Remarks and Replies

The Domain of Formal Matching in Sluicing

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This article is concerned with the role of syntax in the licensing of sluicing in English. It amends and provides new support for a proposal made by Rudin (2019) in which syntax plays a crucial but circumscribed role: crucial in that antecedents are required; circumscribed in that matching with an antecedent holds only with respect to a proper subpart of the elided clause—its argumental core.

Keywords: ellipsis, sluicing, antecedent, matching, argument domain, first phase

1 Introduction

It seems undeniable that semantic and pragmatic factors (especially those involving the interplay among focus, givenness, and relevance) play a central role in the licensing of ellipsis (see, e.g., Rooth 1992:10–13, Tancredi 1992, Heim 1997:205, Fox 1999, Hardt 1999, Merchant 2001, 2018). Whether or not there is a role for syntax seems less clear. That said, there exists a stubborn body of evidence suggesting that, for ellipses of the sluicing type at least, a purely formal condition of syntactic isomorphism is also required. Sluicing is possible, it seems, only if an antecedent phrase can be identified in the local discourse context whose syntactic composition parallels, in certain respects, that of the clause to be elided. The observations that suggest this conclusion center principally or exclusively on argument structure parallelism: sluicing can proceed only if there is an antecedent constituent in the local discourse context whose argument structure matches point for point the argument structure of the targeted clause. In particular, the two must be parallel with respect to voice and with respect to the fine detail of certain (semantically vacuous) selectional properties (Levin 1982, Chung, Ladusaw, and McCloskey 1995, 2011, Merchant 2005, Chung 2006, 2013, Lasnik and Funakoshi 2019, Anand, Hardt, and McCloskey 2021).

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The empirical generalizations that support these theoretical claims have not been challenged, as far as we know, and their validity has been further confirmed in the large-scale corpus study reported on in Anand, Hardt, and McCloskey 2021. Nor has there been to date a successful restatement of those generalizations in nonsyntactic terms, as far as we are aware.

The conclusions those generalizations suggest, however, seem to be at odds with an equally substantial body of evidence that documents striking mismatches in other aspects of clausal structure between the elided clause in a sluicing construction and its apparent antecedent. These are mismatches, both formal and interpretive, in dimensions such as tense, modality, and polarity, among others (Fiengo and May 1994, Merchant 2001, Yoshida 2010, Kroll 2016, 2019, Kroll and Rudin 2018, Rudin 2019, Vicente 2019, De Vries 2020, Anand, Hardt, and McCloskey 2021, Landau 2022). Such findings make it difficult to maintain that sluicing is subject to a requirement of morphosyntactic isomorphism across the entire elided constituent, even though the observations about argument structure parallelism suggest the need for just such a requirement.

Rudin (2019), building on earlier suggestions by Chung (2013), proposes a resolution of this apparent paradox by linking the formal condition on sluicing with contemporary conceptions of how clauses are composed. The border between the domain in which parallelism requirements are imposed and those in which they are not corresponds exactly to the border between the "first phase" (in Ramchand's (2008) term) of clausal composition—that concerned with the syntactic expression of argument structure—and later phases. Rudin proposes that the morphosyntactic isomorphism requirement inspects only "first phase" material, which he identifies with the syntactic category vP. This is why argument structure is subject to such stringent matching requirements in sluicing, while other aspects of clause structure are not.

In this article, we extend and modify Rudin's proposal. First, we present several new bodies of evidence, based on small clause and copular structures, that further support the general approach of restricting parallelism requirements to a subdomain of the structure elided. We show, in addition, that this new evidence requires a generalized notion of the parallelism domain that cannot be captured by reference to a particular syntactic category; we provide instead a definition that incorporates both syntactic and semantic criteria. Finally, we demonstrate that this more general definition allows us to capture a certain class of copular pseudosluices, in the process modifying Rudin's definition of isomorphism in crucial ways.

We deal only with English, but our claims are intended to be general; hopefully, further investigation will test and refine those claims beyond English.

2 Small Antecedents

Among the new phenomena brought to light in the corpus annotation project described in Anand, Hardt, and McCloskey 2021 are instances of sluicing in which an antecedent for the sluice can be readily identified but in which that antecedent consists only of a "small clause." The three examples in (1), all involving small clause complements to perception verbs, are typical.[1]

[1] In citing examples, we often indicate the apparent antecedent by way of square brackets and we identify elided content by way of square brackets and gray type. Examples cited from the annotated dataset described in Anand, Hardt, and McCloskey 2021 (such as (1a)) are tagged with a unique numerical identifier. See that article for further detail on the source of such examples and further information about the methodology used in their collection and annotation.

(1) a. The bodies were discovered just before 1 a.m. when an employee of the shop happened to drive by, noticed [lights still on] almost three hours after closing time and went inside to see why. [72082]
b. "When you see me [smiling on the weekend], you'll know why." [96338]
c. It remains to be seen if the GOP candidates can crawfish away from previous environmental positions quickly enough to keep the environment from becoming a wedge issue. So next time you see [a Republican planting a tree], you don't have to ask why. [141467]

For these examples, the antecedents indicated by square brackets in (1) were identified, along with the paraphrases in (2).

(2) a. . . . and went inside to see why [lights were still on]
b. . . . you'll know why [I'm smiling]
c. . . . you don't have to ask why [that Republican is planting a tree]

The noteworthy characteristic of such examples is that the only structure shared between the ellipsis site and the antecedent context is the small clause. However, if the syntactic and semantic composition of the elided clause, in its pre-ellipsis state, must proceed as it would in the absence of ellipsis, that clause, in examples like (1a–c), must include at least the verb *be* and a specification of tense and/or modality (*why lights still on* is not a well-formed question in English). In the antecedent context, however, the small clause is the complement of a perception verb, and the TP that most immediately includes the small clause includes the perception verb and its associated higher functional structure. None of this material figures in the clause elided by sluicing. Such cases, then, seem to pose a substantial challenge for any condition of syntactic identity calculated for the entire elided constituent.[2]

