doctor is she, anyhow!?
       c.   * What kind of a doctor the hell is she, anyhow!?

Crucially, the wh-pronouns retain their head status as diagnosed by the attachment of these modifiers even in swiping:

(39)   a.   He was talking, but God knows who the hell to.
       b.   He was talking, but God knows what the hell about.

The second kind of evidence comes from modifiers with the opposite property. These include *exactly* and *for example*, which attach only to phrases as in (41) and not to heads as in (40).

(40)   a.   * Which exactly train did they take?
       b.   * What for example books should he be reading?
       c.   * What exactly kind of a doctor is she?
(41)   a.   {Exactly} Which train {exactly} did they take?
       b.   What books for example should he be reading?
       c.   {Exactly} What kind of a doctor {exactly} is she?

Again we find this distribution reflected under swiping as well:

(42)   a.   * He was talking about something, but God knows what exactly about.
       b.   A: You should talk to somebody in marketing for help with that.
                B: * Could you tell me who for example to?

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[9] Cf. the distribution of the free relative morpheme *-ever* (*whoever, whatever, wherever, whenever, however, whichever*), thanks to T. Stowell (p.c.) for bringing this parallel to my attention.
      (i)   a.   How{ever} potent {*ever} this symbol is,…
             b.   How {the hell} potent {*the hell} do you think this is?!?
[10] As J. McCloskey (p.c.) notes, the distribution of *the hell* in (i) supports the first treatment of *whose* above, as *who* + *'s*, and argues against Abney's analysis of *whose* as a genitive-marked head.
      (i)   a.   Who the hell's car is parked on the lawn?!
             b.   * Whose the hell car is parked on the lawn?!

These diagnostics thus pick out exactly the desired class of wh-pronouns, in perfect agreement with the data from swiping.[11]

The minimality condition, then, leads us to assume naturally that the movement behind the exceptional order of wh-word and preposition in swiping is head-movement.

3.2.2 *Prosodically conditioned head movement and the sluicing condition*

To account for the sluicing condition we must examine the interaction of head-movement and ellipsis. Though doing so requires us in part to rely on systems whose workings are at present not fully understood, the potential rewards are great, since this goes directly to the question of whether some or all head-movement occurs after Spell-Out (see Chomsky 1995, 1999, Zwart to appear for the timing of head-movement(s) in particular, and Aoun and Benmamoun 1998, Bobaljik 1998, and Sauerland 1999 for proposals relating to XP movement after Spell-Out). If we can establish that the head-movement involved in swiping must take place after deletion, itself a PF operation as argued in section 1 above, we have powerful new evidence for taking head-movement in at least one of its manifestations to be a late process, occurring in the mapping from Spell-Out to PF (in common but slightly misleading terminology, 'at PF'), and perhaps essentially phonological in nature.

Although certain details of the algorithms for assigning prosodic prominence will be irrelevant here, the logical structure of the argument should be clear. Essentially, it rests on three premises that have already been established: 1. that swiping involves (a kind of) head movement (of D to P), 2. that swiping occurs only in sluicing, and 3. that sluicing is IP-deletion at PF. From these we can conclude that swiping must be linked to the absence of prosodic material in IP, i.e., to IP-deletion having occurred. Since IP-deletion occurs after Spell-Out, so must the head-movement involved in swiping.

Conditioning the head-movement on its immediately following prosodic environment may allow us to build an account of another fact of swiping: exceptionally, in these cases the main stress falls on the preposition, not on its complement. The facts are in (43), where [ ]$_\phi$ represents the prosodic phrase formed by the CP.

(43)   Ben was talking, but I don't know
        a. [who TO]$_\phi$ b. * [WHO to]$_\phi$ c. [to WHO]$_\phi$ d. * [TO who]$_\phi$

In both grammatical cases, the prosodic prominence falls on the final element of ϕ, a result of general head-final prominence algorithms operative in English, however encoded (cf. the nuclear stress rule and its descendents); for our purposes, it will suffice to call this constraint HEADFINAL (i.e., the prosodic head of ϕ should be final in ϕ).

