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Islands and LF-movement in Greek sluicing*

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This paper investigates the interaction of island insensitivities and form-identity effects in sluicing, and examines the consequences of these for the architecture of ellipsis resolution. On the basis of a number of novel facts from Greek, it is argued that current approaches, both PF-deletion and LF-copying, are inadequate. The present data instead motivate a revised LF-copying approach which relies on the scoping movement of indefinites at LF and Ā-chain uniformity.

Keywords: sluicing, ellipsis, preposition stranding, pied-piping, islands, (scope of) indefinites

1. Islands in sluicing

Sluicing is a widely attested elliptical construction in which the sentential part of a constituent question is elided, leaving only the wh-phrase, as in (1a), which corresponds to its non-elliptical counterpart in (1b):

(1) a. Κάποιος πήρε τηλέφωνο, αλλά δεν ξέρω   ποιος.
          kapjos pire tilefono ala δen ksero   pjos
          someone took telephone but not know-1SG who
          'Someone called, but I don't know who.'

      b. Κάποιος πήρε τηλέφωνο, αλλά δεν ξέρω   ποιος πήρε
          kapjos pire tilefono ala δen ksero   pjos pire
          someone took telephone but not know-1SG who took
          τηλέφωνο.
          tilefono
          telephone
          'Someone called, but I don't know who called.'

The full range of wh-phrases found in constituent questions is found in sluicing as well, as documented in Ross (1969), Levin (1982), Chung et al. (1995) (henceforth CLM), and others. CLM further divide sluicing into two types: examples like those in (1a) in which the sluiced wh-phrase corresponds to some XP (which I will call the 'correlate') in the antecedent sentence (in (1a), the correlate is κάποιος *kapjos* 'someone'), and cases of sluicing as in (2), in which no overt correlate is found. This second type they name the 'sprouting' subcase, after the LF-repair operation they posit for the derivation of these structures.

(2)   Ο   Κώστας πήρε τηλέφωνο, αλλά δεν ξέρω   πότε.
      o   kostas pire tilefono   ala δen ksero   pote
      the Kostas took telephone but not know-1sɢ when
      'Kostas called, but I don't know when.'

In this paper, I will refer to this second kind of case as involving 'implicit correlates'.

As Ross (1969) noticed, and as CLM bring to the fore, the first kind of sluicing is insensitive to islands; examples like (3a) and (4a) have the interpretation of their ungrammatical non-elliptical (b) counterparts (where the italics represent the deaccented pronunciation discussed in Tancredi 1992 and Winkler 1997, and the island is bracketed). Here I give only examples of relative clause and adjunct clause islands; see CLM and Merchant to appear for extensive exemplification of this effect across a fuller range of islands (for reasons of space, I illustrate these well-known effects only with English in the remainder of this section).

(3)   a.   They want to hire someone who speaks a Balkan language, but I don't remember which.
      b.   *They want to hire someone who speaks a Balkan language, but I don't remember which *(Balkan language) they want to hire someone [who speaks t].*

(4)   a.   Ben will be mad if Abby talks to one of the teachers, but I don't remember which.
      b.   *Ben will be mad if Abby talks to one of the teachers, but I don't remember which *(of the teachers) Ben will be mad [if Abby talks to t].*

Ross, who pursued a deletion approach to sluicing, recognized the difficulty that such examples create. If sluicing is a product of PF-deletion, then the grammatical sluices in the (a) examples in (3) and (4) have as their syntactic sources the ungrammatical island-violating (b) examples. Ross could propose no more than a vague answer to this puzzle, suggesting that island deviancies

are calculated cumulatively across the derivation, with PF-deletion repairing island violations. This idea can immediately be seen to fail, since in fact island violations in sluicing remain when no overt correlate is available, as pointed out in CLM:

(5)   a.   *They want to hire someone who speaks Greek, but I don't remember how well.
      b.   *They want to hire someone who speaks Greek, but I don't remember how well *they want to hire someone [who speaks Greek t].*

For sluiced wh-phrases that do not have an overt correlate — the implicit correlate cases — PF-deletion of the island does not repair the violation. Why this dichotomy should exist is mysterious under a PF-deletion approach to sluicing.

To deal with this problem, CLM propose that the ellipsis in sluicing is not the result of PF-deletion. Instead, following Chao (1987), Lobeck (1995), and others, they posit an empty IP category in the syntax, as in (6), with the wh-XP base-generated in SpecCP:

(6)   Spell-out
      Someone called, but I don't know [CP who [IP e]]

In order for interpretation to proceed at LF, however, this empty category must be replaced by a syntactic constituent of the appropriate type (namely an IP). In (6), the first IP can serve as the antecedent to the ellipsis, and can be copied in for *e* in the second clause, yielding (7) (I use boldface to indicate LF-copied material):

(7)   After IP-copy at LF
      ... but I don't know know [CP who [IP **someone called**]]

CLM follow Kamp (1981) and Heim (1982) in assuming that indefinites are not quantificational but rather simply provide a variable (with a descriptive content), which is bound by a separate operation of existential closure that can apply at different points in the structure, deriving the variable scope of indefinites. With this view, the copied indefinite in (7) is free to be bound by the existential operator which binds the variable introduced by the wh-phrase in SpecCP (similarly an indefinite), a process CLM call 'merger' (simplifying here somewhat). They represent merger as co-superscripting at LF; the LF output of merger in (8a) will then yield the desired Karttunen-style interpretation for the embedded question in (8b) by standard techniques.