While we believe that these annotation decisions were correct, the examples in (1) involve perception verb complements, which have a number of special properties. In addition, a reviewer points out that these examples could possibly be construed as nonisomorphic sluices—as having, that is, pre-ellipsis structures involving copula clauses of one kind or another—an interpretation that is perhaps more plausible for (1a) than for (1b–c). The interaction with sluicing we see in (1) is not, however, restricted to such cases. Small clauses of various types occur in a wide range of contexts, and when we examine the behavior of sluicing in such contexts, the same conclusions

[2] They also pose obvious difficulties for a condition that demands strict semantic identity, calculated at the TP level, between the elided constituent and an antecedent. If, however, the clause *an employee . . . noticed lights still on* presupposes *there were lights still on*, then the local context update triggered by the first conjunct of (1a) will entail that there were lights still on. In that circumstance, examples of the general form in (1) meet the pragmatic condition on the licensing of sluicing developed by Kroll (2019) in her study of polarity reversal under sluicing (a TP α may be elided if and only if the existential closure of $[\![\alpha]\!]$ expresses a proposition that is maximally salient and that is entailed by the local discourse context). It is less clear, however, that an equivalent presupposition holds of the causative cases involving *make* and *have* as selectors of the crucial small clause.

In a closely related observation, an anonymous reviewer suggests that the relation between antecedent and elided content for cases such as (1) might be viewed in terms of the relation of Strawson entailment, as defined by von Fintel (1999).

All of these questions merit close study. However, since our focus here is on a claimed formal, or syntactic, constraint on sluicing, rather than on semantic/pragmatic constraints on elided content, we will not pursue them further here.

emerge as are suggested by (1). We return to the general issue of "nonisomorphic" sources for sluices in section 5, where we show how they can be integrated into the general theoretical framework defended here. Having such a framework in place will in turn hopefully give us a better sense than we have at present for when it is appropriate to appeal to such sources and when it is not. For now, consider the examples in (3).[3]

(3) a. I want this junk out of here. I don't care when, but I want it out of here at some point.
b. We made all of our employees contribute money to the campaign, but we didn't specify how much.
c. CONTEXT: *You are discussing with a colleague what the course requirements are in your graduate introduction to syntax. You say:*
I have the students write a series of literature reviews. How many is up to them, but each student has to have written at least 20,000 words by the end of the quarter.
d. Wheeler still considers early treatment appropriate in some cases. The next question on his team's research agenda is: Under what conditions?
e. With the campaign on hold—and who knows for how long—Biden is left without any regular way to make his case to the electorate.

It is clearly possible to have a small clause–internal Merge site for *when* in (3a) (as in *When do you want this junk out of here?*), but the paraphrase 'I don't care when I want this junk out of here' is bizarre and is at odds with the actual interpretation—which can be paraphrased as 'I don't care when this junk MODAL get out of here'. The term *MODAL* here identifies cases (which are extremely numerous) in which the interpretation of the elided clause contains a modal of vague or ambiguous force or flavor (see Anand, Hardt, and McCloskey 2021 for discussion of such cases).

Similarly in (3b), the interpretation of the sluice is not 'we didn't specify how much we made our employees contribute to the campaign'; rather, it is something along the lines of 'we didn't specify how much our employees MODAL contribute', where crucial properties of the modal are once again underdetermined but appropriate to the context. Equally clearly, the meaning of the elided clause in (3c) does not include the embedding causative verb *have* or its external argument; if it did, the interpretation would be the bizarre 'how many reviews I have them write is up to them'. (3d) involves an adjectival small clause, and once again it is crucial that neither the verb that selects that small clause (*consider*) nor its external argument (*Wheeler*) be part of the elided content. The question that the research team will investigate has to do with the conditions under which early treatment might be appropriate, not the conditions under which Wheeler might come to have some opinion. Finally, (3e) is perhaps clearest of all, involving, as it does, an absolute phrase headed by a use of *with* that selects a verbless small clause (see, e.g., Ishihara 1982). In a case such as this, it is inconceivable that the item that selects the small clause (presumably *with*) could be part of the elided content, and there seems to be no candidate TP at all in the antecedent context whose content could match that of the clause elided under sluicing. Once

[3] Example (3d) is a slightly adjusted version of an example from the annotated dataset already referred to—example 115760.

again, all that is shared between the antecedent context and the elided clause is the small clause itself (*the campaign on hold*). Of course, the ellipsis site includes other elements: at least a circumstantial possibility modal with future orientation (something like *might* or *could* or *will*). But that element has no counterpart anywhere in the antecedent context.[4]

All of these cases have a similar character. In each, the only structure shared between the discourse context and the elided material is a small clause, which denotes a property of eventualities. The predicate that embeds that small clause in the antecedent context, along with its external argument (if there is one), plays no role in the interpretation of the ellipsis, nor does any functional structure that appears above that embedding predicate. Meanwhile, the clause elided by sluicing has the shared small clause as its predicational core, but—assuming it is subject to the same structure-building and selectional restrictions as overt material—the rest of its extended projection has no counterpart at all (matching or nonmatching) in the antecedent context. That extended projection includes both semantically potent items, such as those expressing modality and/or tense, and elements often thought to lack semantic content, such as the copula. The meaning of the unmatched functional material is underspecified but appropriate to the discourse context.[5]

These observations are in harmony with the general thrust of Rudin's (2019) proposals, since they reinforce the surprising conclusion that, if there actually is a requirement of *syntactic* antecedence in sluicing, it must hold only over a proper subpart of the elided clause and not of its entirety. As it now stands, however, Rudin's vP-level Isomorphism Condition does not actually allow these cases. In the next section, we develop a revision of Rudin's condition that covers both the cases that originally motivated it and the results of the present discussion. With the amended condition in hand, we then consider two additional phenomena that also fall into place theoretically.

3 The Isomorphism Condition

Rudin's (2019) proposals make explicit reference to the syntactic category vP, enforcing strict identity within its limits but allowing formal and interpretive mismatches in higher regions of

[4] A reviewer observes that the large majority of instances of substantive mismatches in sluicing seem to involve adjunct *wh*-phrases (*why* and *how* especially). Assessing the significance of this possibility is complicated by the fact that adjunct sluices, especially *why*-sluices, are overwhelmingly more frequent than other types quite generally (see Anand, Hardt, and McCloskey 2021:e75, especially table 1, for evidence and discussion). Degree sluices introduced by *how*, like that in (3e), represent the second most common type after *why*-sluices. It is not obvious, then, that adjunct *wh*-phrases are overrepresented among well-formed examples involving substantive mismatch.

