

The syntax and semantics of elliptical constructions: A direct interpretation perspective*

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Kim, Jong-Bok and Joanna Nykiel. 2020. The syntax and semantics of elliptical constructions: A direct interpretation perspective. *Linguistic Research* 37(2), 327-358. Ellipsis refers to a phenomenon that involves the omission from a clause of one or more words that are nevertheless understood in the context of the remaining elements. The key question for its analysis is then how to license such correspondences between incomplete syntax and complete semantics. There have been two main strands: deletion-based and direct interpretation-based. The former derives elliptical structures from clausal sources such that there is no mismatch between the syntax and the semantics of ellipsis. Meanwhile, the latter countenances non-correspondences at syntax but derives sentential semantics from structured discourse information. This position paper discusses a direct interpretation perspective on elliptical constructions as represented by HPSG. (Kyung Hee University · University of Oslo)

Keywords ellipsis, direct interpretation, sluicing, gapping, pseudogapping, merger, sprouting, fragment answer, salient utterance, question-under-discussion

1. Introduction

Elliptical constructions involve the omission from a clause of one or more words that are nevertheless understood in the context of the remaining elements. Like other natural languages, English has a variety of elliptical constructions, as illustrated in (1):

- (1) a. VPE
Pat has climbed Mt. Everest, and Chris has __, too.
b. Sluicing
Lee is writing something, but you can't imagine what/why/how __.

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c. Stripping

Pat just left, and Chris __, too.

d. Fragment answer

Q: Do you know what happened? A: Nothing.

f. Gapping

Pat has climbed Mt. Everest, and Chris __ Mt. Kilimanjaro.

Each of these constructions involves an unexpressed part (marked with an underscore), thus requiring a noncorresponding mapping relation between syntax and semantics. That is, what appears to be the syntactically incomplete utterance *Chris has* in (1a) still receives a semantically complete representation such as the following:

(2) Chris has climbed Mt. Everest.

The key issue for syntactic theory is thus to account for how the complete semantics can be reconciled with the apparently incomplete syntax. One of the key questions here relates to the structure of the ellipsis site, that is, whether or not we should assume the presence of invisible syntactic material (Lobeck 1995; Ginzburg and Sag 2000; Merchant 2016). Section 2 introduces three types of ellipsis (nonsentential utterances, predicate ellipsis, and (pseudo)gapping) that have attracted considerable attention. In Section 3 we overview existing evidence for and against the DI approach to ellipsis, where no invisible material is posited at the ellipsis site. Finally, in Section 4, we offer DI approaches to the three types of elliptical constructions presented in Section 2.

2. Three main types of ellipsis

Depending on the type of unpronounced expression, elliptical phenomena can be broadly divided into three types: nonsentential utterances (NSU), argument ellipsis, and verbal ellipsis. NSUs include examples like the following:

(3) A: You were angry with them.

- B: Yeah, angry with them and angry with the situation.
- (4) A: Where are we?
 B: In Central Park.
- (5) A: There's someone at the door.
 B: Who?/I wonder who.

All the responses in B involve incomplete sentences, NSUs. BAE (often called stripping) in (3) has just one single remaining constituent while everything else in the clause is elided. (4) includes a fragment answer where the responder uses a fragment to answer the *wh*-question. Meanwhile, sluicing, shown in (5), hosts stranded *wh*-phrases and has the function of an interrogative clause.¹

The next key type involves ellipsis of an argument: VP ellipsis (VPE), Null Complement Anaphora (NCA), and argument drop (or pro drop). The VPE in (6) elides the VP argument of an auxiliary verb, the NCA in (7) involves omission of the PP complement, and finally the argument or *pro*-drop in the Korean example (8) includes omission of a pronominal subject or an object argument.

- (6) A: I didn't ask George to invite you.
 B: Then who did?
- (7) Some mornings you can't get hot water in the shower, but nobody complains.
- (8) Mimi-nun ilccik kwikaha-yess-e. kuliko phikonhayese palo
 Mimi-TOP early return.home-PST-DECL and tired soon
 ca-ss-e
 sleep-PST-DECL
 'Mimi got home early. And, because (she) was tired, (she) went to bed soon.

The third type of ellipsis includes gapping and pseudogapping. This type differs from the two previous ones in that it involves the ellipsis of a verb or (part of) a VP (Ross 1967):

¹ Several subtypes of nonsentential utterances can be distinguished, based on their contextual functions, which we leave it open here (for a recent taxonomy, see Ginzburg 2012: 217).