(8) a. After merger at LF
         ... $[_{CP}$ who^x $[_{IP}$ someone^x called]]
     b. ... $\lambda p[\exists x[person(x,w_o) \wedge p(w_o) \wedge p=\lambda w[call(x,w)]]]$

In doing this, CLM make the grammaticality of sluicing dependent on the availability of an unbound variable (usually supplied by an indefinite) in the copied IP. Under their account, if no such variable can be found (for example, if no indefinite is present, or if the indefinite has been existentially closed within the IP, as is the case with narrow-scope indefinites, negative polarity items, etc.), sluicing will fail. CLM thus correctly predict that sluicing will always require a wide scope reading for the correlate in its own clause, deriving the attested scopal parallelism (since the wh-phrase itself has wide scope over its clause as well).

Since there is no movement of the sluiced wh-phrase, island constraints are not expected to hold. For CLM, the derivation of an example like (3a) is straightforward. At Spell-out, the structure is that in (9a) (ignoring the independent question of the resolution of the NP-ellipsis after *which*), while after IP-copy and merger, the structure is that given in (9b).

(9) a. ... $[_{CP}$ which $[_{IP}$ e]]
     b. ... $[_{CP}$ which^x $[_{IP}$ they want to hire someone who speaks [a Balkan language]^x]]

Since sluicing resolved by merger is simply a species of variable-binding, which is not sensitive to syntactic constraints on Ā-movement, no island sensitivity is expected. Instead, sluicing is sensitive to the scope of the correlate: if the correlate has a scope narrower than that required by sluicing, sluicing will fail. The scopal parallelism enforced by sluicing can be seen in (3a), for example. The indefinite *a Balkan language* in the first clause can only have scope over *want*, as in (10a), not inside it as in (10b); though the narrow scope reading in (10b) is certainly available to this sentence in other contexts, when the clause is meant to serve as the antecedent to the elliptical IP under sluicing, this reading is excluded. This is because using the LF that generates the reading in (10b) to resolve the IP-ellipsis in the second clause in (3a) would lead to vacuous quantification of the existential operator in SpecCP, since the necessary variable associated with *a Balkan language* has already been bound by the lower ∃.

(10) a. $\exists y[Balkan\text{-}language(y) \wedge want(they, {}^{\wedge}\exists x[person(x) \wedge speak(x,y) \wedge hire(they,x)])]$
     b. $want(they, {}^{\wedge}\exists x[person(x) \wedge \exists y[Balkan\text{-}language(y) \wedge speak(x,y)] \wedge hire(they,x)])$

When no overt correlate is available, however, sprouting must occur; CLM hypothesize that sprouting is an instantiation of the syntactic operation of FormChain, and hence subject to island constraints, conceived of as constraints on Ā-chain formation (independent of movement, following Cinque 1990). Quite apart from questions of the theoretical import of this approach, accounting for the locality restrictions on implicit correlate sluices solely by imposing island constraints on FormChain overgenerates. There are cases of licit Ā-chains as in (11a) and (12a) which nevertheless do not make good sluices, as in (11b) and (12b).

(11) a. When was no nurse on duty?
     b. *No nurse was on duty, but we don't know when.
(12) a. When is a nurse rarely on duty?
     b. *A nurse is rarely on duty — guess when!

For CLM, the ill-formedness of the (b) examples is unexpected, since, as attested by the (a) examples, the corresponding Ā-chains are well-formed. Instead, as pointed out by Albert (1993) and Romero (1998), the 'sprouting' cases are uniformly sensitive to selective islands (Sauerland 1996 makes a related point). This can be reduced again to the requirement for scopal parallelism between the implicit quantifier in the antecedent clause and the quantifier associated with the wh-phrase in the sluicing clause. In the first clause in (11b), for example, the implicitly bound temporal variable has narrow scope with respect to 'no nurse', as in (14a), and does not have the reading expressed in (14b). It is this second reading which would have to be available for the sluice in (11b) to be well-formed.

(14) a. $\neg\exists x[nurse(x) \wedge \exists t[time(t) \wedge on\text{-}duty(x, at\ t)]]$
     b. $\exists t[time(t) \wedge \neg\exists x[nurse(x) \wedge on\text{-}duty(x, at\ t)]]$

Thus there is no reason to make an analytical distinction between 'merger' and 'sprouting' cases: both cases can profitably be analyzed as requiring an unbound variable in the antecedent. They differ only in that implicit existentials (whether arguments or adjuncts) always take narrow scope in their clause, and therefore cannot provide the open variable needed in sluicing when certain other operators intervene (as in selective islands). I will henceforth assume that 'sprouting' as an operation can be dispensed with, and concentrate on examples with overt correlates, as these are the ones that *can* violate islands.

When there is an overt correlate as in (3a), for example, the possible sluices over that antecedent are constrained only by whether or not the indefinite in

question can be bound at a level parallel to that needed for resolution of the ellipsis, i.e., external to the IP needed for copying at LF. Since such wide-scoping behavior is only found with (certain kinds of) overt indefinites, island-insensitive sluicing will only be found with these.

The main conclusion to be drawn from this discussion is that the island-violating nature of sluices with overt indefinite antecedents strongly supports the LF-copying approach to the resolution of sluicing, and is fatal for the PF-deletion approach. Especially the fact that sluicing does not uniformly void islands, as might be expected if islands were somehow thought to be PF-phenomena only, but rather tracks scopal possibilities, is a straightforward consequence of CLM's LF-copying approach.

2. Form-identity effects in sluicing

While CLM's LF-copying approach is superior to a PF-deletion approach in its handling of the island data, there is a set of data which at first sight seems less tractable for LF-copying and has been argued (by Ross 1969) to support the PF-deletion approach. In Section 2.1, I will first discuss these data, from form-identity effects relating to case, and show how CLM's approach can handle them. Then I turn, in Section 2.2, to a new set of data concerning PP form-identity, and demonstrate that these data are in fact intractable for the CLM approach.