[5] One might avoid the text conclusion by claiming that the instance of C that licenses sluicing may directly select small clause complements. This is of course technically possible. But, as stressed by Yoshida (2010) in a related but distinct context, such proposals give up on the central commitment of the compose-then-delete family of analyses: that elided structures are composed and interpreted in the same way as pronounced structures. The core problems are also untouched on this approach: what is the source of tense and modality in the elided clause? Syntactic issues also arise: if the case licensing of subject nominals depends on elements of the extended clausal projection (finite T, say), it is unclear how subject *wh*-phrases would be case-licensed in their absence.

One might also resist the text conclusion by holding that all of the small clauses in (1) and (3) have fully articulated, but necessarily silent, extended projections. The plausibility or implausibility of such a line of analysis is probably different for the different kinds of embedding predicates (more plausible for absolutive *with*, say, than for others). But the general approach risks giving up the important analytical and theoretical gains won by reduced-complement analyses of causative and perception constructions in particular (among many others, see Wurmbrand 2003 and Folli and Harley 2007). Such a response would in addition leave untouched the data concerning allowed mismatches in the inflectional domain—legal mismatches (formal and interpretive) in polarity, tense, and modality.

the extended projection. In revising and extending his Isomorphism Condition in light of the new observations made here, we need, then, a theoretical concept that will bring together under a single rubric small clauses of various types and the maximal verbal projection within a clause. Given that a major theme of research on small clauses, at least since the 1980s, has been their close kinship with the thematic core of a full verbal clause,[6] this is hardly a revolutionary move. We are dealing in all cases with bare predicational complexes—phrases that include a lexical head (verbal, prepositional, adjectival, or nominal) in composition with all of its arguments, external and internal. Call this an *argument domain.*

One might then frame this definition in purely syntactic terms. In a very influential line of research initiated by Bowers (1993), small clauses and "verb phrases" are taken to be maximal projections of a functional head Pred; that head is assumed to mediate the composition of a predicative expression (the complement of Pred) with a DP that saturates it (the specifier of Pred). Working within that tradition, one would simply identify an argument domain as an instance of PredP.

Matushansky (2019), however, argues that appeal to such a head is unnecessary and unwelcome in contemporary contexts; she maintains that the independent arguments for the existence of such a head are weak. Reasonable theories of semantic composition do not require the mediation of a syntactic head for the final compositional step in the building of a small clause, while on the syntactic side, the transition from X-Bar Theory to Bare Phrase Structure means that a head may host multiple specifiers. The subject of the small clause can therefore be taken to occupy the outermost specifier position of the predicate itself. The need to postulate a Pred head thus drops away and the category of the small clause is that of its predicate—as was argued to be necessary by Stowell (1981) on the basis of selectional distinctions not easily captured in a PredP framework (Stowell 1981, 1983, 1995). On this view, there is no unifying syntactic category to which all small clauses belong; therefore, the task of defining *argument domain* in (4) cannot be as simple as identifying a syntactic category to which it corresponds. Matushansky urges instead that argument domains (including small clauses) be viewed as XPs that result from the last thematic Merge to the extended projection of a lexical head (V, A, P, or N). We build on this intuition in proposing the definition in (4); in turn, we will argue in section 5 that our resulting system can furnish an indirect argument against PredP based on the Isomorphism Condition for ellipsis.[7]

(4) *Argument domain*
XP is the *argument domain* of an extended projection E if and only if it is the most inclusive projection in E that denotes a property of eventualities (is of type $\langle \varepsilon, t \rangle$).

The assumptions central to (4) are standard. The concept of "extended projection" is the familiar one, which originates with Grimshaw 2005 and which undergirds a great deal of current research

[6] See Chung and McCloskey 1987, for instance, and Citko 2011 for a perceptive overview. See also Svenonius 1994, Heycock and Kroch 1999, Bowers 2001, Den Dikken 2006, Citko 2008, and especially Basilico 2003 and Citko 2011:751–755.

[7] The understanding presented in (4) is very close to the notion of "sentence radical" from Krifka 1989:90. See also Langacker's (1974) "eventive core."

on clausal syntax. We assume in particular that an extended projection E is a sequence of heads (whose order is fixed, at least for a particular language), each of which projects the complement of its immediate predecessor. The initial members of E are functional (closed-class) heads, but its final element is a lexical (open-class) head—the "main verb" in a standard verbal clause in English. Much of what we think of as clausal syntax (case, agreement, movement, constituent order, interpretation) is determined by combinatorial properties of the items that constitute E. It is a crucial property of this conception that the final element in the sequence E be an open-class head (or perhaps an acategorial root preceded by a categorizing head) whose selectional properties determine the argumental core of the clause (on this, see Grimshaw 2005:7 and especially Williams 2009).

The definition in (4) also presupposes an event-based semantics of a now familiar kind, including the idea that verbal phrases denote properties of eventualities, as do small clauses. The compositional process then results in a shift in semantic type when functional elements above the vP domain (aspect, polarity, tense, modals, and so on) are folded in. The definition in (4) picks out the largest such constituent and so captures Matushansky's intuition that small clauses (and vP) are the result of the final thematic Merge. Consider, by way of illustration, the three examples in (5).

(5) a. Smith might have [*t* expected a promotion].
b. They must really want [this stuff out of here].
c. There must have been [three thousand people on that march].

The definition in (4) picks out the bracketed constituents in (5) as argument domains. In (5a), the extended projection terminates with the main verb *expect* and vP is the largest constituent of type $\langle \varepsilon, t \rangle$ within that extended projection. In (5b) and (5c), the most inclusive extended projection terminates with the verbs that select small clause complements (*want* in (5b), main verb *be* in (5c)); the lower extended projection (selected by the final element of the first) consists of the small clause itself and, since it too is of type $\langle \varepsilon, t \rangle$, it is an argument domain by (4). In cases such as (5b) and (5c), then, the extended projection of the small clause is coterminous with its argument domain.