These prominences interact in crucial ways with the phrasing algorithms for focus as well (see Schwarzschild 1999, Büring to appear), and in particular with a set of facts discussed in Rosen 1976. Rosen claims that swiping is possible only when there is no antecedent for the preposition. She points out that the best cases of swiping are of adjunct PPs with no antecedent,

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[11] I note here that this phenomenon bears certain similarities to D-to-P incorporation in other languages as well (see Baker 1988). A similarly limited form of D-to-P movement is found in Latin with the preposition *cum* 'with': while the argument of *cum* generally appears to the right as in (i), personal pronouns appear to the left.
        (i)   *cum feminā*   'with {the/a} woman'
        (ii)   *mēcum*   'with me'

as in most of the cases examined so far, and identifies two important classes of antecedents that disallow swiping entirely: when the PP is the predicate as in (44a) and when the PP is an idiom chunk as in (44b) (similar to this second case are cases like (44c), where a predicate selects a preposition which combines with the predicate in an idiosyncratic way).

(44)   a.   We were with somebody. I forget who (*with).
        b.   Smersh intends to do away with someone. Find out who (*with).
        c.   She got involved in something over her head, but I don't remember what (*in).

She immediately qualifies this blanket claim, however, by noting that there are many cases of swiping where a preposition does occur in the antecedent nonetheless:

(45)   She fixed it with something, but God only knows what with.

She claims that examples like (45) represent interference from performance factors. In terms of the theory of sluicing presented in Merchant to appear, the possibility of swiping in (45) but not in (44) comes from the possibility of taking either a VP or the IP in the antecedent sentence to be the licenser for deletion of IP. (That such an option is necessary independently of the cases considered here is argued in Merchant to appear: section 5.4.3.) In swiping, because of HEADFINAL, the preposition is focused, and hence, *ceteris paribus* (as here), the content of the preposition should not be GIVEN, in Schwarzschild's 1999 sense. This can be formally captured by applying Schwarzschild's constraint AVOIDF — here we will only be interested in AVOIDF violations triggered by the preposition, not those potentially triggered by the wh-word (the computation for the latter is significantly more involved; see Romero 1998). For a usual, antecedentless case of swiping, the analysis is as in (46):

(46)   She fixed it, but God only knows ...
        a.   what WITH.   HEADFINAL √, AVOIDF √
        b.   * WHAT with.   HEADFINAL *, AVOID F √

If the preposition is obligatorily part of the antecedent (marked IP:A), AVOIDF will be violated:

(47)   [IP:A We were with somebody]. I forget
        a.   WHO.   HEADFINAL √, AVOID F √
        b.   * who WITH.   HEADFINAL √, AVOID F *

With adjunct PPs, on the other hand, the lower VP segment, excluding the PP, can be taken as the antecedent to satisfy the identity condition on ellipsis (see Merchant 2000 for independent evidence for this). When the lower VP-segment is taken, the preposition in the sluicing clause will not have an antecedent for deletion, and hence must be retained; otherwise, the result will violate the conditions on deletion (as in **She fixed it, but God only knows what ~~t_{IP}~~ ~~she fixed it with t~~**). In (48), both HEADFINAL and AVOID F are satisfied.

(48)   She [VP [VP:A *t*she fixed it] with something], but God only knows what WITH.

With argument PPs, this way out is not possible: the PP will always form part of the antecedent, be it IP or VP, making F-marking on the preposition under swiping an unavoidable violation of AVOIDF.

Let us assume, therefore, that the account presented thus far is correct in its essentials: swiping is derived by head-movement of a wh-pronoun to a preposition in specCP after IP-deletion has occurred, after Spell-Out.[12] The question that these conclusions do not address is the question of what, in featural terms, permits or triggers the movement itself. Of course, the answer to this latter question is independent of the conclusions reached so far: whatever is triggering the movement does not affect the fact that this movement is head-movement, nor that it must occur after Spell-Out.