2.1 Case-matching

As noted in Ross (1969) for German, the case of a sluiced wh-phrase is not arbitrary, but determined by the case that its correlate bears (he considered only cases with overt correlates; though the point is more general, I will follow him in this). This is a property of all the case-marking languages I have examined (English, German, Greek, Finnish, Russian, Polish, Czech, Slovene, Hindi, Basque); I illustrate this here only with English and Greek:

(15) The police found someone's car, but they wouldn't tell us {whose/*who}.

(16) a. Κάποιος   πήρε τηλέφωνο, αλλά δεν ξέρω   {ποιος /
          kapjos   pire tilefono   ala den ksero   {pjos /
          someone-NOM took telephone but not know-1SG who-NOM
          *ποιον}.
          *pjon}
          who-ACC
          'Someone called, but I don't know who.'

      b. Είδα   έναν   από τους αδερφούς σου — μάντεψε
          ida   enan   apo tus aderfus   su   mandepse
          saw-1SG one-ACC of the siblings   your guess
          {*ποιος /   ποιον}!
          {*pjos /   pjon}
          which-NOM which-ACC
          'I saw one of your siblings — guess which!'

Importantly, although it has never been documented before, case-matching in sluicing also holds across islands:

(17) The police said that finding someone's car took all morning, but they wouldn't tell us {whose/*who}.

(18) a. Θέλει   να βρεί ένα ημερολόγιο που να   το έχει γράψει
          θeli   na vri ena imerolojio pu na   to exi yrapsi
          wants-3SG SUBJ find a diary   that SUBJ it has written
          ένας στρατηγός του   Χίτλερ, αλλά δε θυμάμαι
          enas stratiyos tu   hitler ala de θimame
          a   general-NOM of.the Hitler but not remember-1SG
          {ποιος /   *ποιον}.
          {pjos /   *pjon}
          which-NOM which-ACC
          'She wants to find a diary that a general of Hitler's may have written, but I don't remember which (general).'

      b. Ο Πέτρος θα θυμώσει αν φιλήσει η   Μαρία έναν   από
          o petros θa θimosi an filisi i   maria enan   apo
          the Petros FUT anger   if kisses the Maria one-ACC of
          τους αδερφούς του — μάντεψε {*ποιος /   ποιον}!
          tus aderfus tu — mandepse {*pjos /   pjon}!
          the brothers his   guess   which-NOM which-ACC
          'Petros will get angry if Maria kisses one of his brothers — guess which!'

The generalization that emerges from this data is stated in (19):[1]

(19)   *Form-identity generalization I: Case-matching*
The sluiced wh-phrase must bear the case that its correlate bears.

For Ross, this effect followed from his deletion approach. In (16a), for example, the underlying structure is that in (20a), with the sluiced version being derived by deletion of the struck-through material in (20b) under (presumably morpho-syntactic) identity with the underlined material in the antecedent clause.

(20)   a.   Κάποιος πήρε τηλέφωνο, αλλά δεν ξέρω   ποιος πήρε
            kapjos pire tilefono ala δen ksero   pjos pire
            someone took telephone but not know-1sg who took
            τηλέφωνο.
            tilefono
            telephone
       b.   kapjos ~~pire tilefono~~, ala δen ksero pjos ~~pire tilefono~~

Since the sluiced wh-phrase is in fact the subject of its clause, it will be assigned nominative case by the regular mechanisms, and nothing more need be said. The same reasoning applies to the derivation of (16b) and similar examples.

For a copying approach like CLM's, this explanation does not apply. The sluiced wh-phrase is base-generated in SpecCP and hence does not participate in the regular clause-internal case-assignment mechanisms. Although they do not discuss case-matching in their framework in any detail, the answer to these facts under such an approach is clear. In addition to the semantic binding of the variable, there must also be syntactic binding of the copied antedecent by the wh-phrase. CLM in fact propose this, using subscripted variables to indicate the syntactic relation, as in (21).

(21)   ... pjos^x_i [$_{IP}$ kapjos^x_i pire tilefono]

Although in simple cases like (21), the semantic and syntactic indices will fall on the same constituents, in more complex cases involving any kind of pied-piping, the two will be distinct, just as in the standard representations of pied-piped constituents in questions. For example, while the displaced consituent in (22a) bears the syntactic index i, this constituent does not correspond to the semantic variable quantified over in the question. Quantification in this case is over car-owners, not cars, as represented by the formula in (22b). Such a formula is usually thought to be the direct result of interpreting not the structure in (22a), but the structure in (22c), related to (22a) by reconstruction.

(22)   a.   [Whose car]$_i$ did the police find t_i?
       b. $\lambda p[\exists x.\text{person}(x, w_o) \wedge p(w_o) \wedge p = \lambda w.\text{find}(\text{the-police}, x\text{'s-car}, w)]$
       c.   who^x did the police find [t^x's car]?

It is thus necessary to distinguish syntactic from semantic operator-variable binding relations: this is always implicitly acknowledged, though the usual conventions for indicating the two can be imprecise and tend to confusingly conflate these. Once we carefully separate them, we can see where the solution to the case-matching problem lies. We must impose a condition on the chain formed by the wh-phrase and its syntactic bindee: Ā-chains must be uniform in their case. This is reminiscent of the Chain Uniformity condition discussed in Chomsky (1986), and the principle in Chomsky (1981:334 (16)), given in (23).

(23)   The chain $C = \langle a_1, ..., a_n \rangle$ has the Case K iff for some i, a_i occupies a position assigned K by β (β a Case-assigner).

If we take 'chain' in (23) to refer to the syntactic Ā-chain formed in sluicing at LF with the wh-phrase the head of the chain a_1, and the correlate in the Case-marked position a_j, then the condition in (23) will rule out any case-mismatch, requiring case-uniformity of the entire chain.[2]

While this condition, which refers specifically to Case (for present purposes, case might be more accurate), might be sufficient for the data presented in this section, we will see immediately that the form-identity phenomenon is more general, requiring a more inclusive definition of Ā-chain uniformity.