With this much in place, what we need in order to capture the observations made so far is a condition that demands strict isomorphism between the argument domain of a clause targeted for elision by sluicing and a matching constituent accessible in the local discourse context. We define that condition in (6).[8] Given that the presence or absence of particular lexical items (e.g., selected prepositions) seems to be crucial in the licensing calculus, (6) follows a long tradition (including at least Ross 1967:sec. 5.135, Wasow 1972, Williams 1977, and especially Fiengo and May 1994) in requiring between an argument domain and its antecedent both token identity of lexical items and parallel composition.

[8] A noninnocent simplification in (6) is that it entirely sets aside one of the most disturbing provisions found in all such proposals: the clause that allows any two elements paired in an anaphoric linkage to count as counterparts—to allow, that is, for what Fiengo and May (1994) call "vehicle change" effects. Rudin (2019) is not so lax.

(6) *Syntactic Isomorphism Condition*
   a. The TP complement of *wh*-C may be elided only if the lowest head in its extended projection projects or selects an argument domain XP that meets the condition in b.
   b. There is a phrase YP in the discourse context, such that for each pair of heads $\langle a, b\rangle$ in $\mathcal{H}$, the set of heads targeted for elision in XP, there is a pair of heads $\langle a', b'\rangle$ in YP such that:
      i. Lexical identity: a and a' are tokens of the same lexical item, b and b' are tokens of the same lexical item, and
      ii. Structural identity: the path in XP between a and b is the same as the path in YP between a' and b'.

(6) formally captures the intuition that elided material and antecedent must be formed from the same set of lexical choices composed in the same manner.[9] As restricted by its first clause, it correctly permits all of the cases considered by Rudin (in which the elided vP is matched by a vP in the antecedent), but crucially it will also be satisfied when the argument domain is a small clause, as in the cases considered in the previous section.

Example (3e), for instance, has the schematic structure shown in (7).

(7) With [$_{XP}$ the campaign on hold]—and who knows for how long [the campaign MODAL be [$_{XP}$ *t* on hold]]— . . .

Here, the elided clause contains an argument domain: the small clause headed by the preposition *on* and selected by main verb *be*. Because it is selected by *be*, this small clause is in turn the complement of the final element of the higher extended projection (TP). It also has an appropriately matching constituent in the immediate discourse context: the small clause complement of *with*. The condition in (6) is thereby satisfied. Note that this proposal allows us to capture the presence of an unmatched copular verb in the elision site via precisely the same logic that Rudin uses to capture the presence of the unmatched MODAL element, and we thus predict that certain vPs (but not argument domains) may mismatch between antecedent and elided clause. We return to the ramifications of this flexibility shortly.

In the case of (8a), the structure is roughly as in (8b).

(8) a. I have the students write a series of literature reviews. How many is up to them.
   b. [$_{CP}$ how many [[$_{TP}$ the students MODAL [$_{vP}$ write *t*]]] is up to them]

Here, the argument domain of the elided clause is the vP and there is an appropriately isomorphic vP in the antecedent context: the vP complement of causative *have*.[10]

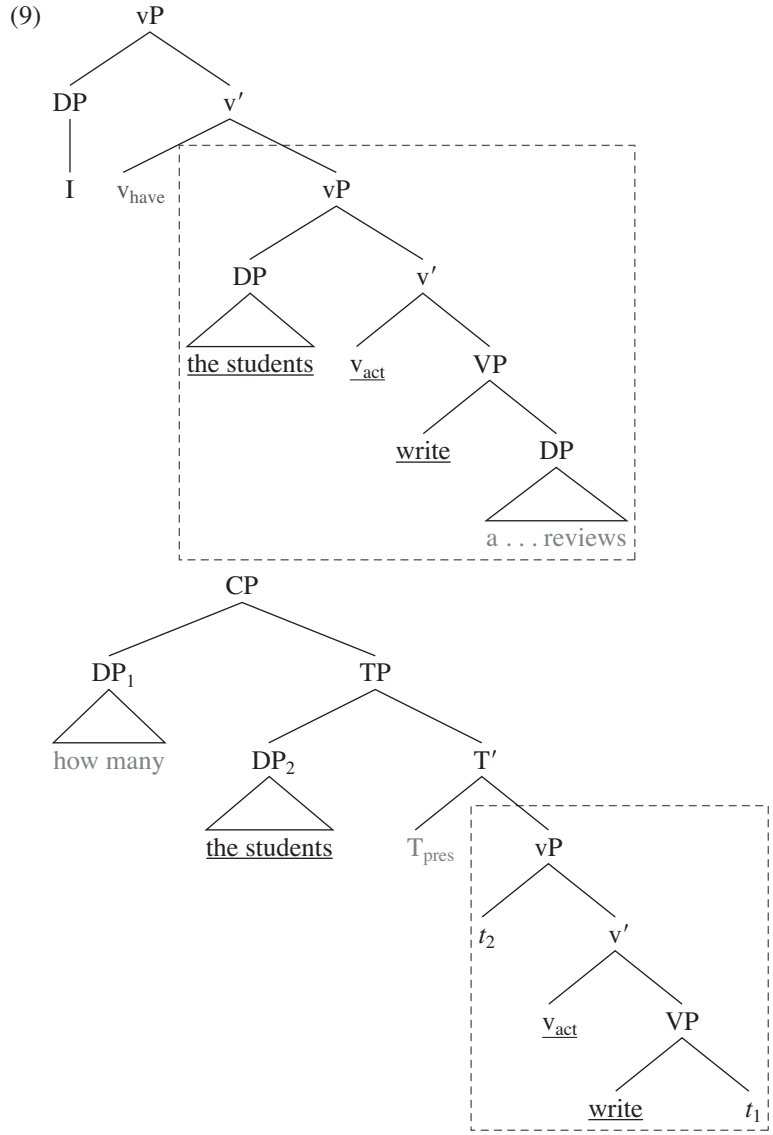
[9] In his analysis of sluicing to implicit verbal arguments, Bruening (2021) modifies identity calculations for sluicing to consider maximal projections, not heads. We briefly discuss differences between that approach and the present one in footnote 13.