In fact, answering this question in full cannot be done in isolation from an answer to the question of what permits preposition-stranding to begin with. It is clear, despite the prosodic sensitivity noted above, that the head-movement in swiping must also be linked in some way to the presence of the [+wh] feature that drives wh-movement in the first place. As such it is related to the mechanisms for pied-piping, possibly affording us a rare look into the mechanism of feature-passing. Although usually feature-passing is not visible in the overt syntax (i.e., there is no obvious component of the lower X (from which the passed feature F originates) on the higher Y (to which F is passed)), swiping perhaps presents just such a case. One way to analyze feature passing or percolation is as feature movement from a lower head onto a higher one. Usually this feature movement has the property of only moving the relevant feature, with the observed effects of making the higher Y a target for movement sensitive to F (as in PP pied-piping under wh-movement). Note that this kind of pied-piping is the exception, not the rule: usually, pied-piping proceeds from the specifier position of the pied-piped YP, where feature-passing can be handled with the regular mechanisms for spec-head agreement and head-XP projection (see Webelhuth 1992, Aissen 1996, Kennedy and Merchant 2000 for recent discussion and references). In contrast to specifier pied-piping, pied-piping from a complement position as in wh-PPs has remained more mysterious. Take (49) for example:

(49)   [$_{PP}$ with what] did she fix it?

We must assume that the [+wh] feature F that originates on *what* is passed on to the PP, marking the PP as [+wh] and hence a possible attractee for movement to specCP, where it checks F against a compatible F in C. The simplest mechanism in current terms for implementing this 'passing on' is feature movement of F from *what* to *with* in (49). Usually, feature movement that occurs before Spell-Out, as must happen in (49) for the PP to be displaced, must pied-pipe the originator X of F, due to 'PF convergence requirements' (as Chomsky 1995 discusses for I-to-C movement; cf. the lack of I-to-C movement in matrix sluices, as independently noted by Lasnik

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[12] An alternative that comes to mind is that the head-movement takes place before wh-movement, and that this head-movement somehow conditions the later IP-ellipsis, once the amalgamated PP has reached specCP. It is not clear to me, however, how to understand the mechanisms that would be involved in such an account, nor whether such an account could successfully be combined with the independently needed trigger for sluicing in non-swiping cases. (Another possibility is that there is a feature E on D that must be checked against the feature E on C which triggers IP-deletion (see Merchant to appear). Movement of D to P would allow this E, like the feature [+wh], to be checked in a spec-head configuration with C[+wh, E].) A nontrivial complication for any account analyzing the head-movement in swiping as occurring prior to Spell-Out is that such head-movement must presumably be undone or otherwise fixed by LF, in order for the wh-element to be interpreted in the usual way (typically taken to be in specCP).

1999 and Merchant to appear). Seen from this perspective, the swiping cases are in fact the expected ones, since the originator X has been moved along with F, adjoining to the target Y, in this case a preposition. The mystery that remains is why cases like (49) are well-formed, in fact almost the only possible option in languages that displace wh-phrases.

Here again we run up against the current lack of any sufficiently deep understanding of the mechanisms of preposition-stranding and its flip side, pied-piping of prepositions. Essentially, this reduces to the larger question of how degrees of analyticity are to be encoded in the grammar, both within and across languages. Unfortunately, the parametrization of analyticity is in its infancy. Apparently in most languages, the connection between D and P is stronger than in English, Frisian, and the Scandinavian languages. If we think of degree of analyticity in terms of whether or not head-to-head feature movement is obligatory, then we can say that in most languages, feature movement from D to P *must* take place, while in the preposition-stranding languages it is only the case that such movement *may* take place. It is important, of course, to remember that we are talking about analyticity only in the domain of prepositions and their objects; all other domains can and will require independently determined degrees of analyticity.