2.2 Preposition-stranding

A more serious problem for CLM's LF-copying and merger approach comes from the behavior of wh-PPs under sluicing, a set of facts that have not previously received attention in the literature. Greek, like most languages, but unlike English, does not allow preposition-stranding (P-stranding) under wh-movement:

(24)   a.   *Ποιον μιλούσε   η   Αννα με;
            *pjon miluse   i   ana me
            who   was.talking the Anna with
       b.   *Τί   μάλωσαν   οι γονείς του   παιδιού για;
            *ti   malosan   i γonis tu   peδju ja
            what argued-3pl the parents of.the child   about

c. *Ποιο μάθημα αποκοιμήθηκε η   Αννα σε;
   *pjo   maθima apokimiθike i   ana   se
   which class   fell.asleep   the Anna in

In all cases, pied-piping the preposition is obligatory:[3]

(25) a. Με ποιον μιλούσε   η   Αννα;
        me pjon miluse   i   ana
        with who was.talking the Anna
        'Who was Anna talking with?'

   b. Για   τί   μάλωσαν οι γονείς του   παιδιού;
      ja   ti   malosan i yonis tu   peδju
      about what argued-3PL the parents of.the child
      'What did the child's parents argue about?'

   c. Σε ποιο μάθημα αποκοιμήθηκε η   Αννα;
      se pjo   maθima apokimiθike i   ana
      in which class   fell.asleep   the Anna
      'Which class did Anna fall asleep in?'

This pattern is replicated in its essentials under sluicing in Greek as well. If the correlate is the object of a preposition, the preposition must occur in the sluiced wh-phrase as well. (Similar constraints hold of elliptic conjunctions, stripping, comparative deletion, and fragment answers.) English, which allows preposition-stranding, also allows sluiced DPs to associate with correlates inside PPs, as indicated by the grammaticality of the English translations.

(26) H Αννα μιλούσε   με   κάποιον, αλλά δεν ξέρω   *(με) ποιον.
     i ana miluse   me   kapjon ala δen ksero   *(me) pjon
     the Anna was.talking with someone but not know-1SG with who
     'Anna was talking to someone, but I don't know who.'

(27) Οι γονείς του   παιδιού μάλωσαν για   κάτι,
     i yonis tu   pedju malosan ja   kati
     the parents of.the child   argued-3PL about something
     αλλά αρνείται   να   μας πεί *(για) τί.
     ala arnite   na   mas pi *(ja)   ti
     but refuses-3SG SUBJ us tell about what
     'The child's parents were arguing about something, but she refuses to tell us what.'

(28) H Αννα αποκοιμήθηκε σε ένα από τα μαθήματα, αλλά δεν
     i ana apokimiθike se ena apo ta maθimata ala δen
     the Anna fell.asleep   in one of the classes   but not
     ξέρω   *(σε) ποιο.
     ksero   *(se) pjo
     know-1SG in which
     'Anna fell asleep in one of the classes, but I don't know which.'

As with case-matching, this preposition-matching effect holds even across islands:

(29) H μητέρα του Γιάννη θα θυμώσει αν μιλήσει   με   κάποιον
     i mitera tu jani   θa θimosi   an milisi   me   kapjon
     the mother of Giannis FUT get.angry if talks-3SG with someone
     από την τάξη του, άλλα δε θυμάμαι   *(με) ποιον.
     apo tin taksi tu ala δe θimame   *(me) pjon
     from the class his but not remember-1SG with who
     'Giannis's mother will get angry if he talks with someone from his class, but I don't remember who.'

(30) H Μαρία θέλει να   μιλήσει με   κάποιον που να   έχει πολεμήσει
     i maria θeli   na   milisi me kapjon pu na   exi polemisi
     the Maria wants SUBJ talk   with someone who SUBJ has fought
     σε έναν από τους βαλκανικούς πολέμους, αλλά δεν ξέρω
     se enan apo tus valkanikus polemus ala δen ksero
     in one from the Balkan   wars   but not know-1SG
     *(σε) ποιον.
     *(se) pjon
      in which
     'Maria wants to talk to someone who fought in one of the Balkan wars, but I don't know which.'

These facts[4] form the basis for a second generalization, supported not only from the Greek facts given here, but holding across a number of both pied-piping languages and preposition-stranding lanugages (see Merchant to appear for data from twenty-four languages). This generalization is given in (31).

(31) *Form-identity generalization II: Preposition-stranding*
     A language *L* will allow preposition stranding under sluicing iff *L* allows preposition stranding under regular wh-movement.

While such a generalization seems *prima facie* to support a deletion analysis of sluicing, the fact that such prepositional form-identity holds even across islands leads to a paradox for the deletion approach: for the deletion approach, islands must somehow be PF-phenomena. But if PPs are islands, as usually assumed for non-preposition-stranding languages, the fact that the PP island cannot be voided by deletion is mysterious.

These facts are equally problematic, however, for the CLM approach. For them, the sluiced wh-XP is base-generated in SpecCP and bears no movement relation to the copied correlate position inside the clause, though it does Ā-bind it. The representation they would assign to the two variants in (26), for example, are given in (32a) and (32b), with a sluiced PP and DP, respectively.

(32) a.   ... [me pjon^x]$_1$ [$_{IP}$ miluse [me kapjon^x]$_1$]
      b.   ... pjon^x$_1$ [$_{IP}$ miluse me kapjon^x$_1$]

In (32a), the semantic index x on the DPs *pjon* and *kapjon* indicates the semantic variable binding while the syntactic index 1 on the PPs *me pjon* and *me kapjon* indicates the Ā-chain formed between the two PPs. Both of these relations are well-formed, and obey all the relevant constraints. Unfortunately, the representation in (32b) of the ungrammatical variant without the preposition, where the semantic and syntactic indices occur on the same DP constituent as in the limiting case examined in (21) above, is equally well-formed; indeed, this is precisely the representation needed for its grammatical English counterpart. The island nature of the PP in Greek is ignored by Ā-chain formation under CLM's approach just as other islands are.[5]

3. P-stranding and Ā-chain uniformity at LF

The data presented in Section 1, showing that islands are voided under sluicing with overt indefinite correlates, but not otherwise, showed that the PF-deletion approach to islands is inadequate. The preposition pied-piping facts of Section 2, however, showed that CLM's approach to LF-copying, in which the indefinite is interpreted as a Heimian variable, could not account for the grammatical sensitivities attested.