[10] When the argument domain of the lower extended projection is calculated, the selecting verb *have* cannot be included because *have* and the head of the small clause are in different extended projections. Of course, one can also calculate the argument domain of the higher extended projection, the one that terminates with causative *have*. It is the availability of this possibility that allows for cases like (i), in which the ellipsis site includes an occurrence of causative *have* and it, along with its argument domain, is matched in the antecedent.

(i) They had us read all of *Ulysses*; I have no idea why.

In (9), we articulate (8) a bit more closely. The argument domains in each clause are bounded by rectangles, and the heads within each argument domain that correspond are underlined, while those outside of the argument domain are marked in gray (we also mark the *wh*-phrase and its correlate in gray).

(9)



(8a), then, with the structure and interpretation indicated in (8b), satisfies the syntactic matching condition of (6). The ultimate well-formedness of such examples will then turn on whether conditions governing givenness, relevance to a question under discussion, discourse coherence, and so on are satisfied with respect to the (entire) elided clause in its discourse context. Mismatches in voice, however, have no path to well-formedness. Consider (10), for example.

(10) *All the rules around here have changed, but I just can't work out who.

Here, it is difficult to see what pragmatic considerations might be sufficient to explain the degree of felt ill-formedness. In such a case, however, there will be no way to meet the Isomorphism Condition in (6). Within the elided clause, the argument domain, according to the definition in (4), must be the transitive structure built around *change*; it is the largest subpart of the extended projection that is of type $\langle \varepsilon, t \rangle$. It will necessarily then include the transitive-causative light verb that introduces the agent-causer argument. But the only available matching constituent is an unaccusative structure that, by the same reasoning, must include the unaccusative light verb that introduces no external argument. These are distinct lexical items, and matching fails at the level of lexical identity.

By exactly similar reasoning, active-passive mismatches such as that in (11a) will fail on syntactic grounds, no matter how well they fare with respect to a condition grounded in semantic or pragmatic concerns; the argument domain within the elided clause must contain the transitive light verb, which is crucially distinct from the light verb that is characteristic of passive structures.

(11) a. *It's important to establish when he was robbed and, more important, who.
b. It's important to establish when he was robbed and, more important, who robbed him.

It is natural, in the context of (6), to assume that the terminal nodes of the ellipsis site are marked for nonpronunciation in the phonological component (see Bennett, Elfner, and McCloskey 2019 for references and arguments). In the context of multioccurrence theories of movement, it is also natural to assume that only phrases that are fully contained in the ellipsis site are so marked. A phrase is in turn "fully contained" within a constituent α if and only if all of its occurrences are within α. Material raised out of the constituent targeted for ellipsis will not be so marked, and (6) will have no jurisdiction over them. As a consequence, they will not be required to have a counterpart in the antecedent argument domain. This is the basis for what has been termed "sprouting": instances of sluicing where the remnant *wh*-phrase lacks a syntactic correlate in the (apparent) antecedent TP (in Rudin's account, which assumes that movement involves distinct objects connected in a chain, tails and intermediate members of chains are not subject to identity restrictions).[11] The familiar contrasts related to sprouted PPs in (12) then fall into place.

(12) a. They're furious but it's unclear at who(m).
b. They're furious but it's unclear who at.
c. *They're furious but it's unclear who.

In (12a), the PP *at who(m)*, having undergone *wh*-movement, is not fully contained within the ellipsis site and is therefore not marked for elision and is not subject to the requirements of (6). The fact that it has no counterpart in the antecedent context therefore does not count against it.

[11] Lower occurrences of moved phrases will be eliminated by the mechanisms that regulate nonpronunciation of lower occurrences in general. For a more detailed discussion of how (6) does its work here, see Rudin 2019:258 and 269–270.

If (12b) involves pied-piping and a subsequent internal reordering, the calculation of well-formedness proceeds exactly as in the case of (12a).[12] In (12c), however, there is an item within the argument domain of the elided clause (namely, the possibly semantically vacuous preposition *at*) that has no counterpart in any argument domain in the local discourse context, and the example has no path to well-formedness. This combination of assumptions thus yields an account of what has been called Chung's Generalization (Chung 2006, 2013, Chung, Ladusaw, and McCloskey 2011): the observation that a preposition can be stranded in a sluicing ellipsis site only if it is matched in the antecedent by an identical preposition in an identical web of syntactic relations.[13]

4 Stranded Prepositions

This combination of assumptions also now gives rise to new expectations. Since formal isomorphism is required only within the argument domain, nonargument prepositional phrases merged above vP should be free of any matching requirement. We therefore expect to encounter (if all other conditions are met) well-formed exceptions to Chung's Generalization for nonargument prepositional phrases.

The annotation project described earlier (Anand, Hardt, and McCloskey 2021) unearthed a variety of examples of just this type. In these cases (17 in all), annotators postulated a stranded preposition within a sluiced clause that lacks any counterpart in the antecedent clause. All such cases involve non-argument-marking prepositions. (13) and (14) present some representative examples (for embedded and root sluices, respectively).

(13) a. "The board believes that a 'one-size-fits-all' approach to financial market regulation is inappropriate," Phillips said. "A particular market's characteristics determine whether government regulation is necessary, and if so, what form [government regulation is necessary IN]." [138195]

b. When the officer asked me about her, I remembered meeting her but I couldn't say what date [I MET her ON]. [F38]

[12] If the preposition is not marked for elision—say, in virtue of being, in some sense, focus-marked—the account in (6) is compatible with analyses (such as that in Ross 1969) in which the stranded preposition survives elision in place.