We might then think of swiping in English, for example, as a manifestation of the fact that English stands at the extreme end of the scale of analyticity in this domain; apparently certain elements of the grammar are somewhat unstable at such extremes. The instability in English is manifested in the ability of feature movement, in most languages without ramifications for the relative position of D and P, to pied-pipe its originator. For some reason, when feature movement becomes optional, pied-piping also becomes an option, subject to the constraints on head movement observed above; a possible way to think about this rare correlation is that by making feature movement optional, we make room for economy — that is, as opposed to when a movement is obligatory, in which case economy considerations play no role. Compare the three possibilities below, where strikethrough indicates a trace of movement.

(50) a. ⌐ 2 ⌐   b. ⌐ 2 ⌐   c. ⌐ 2 ⌐
         P   2   P$_{[F]}$ 2   D$_{[F]}$+P   2
              D$_{[F]}$ D$_{\text{[F]}}$ D$_{\text{[F]}}$

The option in (50a), where no feature movement has occurred, is the most economical, since no operations apply. (This fact is irrelevant for languages like German etc., since in these languages feature movement is obligatory *ex hypothesi*.) This leaves options (50b) and (50c). I would contend that a grammar that supports such optionality is in imbalance; there is no reason for the less economical options ever to be taken, but since they must be generated, some kind of grammatical patch is kludged together to permit the attested structures despite economy considerations (cf. Slobin's 1997 'grammatical viruses'). Specifically, a movement operation must be posited that is not subject to economy considerations (since otherwise the availability of (50a) would block it). Once such a movement operation is added to the grammar, given that it is by hypothesis uneconomical, or immune to economy, suddenly the comparison between 'mere' feature movement in (50b) and the usually more costly head-movement in (50c) becomes moot: the movement can effect either of these, leading to the results we have seen.

Whatever the results of these extended considerations, however, we are left with a fairly persuasive argument that the sluicing condition reduces to a sensitivity to IP-ellipsis, detectable only after Spell-Out, and which must therefore be captured by mechanisms, prosodic, featural or otherwise, which operate in the mapping from Spell-Out to PF. Combined with the conclusion of the previous section then, an argument emerges for a kind of head-movement at PF.

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4 The cross-linguistic distribution of swiping

We are now in a better position to consider again the at first glance somewhat puzzling distribution of swiping across the Northern Germanic languages (English, Frisian, and the Scandinavian languages), seen above in (20) and (21) and repeated here (further English-specific questions regarding swiping will have to await further research[13]).

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[13] For example, one interesting puzzle that remains concerns the distribution of *what ... for* in its idiomatic meaning synonymous with *why*, as in (ia). The puzzle arises from the fact that in this meaning, the preposition *for* cannot be pied-piped, as in seen in (ib).

   (i)   a.   What did you do that for?
           b.   * For what did you do that?
                 'Why did you do that?'

Given this state of affairs, one might expect that *what for* would not occur in swiping, if the initial pied-piping of *for* into SpecCP that is necessary to feed the derivation of swiping is ruled out in principle. This expectation is incorrect, however; (iia) is possible, which must have the structure in (iib).

   (ii)   a.   He did it, but I don't know what for.
          b.   ... [$_{CP}$ [$_{PP}$ what$_1$+for t_1]$_2$ [$_{IP}$ ~~he did it t_2~~]]

Thus whatever rules out pied-piping in (ib) must be repaired either by the deletion of IP or by the head-movement in the PP in (ii). Given our current only very partial understanding of the mechanisms involved in pied-piping (feature percolation or the like), it is difficult at this stage to decide between these alternatives. One possibility is that the [+wh] feature that normally appears on the PP in pied-piped structures, via transferance through the head P, cannot appear there because of some lexical property of *for* in this meaning; imagine that the percolated [+wh] feature on *for* cannot be checked by the [+wh] C in (ib). What differs in (ii) is that *what* has raised to P; this appears to allow parasitic checking of the transfered [+wh] on *for*. Presumably a single head cannot support two occurrences of the same feature, and amalgamation occurs — in the resulting complex head, the checking mechanism is sensitive only to [+wh] and checks this, voiding the posited lexically specified uncheckability of [+wh] on *for* alone in (ib).