The difficulty with CLM's approach can be traced to their adoption of the Heimian approach to indefinites. For them, the correlate undergoes no movement, remaining in situ in the target clause, interpreted as an unbound variable. They assume only that the operation of existential closure must apply in the target clause before IP-copy, in order to account for the scope parallelism. It is this reliance on the Heimian theory, then, that precludes any account of the second form-identity generalization above.

Nevertheless, the reasons for adopting an LF-copy approach over a PF-deletion one remain convincing. How can we retain the advantages of the movement approach while continuing to make sluicing track the scope of indefinites? The answer, I propose, is suggested by Bayer's (1996) results concerning P-stranding at LF.

On the basis of an investigation of focussing particles and wh-in-situ, Bayer shows that languages differ not only in whether or not they allow P-stranding under overt Ā-movement, but also under covert Ā-movement, at LF. His conclusions are based on data like that in (33) and (34). Certain types of focussing particles, like *only*, on their non-scalar readings, require LF movement of their associates. In English, which allows P-stranding, these focus particles can associate directly with a DP inside a PP as in (33b), since the DP can licitly move out of the PP at LF.[6] In Greek, on the other hand, which does not allow P-stranding, the focus particle must attach to the PP, as in (34a). The distribution of the focus particle follows, Bayer argues, if PPs in Greek are islands at LF as well; since the particle+XP must move at LF for scopal reasons, a P-stranding violation will result at LF, correctly ruling out (34b).

(33) a.   I spoke only to Bobby.   LF: [$_{PP}$ only to Bobby]$_1$ I spoke t_1
      b.   I spoke to only Bobby.   LF: [$_{DP}$ only Bobby]$_2$ I spoke [$_{PP}$ to t_2]

(34) a.   Μίλησα   μόνο με   τον Μπόμπυ.
           milisa   mono me   ton bobi
           spoke-1SG only   with the Bobby
           LF: [$_{PP}$ mono me ton Bobby]$_1$ milisa t_1
      b.   *Μίλησα   με   μόνο τον Μπόμπυ.
           *milisa   me   mono ton bobi
           spoke-1SG with only   the Bobby
           LF: *[$_{DP}$ mono ton Bobby]$_2$ milisa [$_{PP}$ me t_2]

We can use this result to solve the form-identity problem for an LF-copying approach if we give up the assumption that indefinites do not move at LF. Instead, I will adopt the view that indefinites, like all scope-bearing DPs, are generalized quantifiers, and as such must move at LF for type-hygienic reasons. After the indefinite has been scoped, the resulting IP can be used to resolve the ellipsis in the sluice. For a simple case like (35a), this will result in the derivation whose parts are given in (35b, c).

(35) a. Η Αννα είδε κάποιον, αλλά δεν ξέρω   ποιον.
i ana iðe kapjon ala ðen ksero   pjon
the Anna saw someone but not know-1SG who
'Anna saw someone, but I don't know who.'

b. kapjon₁ [$_{IP2}$ i ana iðe t_1]
[[kapjon]] = λP.∃x[**person**(x) ∧ P(x)]
[[[$_{IP2}$ i ana iðe t_1]]] = λy.saw(ana, y)

c. [pjon]₁ [$_{IP2}$ **i ana iðe** [$_{DP}$ **t**]₁]

The indefinite *kapjon₁* in the antecedent clause raises at LF (by whatever version of QR is appropriate for indefinites), adjoining to IP, whose lower segment is labelled here IP₂. IP₂ can then be copied in for the missing IP under the sluiced *pjon*, yielding the LF in (35c), after Ā-chain formation, represented by the syntactic subscripts.

This approach will also derive the scopal parallelism of CLM's account. If the indefinite scopes too low, namely inside the copied IP, the existential quantifier of the wh-phrase will vacuously quantify in its second argument (lamda-conversion will not be able to occur, hence the second conjunct will not be type ⟨t⟩ as required). Only if the indefinite scopes outside the IP used to resolve the ellipsis will an appropriate variable be made available. This purely mechanical approach to the syntactic resolution of the missing IP of course does not rule out other elements scoping out and providing a variable. Though in some cases, such IPs may indeed be able to provide a syntactically appropriate IP[7], other factors may intervene to make the resulting interpretation infelicitous (namely constraints on focus alternatives; see Romero 1998). I will here be concerned only with the narrower requirement for the structural resolution of the ellipsis (Rooth 1992's "redundancy relation 1", Fiengo and May's 1994 "reconstruction").

We are now in a position to see how to derive the preposition-matching effect under sluicing. Indefinites, like other DPs, must pied-pipe a governing preposition at LF, given Bayer's results. This entails that the derivation of a well-formed example like (36a) will proceed in the steps given in (36b) and (36c). First the QRed indefinite along with the preposition raises in the antecedent clause to its scope-taking position outside IP₂ as in (36b) (see Bayer 1996 for the adjustments necessary to allow composition of the generalized quantifer inside the PP to occur). The resulting IP₂ is then used to resolve the ellipsis as in (36c).