[13] Bruening's (2021) important study of implicit arguments and their interaction with sluicing also assumes a syntactic condition like that in (6). It too assumes that implicit arguments do not appear in syntactic representations. It also assumes, however, that implicit arguments involve the presence of syntactic heads—heads that adjoin to the lexical verb and have an important role in both the licensing and the interpretation of implicit arguments (determining, for instance, whether they are interpreted as narrow scope indefinites or as definite-like, in the sense explored by Fillmore (1986)). Given the head-based definition of isomorphism in (6), the postulation of such heads is incompatible with the well-formedness of examples such as (12a) and many similar ones, since the crucial licensing head will appear in the antecedent but not in the ellipsis site. For this reason, Bruening proposes to restrict identity calculation to maximal projections, arguing that, for example, active-passive mismatches involve the lack of a correspondent for a PassP phrase.

Ultimately, these issues have less to do with how sluicing is computed than with how implicit arguments are to be analyzed—an important topic, but well beyond the scope of the present article. We note, though, that the general approach advocated here is not incompatible with Bruening's system for implicit arguments. While we have assumed that predicates with and without implicit arguments are token-identical, to be in conformity with Bruening's syntax for implicit arguments, we could define $\mathcal{H}$ of (6) to ignore heads that do not project (namely, those heads that license implicit arguments).

c. Decker was weaned in the world of investing by his father, who had also been a mutual fund manager. (Decker won't say which firm [his father had been a mutual fund manager AT]). [89932]

(14) a. "Hey, you work at Salomon? I have a friend who works at Salomon." "Really? What group [DOES THAT friend work at Salomon IN]?" [105278]

b. "Particularly when Jim, Pete, Andre and I play, it doesn't matter where, what surface [Jim, Pete, Andre and I play ON]," he said of Sampras, Agassi and Jim Courier. [199504-12373]

c. "The first thing he said was so interesting that [he thought it was a period piece]," Scardino recalled. "I said 'What period [do you think it is a piece FROM]?' He said, 'Nineteen ninety-one.'" [195676]

Of the 17 examples discovered, 2 were judged to be less than fully acceptable by the annotation team ((14c) was one of those—judged to be of "medium" acceptability).

This complex of facts falls within the range of understanding given the proposals developed here. The extremely sharp contrast between the examples of (13) and (14) on the one hand and those, like (15a–b), that originally motivated Chung's Generalization, provides dramatic confirmation of the divide that, in the calculus of antecedence for sluicing, separates the argument domain from other aspects of clausal organization.

(15) a. *He is very loyal, but I don't know who.

b. *The UN is transforming itself, but what remains unclear.

If the Isomorphism Condition is a hard constraint, the full unacceptability of cases like (15a–b) is understood, as demonstrated earlier. Examples such as those in (13) and (14), by contrast, pass muster with respect to the Isomorphism Condition since it is not at all concerned with material outside the argument domain. However, such examples will inevitably involve movements from within nonargument PPs, movements that will give rise to characteristically weak Adjunct Island Condition violations of the kind seen in (16).

(16) a. ?What form is government regulation necessary in?

b. ?What date did you meet her on?

c. ?What group does your friend work at Wells Fargo in?

d. ?What period do you think this is a piece from?

If sluicing then applies to such structures, we should expect that the island-amnestying effect (Ross 1969, Chung, Ladusaw, and McCloskey 1995, Merchant 2001, among many others) should be in play, reducing the felt degree of unacceptability. Our understanding of how the island amelioration effect for sluicing interacts with the (already weak) Adjunct Island Condition remains limited, but it seems reasonable to expect that such examples should be found in natural settings (unlike those in (15)), that they should be interpretable, and that they should not be judged fully acceptable or fully unacceptable by all speakers on all occasions. This seems to be exactly what we observe in the existence and status of examples like those in (13) and (14).

We take it to be a strong argument in favor of the proposal in (6) that it provides a way of understanding such a complex array of facts, and in particular that it provides an understanding of the extremely stark contrast between the ways in which argument PPs and adjunct PPs behave under sluicing.[14]

5 Yet Smaller Antecedents

Finally, there is a third new prediction to explore.

The treatment of sprouting in (6) interacts with the treatment of small clauses adopted earlier in a very particular way. Consider structures like (17a–c), involving small clause complements to *be*.

(17) a. [$_{TP}$ . . . be [$_{SC}$ DP XP]]
b. There were [$_{SC}$ two thousand people on that march].
c. Two thousand people were [$_{SC}$ *t* on that march].

What kinds of sluicing should such structures support? The small clause complement of *be* is an argument domain, and the clause that immediately contains it should be elidable as long as there is an appropriate antecedent of the form required by the Isomorphism Condition of (6). But elements moved out of TP are not targeted for elision and are not under the jurisdiction of (6); as we showed earlier, this is how there can be "sprouting." That being so, if the predicative XP of (17a) moves out of the clause that is to be elided, only the constituent that remains (the subject DP) will be required to have a counterpart in the discourse context. What we expect, then, is that there should be instances of sluicing in which an antecedent is readily identifiable but consists only of a nominal. The interpretation of the sluice, however, should imply the presence of a copula in the ellipsis site, with its associated functional superstructure. The *wh*-phrase of the sluice should supply the predicate for the small clause and the antecedent nominal should correspond to its subject.

Cases of this type are in fact common; at least 23 instances are attested in the annotated dataset already referred to. A representative sample is given in (18) and (19).

[14] A reviewer suggests that some examples of the type we discuss here could be analyzed as "nonisomorphic" copular sluices of the kind we discuss in section 5. Such an analysis, however, is not available for the cases in (13) and (14), none of which have paraphrases in terms of *it be* that express what the sluice in fact expresses.

(i) a. * . . . and if so what form it should/might be.
b. * . . . but I couldn't say what date it was.
c. * . . . Decker won't say which firm it was.

(ii) a. * . . . What group was it?
b. * . . . what surface it was.
c. * . . . What period is it?

Appeal to possible cleft sources for the well-formed examples in (13) and (14) is not a useful analytic move here, since such sources are also available for the examples that originally motivated Chung's Generalization, but they are not repaired by the availability of this source.

(iii) a. He is very proud, but I don't know what [it is that he is very proud of].
b. *He is very proud, but I don't know what.

The crucial contrast between argument-marking prepositions and adjunct-marking prepositions persists.