Another interesting puzzle comes from the a further curiosity to be found in sluicing, and its intersection (null, as it turns out), with swiping. The phenomenon in question is known as 'multiple sluicing' and concerns examples like (iii), which are possible for some speakers in English, and in which apparently more than one wh-phrase has apparently survived IP-ellipsis (see Merchant to appear: section 4.1 for discussion and references).

   (iii)   Everyone brought something different to the potluck, but I can't remember who what.

The first, empirical question that arises is whether swiping can occur with either or both of the multiple remnants in 'multiple sluicing'. The answer is no, as we see for the first remnant in (iv) and for the second in (v) (though see Richards 1997, who reports related data with slightly differing judgments):

   (iv)   Jack lived with different people each year of college, but I don't know
           a.   [with who] when
           b.   * [who with] when.
   (v)   Everyone was talking (with someone different), but it was impossible to tell
           a.   who [with who].
           b.   ... * who [who with].

The question that arises next is why this should be the case. I would suggest that the answer differs for the first and second remnants. Inversion in a non-final PP as in (ivb) will be ruled out because the prosodic weight condition HEADFINAL isn't satisfied. Inversion in a final PP as in (vb) will be ruled out if this PP is not in specCP, since in that case movement can't be parasitic on wh-driven D-to-P movement as discussed above (providing evidence against the suggestion in Merchant to appear that both remnants appear in specCP in 'multiple sluicing', and for the suggestion in Nishigauchi 1998 that the non-inital remnant is displaced by operations similar to those that are responsible for gapping and pseudogapping, despite differences with respect to embeddability etc.; see footnote 6 above for the data demonstrating that remnants of these movements do not permit the inversion characteristic of swiping).

(51)   a.   Per er gået   i biografen, men jeg ved   ikke hvem med.   [Danish]
        b.   % Per   gikk   på kino,   men jeg veit   ikke hvem med.   [Norwegian]
              Per is gone/went to cinema   *but I*   *know not*   *who*   *with*
              'Per went to the movies but I don't know who with.'

(52)   a.   * Per   gick   på   bio,   men jag vet   inte vem med.   [Swedish]
        b.   * Pétur fór   í   bíó,   en   ég veit ekki hverjum meD.[Icelandic]
        c.   * Per   is   nei de bioskoop gien, mar ik   wyt net wa   mei.   [Frisian]
              Per   *went/is to the cinema*   *gone but I know not who with*
              'Per went to the movies, but I don't know who with.'

While English, Danish, and some varieties of Norwegian allow swiping, Frisian, Icelandic, and Swedish do not. Though a detailed explanation of the presence or absence of swiping in these languages remains to be constructed, some preliminary conclusions can be drawn. It is clear that these data rule out simply assimilating swiping to preposition-stranding across the board, as early researchers did; the absence of swiping in Swedish, Icelandic, and Frisian (and for certain speakers of Norwegian, who nonetheless allow preposition-stranding in general) indicates that merely being able to strand a preposition is not a sufficient predictive criterion for swiping. Ideally, however, these data do open another window into the mechanisms of preposition-stranding in general. In terms of the analysis presented above, we would like to see if the above distribution correlates with other, perhaps only very subtle, differences in wh-movement among these languages, in particular differences between head and phrasal movements. If swiping is an instance of head movement, and if the difference among the Northern Germanic languages with respect to swiping is to be traced to properties of head movement, we might expect to find independently differing properties of head movement among these languages.

       Another possibility is that the availability of swiping is to be traced to the Janus-faced nature of pronominals in the swiping languages, behaving as heads for some purposes and as phrases for others, similar to clitics; by hypothesis, Frisian and Swedish wh-pronominals must be phrasal (must project to XP) at all levels of analysis. While positing such lexical differences in the category of the pronominals in question fits with the analysis to correctly capture the distribution seen above, we would like to uncover some independent evidence that such a distinction is necessary.