(36) a. Η 'Αννα μιλούσε   με   κάποιον, αλλά δεν ξέρω   με
i ana miluse   me kapjon ala ðen ksero   me
the Anna was.talking with someone but not know-1SG with
ποιον.
pjon
who
'Anna was talking to someone, but I don't know who.'

b. [me kapjon]₁ [$_{IP2}$ i ana miluse [$_{PP}$ t_1]]

c. [me pjon]₁ [$_{IP2}$ **i ana miluse** [$_{PP}$ t_1]]

In the representation in (36c), the base-generated wh-PP Ā-binds a syntactic variable of the same category, namely PP. It seems reasonable to believe that Ā-chains are subject to a condition that requires every link in the chain to share certain basic features, here category features. But, as we saw above, such uniformity among the links of an Ā-chain is not limited to category features, but rather extends to case (and φ-features) as well. I propose to capture this in the following condition on Ā-chains (the only relevant instantiation here; nothing prevents this condition from being generalized in some version to A-chains as well):

(37) Ā-chain uniformity
∀α∀β [[(α ∈ C) ∧ (β ∈ C)] → (F(α) = F(β))]
where
a. C = the maximal co-indexed sequence ⟨α₁, ..., α$_n$⟩, such that α₁ is in an Ā-position and α$_n$ is a trace, *and*
b. F(x) = {F | F is a feature of x} (let *feature* here range over at least category, case, and φ-features)

The constraint in (37) states that the features of every link in a maximal Ā-chain must match the features of every other link of the chain (including of course self-matching). This is simply one of many conceivable ways of stating the condition; we could have enforced uniformity to any arbitrarily chosen link of the chain (α₁ or α$_n$, for example) with the same results.

The effects of (37) are usually derived from the definition of the operation Move; Move copies an element whole, and does not alter any of its features, thereby ensuring chain uniformity. But the facts of sluicing indicate that some version of uniformity must hold of chains created by Ā-indexing at LF as well. Note that such a uniformity condition must *not* apply to resumptive chains as discussed in McCloskey (1990), among others; operators that bind resumptive

pronouns have a number of properties that distinguish them from the operators in sluicing (see Merchant to appear).

Let us now examine what goes wrong in an ill-formed example like (38), from (26).

(38) *Η 'Αννα μιλούσε   με   κάποιον, αλλά δεν ξέρω   ποιον.
     *i   ana miluse   me kapjon ala δen ksero   pjon
     the Anna was.talking with someone but not know-1sg who

There are two possible derivations to consider. First, parallel to its grammatical English counterpart, we might attempt to provide an appropriate IP for copying into the ellipsis site by scoping the correlate DP *kapjon* directly, as in (39).

(39) *[kapjon]$_1$ [$_{IP2}$ i ana miluse [$_{PP}$ me [$_{DP}$ t_1]]]

While the resulting IP$_2$ would be able to resolve the ellipsis, the movement of *kapjon* out of its governing PP is illicit, violating the PP island which holds at LF; cf. (34b) above.

The second derivation to consider satisfies LF-movement constraints by pied-piping the PP as in (36b) above, yielding (40) as the LF for the antecedent clause.

(40) [me kapjon]$_1$ [$_{IP2}$ i ana miluse [$_{PP}$ t_1]]

IP$_2$ is now the only structural antecedent available to resolve the ellipsis under *pjon*; copying this IP in yields (41).

(41) [pjon]$_1$ [$_{IP2}$ i ana miluse [$_{PP}$ t_1]]

Pjon must form an Ā-chain with a trace inside the IP; the only trace available here is [$_{PP}$ t_1], and the chain formed is ⟨[$_{DP}$ *pjon*], [$_{PP}$ t]⟩, as indicated by the indexing in (41). But this chain violates the Ā-Chain Uniformity condition in (37) — since *pjon* is a DP but *t* is a PP, their category features do not match as required by (37).

Since neither of the possible derivations for (38) are licit, the example is ruled out. This reasoning applies of course to all cases of correlates inside PPs. Note that this account places the ungrammaticality of such sluicing examples not on some violation concerning the sluiced wh-phrase itself — DP sluices can be perfectly well-formed. Instead, the ungrammaticality arises through an inability of the grammar of Greek to provide an appropriate IP antecedent to resolve the ellipsis; since PPs are islands to movement, no DP trace inside a PP can be provided as required by Ā-Chain Uniformity.

We have now seen how Ā-Chain Uniformity, combined with Bayer's results, can derive the form-identity effects documented in Section 2. This account rests on treating indefinites as a kind of generalized quantifier which reaches its scopal positions at LF via some kind of movement operation. Since indefinites can take scope out of islands (see especially Farkas 1981), licit IP antecedents will be able to be generated to resolve the ellipsis in sluicing out of islands as well. Recall for example (18a), repeated here slightly modified as (42).

(42) Θέλει   να βρει ένα ημερολόγιο που να το έχει γράψει ένας
      θeli   na vri ena imerolojio pu na to exi γrapsi enas
      wants-3sg subj find a   diary   that subj it has written a
      στρατηγός του Χίτλερ, αλλά δε θυμάμαι   ποιος.
      stratiyos tu   hitler ala δe θimame   pjos
      general   of.the Hitler but not remember-1sg which.
      'She wants to find a diary that a general of Hitler's may have written, but
      I don't remember which (general).'

Disregarding the scope of the indefinite ένα ημερολόγιο *ena imerolojio...* (which must take scope under θέλει *θeli*, by virtue of its modification with a subjunctive relative clause), the first clause has two possible interpretations, corresponding to the scopal possibilities of the embedded indefinite ένας στρατηγός του Χίτλερ *enas stratiyos tu hitler*. These two possibilities are represented by the LFs in (43a,b), and correspond in essentials to the formulas in (10a,b) discussed above.