(18) a. Bradley said that he has not shut the door to [a presidential race], though he would not say when [that presidential race MODAL BE]. [176498]
b. The doctors anticipate [a full recovery] for me, but they really don't know when [that recovery MODAL BE]. [76117]
c. He averaged nearly 30 points a game, and the compensation was all right: [a salary] somewhere in the $35,000 to $90,00 range—he won't say how much [that salary WAS]—plus expenses, the use of a car and a house. [84065]
d. The Forest Service eventually agreed to the proposal, and Wood came up with [a site] that seemed acceptable to the tribes. He won't reveal exactly where [that site IS], except to say that the location is easy to protect from pot hunters. [173508]

The examples in (19) represent a notable subgroup of the general type. Here, the ellipsis site expresses an existential proposition; again, the only structure shared by the ellipsis site and the antecedent context is a nominal—an indefinite that serves as the pivot of the existential in the elided clause. Among the clearer examples are those in (19).

(19) a. [A cut] appears almost certain this year; the question is how soon [THERE MODAL BE a cut], and by how much [THERE MODAL BE a cut]. [15811]
b. Even the most conservative voices in the state seem resigned to the prospect of [a long costly court battle]. To what end [MODAL THERE BE a long costly court battle]? [135056]

These are the copular "nonisomorphic" sluices of recent discussions. They have come to prominence, in particular, in the long-running effort to assess apparent exceptions to Merchant's (2001) Preposition Stranding Generalization and more recently in work arguing that the apparent island-amnestying property of sluicing is an illusion (Erteschik 1973, Rodrigues, Nevins, and Vicente 2006, Van Craenenbroeck 2010b, Gribanova 2013, Barros 2014, Barros, Elliott, and Thoms 2014). Vicente (2019:sec. 4.1) provides a lucid overview of the phenomenon and the issues that it raises, the burden of which is that it is unclear how such cases can be assimilated to what he calls "isomorphic sluicing"—sluicing of the more familiar type, in which the relation between elided material and the form of the antecedent seems more transparent. In fact, as a reviewer emphasizes, such copular sources have been problematic for years for any theory of ellipsis identity that includes a syntactic component. Under the account developed here, however, the existence of these cases is expected rather than anomalous. The elided clauses in (18) and (19) will have the pre-elision and premovement structures shown schematically in (20) and (21), respectively.

(20) a. $[_{TP}$ T be $[_{SC}$ that presidential race $[_{PP}$ when]]]
b. $[_{TP}$ T be $[_{SC}$ that recovery [when]]]
c. $[_{TP}$ T be $[_{SC}$ that salary [how much]]]
d. $[_{TP}$ T be $[_{SC}$ that site [where]]]

(21) $[_{TP}$ T be $[_{SC}$ a cut [how soon]]]

The relevant argument domain in each case is the small clause complement of *be*. But in all such cases, the predicate of the small clause has been raised by *wh*-movement out of the TP that is to be elided and it is therefore exempt from any identity or parallelism requirements. The subject

of the small clause must meet those requirements, though, and in the examples of (18) and (19) it does so in virtue of its relation with the nominal antecedent.

It is worth attending closely to how the requirements in (6) are satisfied in such cases, since they rely on some details whose importance may not be obvious at first blush. Let us consider (20a), which has the structure in (22) after movement. We have noted that because the PP containing the *wh*-phrase has moved outside the TP, it is exempt from identity requirements. This leaves only the DP in the argument domain, and hence the heads in $\mathscr{H}$ as indicated.

(22) $[_{PP}$ when] C $[_{TP}$ T be $[_{SC}$ that presidential race t]]
$\mathscr{H}$ = [that, presidential, race]

The corresponding YP in the antecedent for this argument domain is simply the DP marked in (23).

(23) he has not shut the door to $[_{DP}$ a presidential race]

With this YP, the heads in $\mathscr{H}$ have matches in the antecedent, satisfying both lexical and structural identity (the determiners *a* and *that* correspond despite being lexically nonidentical, a fact that follows from indexation conditions; see footnote 6 for discussion).

However, note that this argument rests crucially on Matushansky's (2019) claim that small clauses are not in fact headed by a null functional head Pred. Were such a head to exist, the structure of the elided clause would be the following:

(24) $[_{PP}$ when] C $[_{TP}$ T be $[_{PredP}$ [that presidential race] [Pred t]]]
$\mathscr{H}$ = {that, presidential, race, Pred}

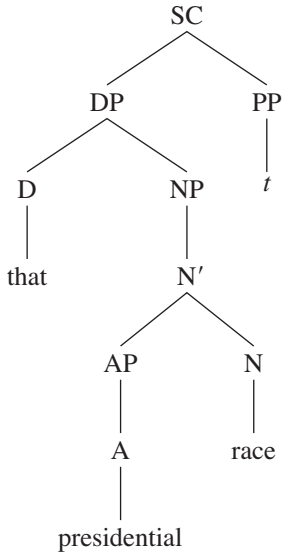
But there is no counterpart to Pred in the antecedent (23), which conspicuously lacks the predicational conditions that motivate Pred. Thus, we would expect examples like those in (18) and (19) to be impossible, as they would have no way of satisfying the lexical identity clause of the Isomorphism Condition in (6). The existence of these examples is, then, an additional argument for the position Matushansky advocates.

There is, however, a potential "residue" of Pred in (22): namely, the small clause SC node itself. A classical graph isomorphism constraint would require an argument domain and its YP counterpart in the antecedent to be identical, with each node n in the argument domain possessing a counterpart $m(n)$ in YP. Since SC comprises the argument domain, under a graph isomorphism condition it would be subject to this matching requirement. But for the cases in (20), unlike the previous instances where the antecedent was a small clause, the SC node does not have a match in the antecedent, and ellipsis should therefore not be licensed. Rudin's (2019) condition, however, requires (lexical) identity only for the *heads* in the argument domain, correctly excluding the SC node from consideration.[15]

[15] Appeal to the small clause structures of (20) and (21) may nevertheless seem excessively elaborate. One might maintain instead that in such cases the DP of the elided clauses of (19b) and (19c) is itself the argument domain of the clause and that in such cases the isomorphism requirement is satisfied in virtue of its relation with the overt DP in the antecedent context. Assessing the viability of this alternative will involve assessing whether the "bare DP" analysis of existentials is appropriate for such cases and the related but independent question of whether or not DP can ever, by itself, constitute an "argument domain."