       Perhaps surprisingly, there are some suggestive indications that at least English and Frisian differ in exactly the way required. Hoekstra 1993 discusses several strands of evidence relating to certain pecularities in the distribution of Frisian *wat* 'what' which he argues can be explained by assuming that *wat* does not behave like a simple pronominal (i.e., as a (projecting) D with no complement as with English [$_{DP}$ what]). Rather, he shows that *wat* occurs only as a D that selects an NP: [$_{DP}$ wat [$_{NP}$ *e*]] (cf. Eng. *which*).[14] Because of this obligatory selection of a complement (even though null), a branching structure will result, requiring projection to DP. The primary evidence comes from a intricate set of facts concerning what Hoekstra analyzes as the

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[14] Note that Frisian *wat*, like English *what*, can also take an overt NP complement (Hoekstra 1993: (26)): *Wat lju binne dat?* lit. *what people are that*, i.e., 'What kind of people are they?'; cf. *What fool left the lights on?* and *What thinking person would agree to that?* (this *what*, like the determiner *which*, does not appear in swiping, as expected). Similarly, if *wat* is used to question a previous utterance, it can select the 'dummy' nouns *ding* 'thing' or *guod* 'stuff': *Wat ding?*, *wat guod?* (meaning roughly 'What did you say?' or 'Beg your pardon?'; cf. the identical usage of Greek *Ti pragma?*, Italian *Che cosa?*, both lit. *what thing*).

clitic complementizer *dat*, too involved to go into here. Though *wat* does not share all its properties with the other simplex wh-words in Frisian, we can note that *wa* 'who' also has a relevant property that contrasts with its English congener — unlike in English, *wa* can select an NP directly: *Wa minkse docht soks no* (lit. *who human.being does such now*) 'What kind of a person does something like that now?' Hoekstra argues further that *wa* in at least some of its uses must be like *wat* in selecting a null NP complement.

Although this evidence from Frisian is only partial, it is highly suggestive, and if the conclusions drawn from the differences between English and Frisian in this domain are correct, it may be indicative that the absence of swiping in Frisian can be traced to independent aspects of the projection properties of Frisian wh-pronominals. It remains of course to be seen whether similar evidence can be adduced for the Scandinavian languages.

It also remains an important fact that swiping is found only in languages that allow preposition-stranding under usual wh-movement, surely no accident. Although many authors have sought to relate the availability of preposition-stranding to the nature of the V-P relation (via incorporation or 'reanalysis'), the evidence from swiping seems to indicate that we should instead concentrate on the relation of P to D in these languages, searching for a property of this latter relation to build an analysis of preposition-stranding on, as mooted in the previous section.

5   Conclusion

The nature and timing of movement operations have been central themes in linguistic theory since *Aspects* and continue to be so; as such, any source of illumination bearing on them is welcome. In this paper, I have argued that one such source comes from a rather modest and largely overlooked set of data hidden away in the nooks and crannies of the grammars of certain Germanic languages. Based on the generalization regarding the nature of the wh-elements that occur in swiping, I concluded that swiping must instantiate a kind of head-movement, of a wh-word to a preposition. Combining this with the evidence that sluicing structures are derived by deletion at PF, largely based on the correlation between preposition-stranding in nonelliptical interrogatives and under sluicing, I argued that the head-movement involved in swiping is most naturally understood as taking place at PF as well, that is, in the mapping from Spell-Out to PF. Though certain details remain unfortunately unclear, due to our incomplete understanding both of the mechanisms that regulate this mapping and of pied-piping in particular, I think it is safe to conclude that swiping does provide an argument that at least one kind of head-movement occurs after Spell-Out, with effects on word order.

If the reasoning laid out here is correct, it is also an indication that even the most unassuming curiosity gathering dust in the grammar's attic may potentially be a source of unexpected insight into the design and construction of the whole.

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