(43) a. [enas stratiyos ...]$_1$ [$_{IP}$ θeli na vri ena imerolojio pu na to exi γrapsi t_1]
      b. [$_{IP1}$ θeli [[enas stratiyos ...]$_1$ [$_{IP2}$ na vri ena imerolojio pu na to exi
          γrapsi t_1]]]

Only the LF in (43a) provides an IP with an appropriate trace for the sluiced *pjos* in (42) to bind. In (43b), neither IP$_1$ nor IP$_2$ suffices: IP$_1$ does not contain an unbound trace (since t_1 is still bound within IP$_1$ by [*enas stratiyos ...*]$_1$), while IP$_2$, if it yields an appropriate interpretation at all, does not generate the desired meaning for (42) (in particular, it loses the subordination of ένα ημερολόγιο *ena imerologio...* to θέλει *θeli*).

As in the non-island cases, the present LF-copying approach correctly derives the observed scopal parallelism. Since the mechanisms for resolving sluicing inside islands as in (42) are the same as discussed for simple cases like (35a), the account of the form-identity effects will persist, even across islands, as was shown to be necessary in Section 2.

The form-identity effects across islands indicate that syntactic information must be present in the scoping of indefinites, even across islands. That indefinites must scope via movement, even across islands, is a conclusion some have sought to avoid;[8] if the present account is correct, this conclusion must be accepted. As recent work has shown (Beghelli and Stowell 1997 and others), the types of movement involved in generating scope are quite varied, and poorly understood. Our present level of understanding of these phenomena indicates at the very least that the simple picture presented in May (1977, 1985) (viz. that QR is uniformly like overt wh-movement) cannot be true: such an approach both over- and undergenerates. Instead, we must begin to look at each kind of quantificational element and ask what its scopal, and hence LF-movement, possibilities are. Once we have a better understanding of the empirical facts, we can begin to try to build a theory of movement that will account for the attested readings. Until that point, however, I see no *a priori* reason to believe that the island constraints observed for wh-movement should necessarily be thought to hold of the different kind of movement needed to place indefinites in particular in their scopal positions. Indeed, if the account pursued here is correct, the sluicing facts necessitate syntactic movement out of islands for at least certain kinds of wide-scope indefinites, and provide a new window into the kind of movement that must be countenanced by a complete theory of scope-shifting operations.

4. Conclusion

Currently available solutions to the problem of ellipsis in sluicing — Ross (1969)'s PF-deletion account and Chung et al. (1995)'s LF-copying + merger approach — suffer empirical shortcomings. The PF-deletion approach has no account of the amelioration of certain island effects, while the LF-copying + merger approach was too insensitive to islands, in particular PP islands in non-preposition-stranding languages like Greek. To resolve these difficulties, I proposed an alternative LF-copying approach which abandoned the 'merger' element of Chung et al.'s approach, based as it was on the Kamp-Heim analysis of indefinites. Instead, I argued that if we treat indefinites as ordinary generalized quantifiers which take scope via LF-movement, the resulting IP can be successfully used to resolve the ellipsis, by copying. The form-identity effects documented in Section 2, some of which were intractable for Chung et al.'s approach, fall out from the interaction of Bayer's (1996) results concerning

P-stranding at LF and a generalized Ā-chain uniformity condition. The proposed account thus incorporates the advantages of the deletion approach (the form-identity effects) and of Chung et al.'s LF-copying approach (scopal parallelism, with indefinites scopally-insensitive to islands) without the shortcomings of either.

Notes

1. In fact, not only case but other grammatical features must match as well, namely the φ-features person, number, and gender. I exclude these from a closer consideration for the moment only because these features are clearly semantic, and thus do not help us distinguish purely grammatical approaches to ellipsis from more semantic ones. Thus it is not at all clear to me that the explanation presented in the text for the generalization in (19) must necessarily be invoked to account for φ-feature matching as well, though it certainly can be.

2. Note that if the wh-phrase and its copied correlate must form not just a semantic chain but also a syntactic Ā-chain, then the lack of island effects indicates that island deviancies are indeed a property of movement structures, not simply Ā-chains, contra Cinque (1990) (see Demirdache 1991 for supporting argumentation for this conclusion as well).

3. See Theophanopoulou-Kontou (1992) for detailed discussion of more complex cases such as (i), which she persuasively argues consist of an adverbial element (πάνω *pano*) before the true preposition (σε *se*); although pied-piping is possible in these cases, it is not necessary. Likewise, sluicing over such correlates can omit the adverbial, as seen in (ii).

(i) Σε ποιο   τραπέζι έβαλε   τα λουλούδια (ε)πάνω;
     se pjo   trapezi evale   ta luludia   (e)pano
     in which table   she.put the flowers   above
     'Which table did she put the flowers on?'

(ii) Έβαλε τα λουλούδια (ε)πάνω σε κάποιο τραπέζι, αλλά δεν ξέρω   σε ποιο.
     evale ta luludia   (e)pano se kapjo trapezi ala den ksero se pjo
     she.put the flowers   above in some   table   but not I.know in which
     'She put the flowers on some table, but I don't know which.'

Thanks to a reviewer (who supplied the pair in (i) and (ii)), Gaberell Drachman, and Anastasia Giannakidou for discussion of these cases.

4. A reviewer reports that he or she has been unable to uniformly replicate the judgments for the sluicing examples given in the text, and wonders if some dialectal differences may be involved. I have tested the examples in the text with on average twelve native speakers of

Greek and received uniform judgments, as reported; most of my informants are from the north of Greece, though not all. Since I have not yet encountered speakers who accept the prepositionless versions of (26)–(30), I am at present unable to determine to what extent regional factors might play a role.

5. A further difficulty for CLM's approach comes from sluices of the form in (i), and related ones (as discussed especially in Romero 1998), where no indefinite (overt or implicit) is present in the antecedent IP:

(i)   Beth called, but I don't know who else.

(ii)   Most students were at the potluck, but I couldn't say how many exactly.

6. See the appendix for discussion of the variation in this domain.

7. Though even this is not obvious — it is probably the case that non-indefinite quantifiers scope to hierarchically different, and lower, positions than wide-scope indefinites, as proposed in Beghelli and Stowell (1997).