However, the structure in (22) is still problematic under Rudin's account when it comes to computing structural identity. To appreciate this, consider (25), a more articulated representation of the argument domain found in (22).

(25)



Informally speaking, the structural identity condition simply requires that the items in the elided clause's argument domain and its correspondent YP in the antecedent be arranged identically. For structures without movement, there are many equivalent ways of formalizing that constraint. In a classical graph isomorphism constraint, the requirement would be that for any two nodes n_1 and n_2 in the argument domain connected by an edge in the tree, $m(n_1)$ and $m(n_2)$ are likewise connected by an edge. Rudin's own formulation in terms of domination chains, provided in (26) for argument domains, is the transitive closure of that condition (since edges in a constituent tree simply reflect the immediate domination relation).

(26) Ellipsis of a TP is licensed only if it contains an argument domain XP such that there is a phrase YP in the discourse context, such that for each head x targeted for elision within XP, there is a head y in YP, x and y are tokens of the same lexical item and are dominated within XP and YP by identical series of immediately dominating heads.

Looking at (25), Rudin's condition means that the antecedent should, for example, contain a token of *presidential* with the domination chain that starts with AP and ends with an SC node. That is, because the SC is the argument domain, an SC node dominates all heads in the argument domain, and hence an SC node should also dominate all the heads in the DP in YP. As there is no such dominating node in the antecedent, elision should be blocked because of a lack of structural identity.

In contrast, the structural identity condition in (6) does not require us to consider the SC node. Instead, like Rudin's own lexical identity condition, it is formulated solely in terms of the

heads in XP. Thus, the requirement is that, for any pair of heads *a* and *b* in $\mathscr{H}$ that are targeted for elision, the path between *a* and *b* be mirrored in the antecedent YP. In (22), this means that we are looking at the paths between *that*, *presidential*, and *race*. None of the paths between these nodes traverse the topmost SC node, and all of them are identical in the corresponding DP in the antecedent YP. Crucially, paths that traverse the SC node would only be relevant if the argument domain contained material outside of the DP, which is not the case. And so the structural identity condition in (6) is met, predicting the well-formedness of the structures in (20).[16]

This much, of course, does not provide a full understanding of the phenomenon of "nonisomorphic" sluicing. Attention must now focus on how such cases meet pragmatic requirements and how they show the particular range of interpretive possibilities that they do. But the strength of the proposal defended here is that it provides a framework in which commonplace examples like those in (18) and (19) no longer seem sui generis and no longer deserve to be called "nonisomorphic." Rather, they take their place as one natural part of a well-defined typological landscape.[17]

6 Conclusion

We have been concerned in this article with a long-standing puzzle concerning the role of syntax in licensing sluicing in English. The puzzle is that strict matching with an antecedent seems to be required for argument structure properties of the elided clause, while mismatches with the antecedent are easily tolerated in other aspects of clause structure (polarity, tense, modality, finiteness). We have provided new kinds of evidence for Rudin's (2019) solution to this puzzle, according to which formal matching is required only for the subdomain of the clause that is concerned with the expression of argument structure. Properties of the elided clause expressed outside that domain are subject to no such requirement and are free to diverge from those of the antecedent to the extent permitted by pragmatic and semantic calculations. Syntax leaves the matter open.

The new kinds of evidence we have brought to light in turn force a new understanding of the relatively small domain in which formal isomorphism is enforced, one that is cross-categorial and that corresponds closely to the intuitive notion of a "predicative core" or the "complete functional complex" familiar from work in binding theory.

[16] A further prediction is that there should be examples in which the subject of the small clause is extracted and in which only the predicate must be matched under ellipsis. Stockwell (2021) argues that such cases are in fact attested, though they are admittedly difficult to find and to construct.

[17] Among the issues that remain is how we should treat sluices that derive from clefts, on which see Rosen 1976, Merchant 2001, Van Craenenbroeck 2010a, and Barros 2014. The general scheme defended here will incorporate such cases if the focused phrase and the *wh*-clause together form a small clause, as seems entirely plausible on independent grounds (the sequence of focused phrase and *wh*-clause is a constituent and a complement of *be*; the *wh*-clause is standardly analyzed as being predicated of the focused phrase). Extending the definition of *argument domain* in (4) to include such cases will be a challenging and interesting project and one that surely needs to be undertaken for reasons entirely independent of ellipsis.

A remaining mystery concerns cases of "ignorance" or "indifference" sluices with disjunctive antecedents (among many others, see AnderBois 2011, 2014, Barros 2014, Fusco 2019), which are as recalcitrant on this view as they always have been.

The overall account that emerges is in the tradition of so-called "two-tier" approaches to the general problem of ellipsis licensing and resolution. Within this tradition, a condition of syntactic isomorphism acts to restrict the space of ellipses that are allowable on purely pragmatic grounds (see, e.g., Rooth 1992:10–13, Tancredi 1992, Heim 1997:205). In his initial presentation of the idea, Rooth emphasizes that the two conditions, being distinct, may have different domains of application, arguing in particular that for VP-ellipsis in English the condition that assesses pragmatic appropriateness has access to a more inclusive domain than the one that is inspected by the condition of syntactic isomorphism. This is also the picture that emerges from our discussion of sluicing.

Such theories are open to the charge that they are insufficiently parsimonious (why two conditions rather than one?). In addition, the technical devices that must be appealed to in defining the Isomorphism Condition are elaborate enough that skepticism about them is clearly in order. There are also real concerns about the extreme nonlocality of the interaction between ellipsis site and antecedent——syntactic interactions do not in general span such distances.

We entirely recognize the force of such concerns. But to develop more parsimonious alternatives, we must first understand what work the existing proposals do and what descriptive responsibilities an alternative or successor theory will inherit. If something along the lines of (6) survives such scrutiny, then an interesting research path opens out: what is it about the eventive core of a clause (Ramchand's (2008) First Phase Syntax) that makes it privileged, how should it be represented, and why should ellipsis (along with, perhaps, binding theory) be particularly concerned with it?

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