8. See especially Winter (1997), Reinhart (1997). Their best argument against scoping indefinites out of islands comes from Eddy Ruys's observation that distributed readings of plural indefinites are indeed island restricted. But this argument goes through only if the source of indefinites are indeed island restricted. But this argument goes through only if the source of distributivity is the plural indefinite itself (or a distributivity operator that operates on DPs), a view that is not widely held. If I am correct, this fact must derive not from different mechanisms for interpreting indefinites (e.g. choice function vs. generalized quantifier, as Reinhart proposes), but from a separation of existential force and distributivity. Ruys's observation falls out from the current assumptions if distributivity is in fact a predicate-based operator which scopes, if at all, on its own and extremely locally. Such a predicate-based approach to distributivity is in fact present in almost all recent accounts of the phenomenon (see Link 1991; Roberts 1991; and especially Lasersohn 1998 for a recent survey and references).

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Appendix: The distribution of P+*only* vs. *only*+P

As noted in the text, in English both the orders given in (33a) and (33b) are possible, repeated here:

(A1) a. I spoke only to Bobby.
      b. I spoke to only Bobby.

This is not the whole story, however. As noted in Bayer (1996: 32), the order "P only DP" as in (A1) is slightly marked, though it's fairly easy to find examples. Bayer has some discussion of the variation in this domain, and notes that various authors have differed in their judgments of such examples. Unfortunately, no previous work has attempted to establish an empirical basis for the widely shared intuition of markedness for the order "P only DP". As a beginning to investigating this question, I did a corpus search using AltaVista, on some of the relevant combinations. While the following is not meant to be exhaustive, it does serve to give independent support to the intuition, and to indicate the extent of the phenomena.

The search was performed for various prepositions in English (*with, to, on, from, about, concerning, on top of*) and German (*mit* 'with', *in* 'in', *auf* 'on', *zu* 'to', *angesichts* 'in view of'). (Unfortunately, due to the limitations of the search engine, I was unable to enter Greek characters into the search field, ruling out performing the search on Greek; German was chosen as a substitute for Greek because it is the language investigated by Bayer, and because it, like Greek, requires pied-piping of prepositions both in overt wh-movement and under sluicing.) Out of the large number of pages containing the search strings, a few were selected for examination, and the percentages given are based on those pages I actually read — approximately 10 pages for each string, on average. The results are presented in the tables in (A2) and (A3).

(A2) English, search results for "P only"

Search string	Hits (pages found)	Exclusive (%)	Scalar (%)	Other (%)
'with only'	710475	50	30	20
'to only'	363891	36	18	45
'on only'	92697	27	55	18
'from only'	51631	12.5	81.25	6.25
'about only'	14511	30	50	20
'concerning only'	912	50	30	20
'on top of only'	15	20	50	30

(A3) German, search results for "P nur"

Search string	Hits (pages found)	Exclusive (%)	Scalar (%)	Other (%)
'mit nur'	31395	0	80	20
'in nur'	18192	0	20	80
'auf nur'	9164	0	40	60
'zu nur'	2079	0	10	90
'angesichts nur'	19	0	40	60

The labels of the rightmost three columns are the following:
"Exclusive" refers to instances like (A4) (i.e., the typical scopal cases discussed by Bayer and of relevance here; these are the ones Bayer argues require LF movement):

(A4) Why wouldn't Windows 3.11 not check to ensure that it is being run on top of only MS-DOS?

Counted as "Scalar" are usages like (A4): (Bayer discusses at length the differences between these and the exclusive readings; note that these are possible in non-P-stranding languages as well, as he points out):

(A5) John spoke to only ONE person.

"Other" refers to false hits (the string was irrelevantly found, usually: the AltaVista search engine ignores punctuation, so a string like 'Who was John talking to? Only the Shadow knows.' would trigger a hit for 'to only').

The results of the searches can be summarized as follows: while English occurrences of "P only" vary between 13 and 50% on the exclusive use, in German, not one instance of "P only" in the exclusive use was found. This lends support to Bayer's and others' introspective data that these forms are possible in English but not German.

A further search also substantiates the feeling that these orders are marked even in English, where they are possible. For comparison purposes, a search using the above prepositions *preceded* by "only" was performed, with the results given in the 'Hits' column of (A6). For the cases where the "only P" order outnumbered the "P only" order given in (A2), the relative frequency of the "only P" was calculated; the resulting comparative frequency is given in the last column of (A6).

(A6)   Occurrence and comparative frequency of "only P" order

Search string	Hits	Times as frequent as "P only" order
'only with'	537307	–
'only about'	402759	27.75
'only to'	2405768	6.61
'only from'	229274	4.44
'only on'	575906	6.21
'only concerning'	1236	1.36
'only on top of'	370	24.67

With the exception of *with* (many of the hits with *with only* were cases of the absolute *with* as in *With only John still in the game, they had no chance*, which clearly have a structure such as [*with* [[*only John*] *still in the game*]], making them irrelevant), the order "only P" was between 1.36 and 27.75 times more frequent than the corresponding case of "P only", lending a clear textual basis to the intuition that "P only" is the marked order.

Περίληψη

Το παρόν άρθρο μελετά τη σχέση μεταξύ νησίδων και περιπτώσεων «ταυτότητας μορφής», όπως παρατηρούνται στο ελλειπτικό φαινόμενο του «φράγματος» (sluicing). Στη βάση ενός αριθμού νέων δεδομένων από τα Ελληνικά, προτείνεται μια ανάλυση στηριγμένη στην ιδέα της αντιγραφής στη Λογική Δομή (LF–copying). Συζητούνται επίσης οι συνέπειες αυτής της ανάλυσης στη γενική αρχιτεκτονική των μηχανισμών έλλειψης.