- (9) Kim reads magazines and Lee books. (Gapping)
(10) Kim has read magazines and Lee has books (Pseudogapping)

As given here, in gapping, the finite verb in the second conjunct is unexpressed: the finite verb in the first conjunct is thus associated with both (or more) conjuncts. Pseudogapping is quite similar to gapping, but differs from it in that it has a tensed auxiliary as a left remnant fragment. Examples like the following are also taken to be pseudogapping:

- (11) a. Kim drinks milk more often than he does [water].
 b. Kim is working today, and he is [tomorrow].
 c. Kim might read the short story, but he won't [the play].

The three key types of ellipsis here behave slightly different in terms of what is elided, but they share the key property that each type includes some elided expression. The key theoretical questions for these three types are whether they are parts of larger sentential structures or nonsentential utterances, and how to derive propositional meanings for seemingly incomplete structures, and what licenses such incomplete structures.

3. Evidence for and against invisible material at the ellipsis site

This section is concerned with NSUs and VPE since this is where the contentious issues arise of where ellipsis is licensed (Sections 3.3 and 3.4) and whether there is invisible syntactic material in an ellipsis site (Sections 3.1 and 3.2). Below we consider evidence for and against invisible structure found in the ellipsis literature. As we will see, the evidence is based not only on intuitive judgments, but also on experimental and corpus data, the latter being more typical of the research following the DI approach.

3.1 Connectivity effects

Connectivity effects refer to parallels between NSUs and their counterparts in sentential structures, thus speaking in favor of the existence of silent sentential structure. We focus on two kinds here: case-matching effects and binding effects (for other examples of connectivity effects including preposition-stranding effects, see Section 4 and Ginzburg and Miller 2018). It has been known since Ross (1969) that NSUs exhibit case-matching effects, that is, they are typically marked for the same case that is marked on their counterparts in sentential structures. (12) illustrates this for German, where case matching is seen between *wh*-phrase functioning as an NSU and its counterpart in the antecedent (Merchant 2004: 663):

- (12) Er will jemandem schmeicheln, aber sie wissen nicht
 he will someone.DAT flatter, but they know not
 wem/*wen.
 who.DAT/*who.ACC
 'He wants to flatter someone, but they don't know whom.'

Case-matching effects are crosslinguistically robust in that they are found in a vast majority of languages with overt case marking systems, and therefore, they have been taken as strong evidence for the reality of silent structure. The argument is that the pattern of case matching follows straightforwardly if an NSU is embedded in silent syntactic material whose content includes the same lexical head that assigns case to the NSU's counterpart in the antecedent clause to assign case to the NSU (Merchant 2001, 2004). However, a language like Hungarian poses a problem for this reasoning (Jacobson 2016). While Hungarian has verbs that assign one of two cases to their object NPs in overt clauses with no meaning difference, case matching is still required between an NSU and its counterpart, whichever case is marked on the counterpart. To see this, consider (13) from Jacobson (2016: 356). The verb *használt* assigns either sublativ (SUBL) or allative (ALL) case to its object, but if SUBL is selected for an NSU's counterpart, the NSU must match this case.

- (13) A: Ki-re hasonlit Péter?
 who.SUBL resembles Peter
 ‘Who does Peter resemble?’
 B: János-ra/*János-hoz.
 János.SUBL/*János.ALL
 ‘Janos.’

Jacobson (2016) notes that there is some speaker variation regarding the (un)acceptability of case mismatch here at the same time that all speakers agree that either case is fine in a corresponding nonelliptical response to (13A). This last point is important, because it shows that the requirement of—or at least a preference for—matching case features applies to NSUs to a greater extent than it does to their nonelliptical equivalents, challenging connectivity effects.

Case-marking facts show that there is some morphosyntactic identity between NSUs and their antecedents, though not to the extent that NSUs have exactly the features that they would have if they were constituents embedded in sentential structures. The Hungarian facts also suggest that those aspects of the argument structure of the appropriate lexical heads present in the antecedent that relate to case licensing are relevant for an analysis of NSUs.²

The second kind of connectivity effects concerns binding phenomena (Merchant 2001, 2004). Consider English and Korean examples in the following:

- (14) A: Who does Mimi like?
 B: Herself.
 (15) A: Mimi-ka nwukwu-lul cohaha-ni?
 Mimi-NOM who-ACC like-QUE
 ‘Who does Mimi like?’
 B1: cakicasini-ul.
 self-ACC
 ‘Herself.’
 B2: Mimi-ka cakicasin-ul cohaha-y.
 Mimi-NOM self-ACC like-DECL

² Hungarian and Korean are in fact not the only problematic languages; for a list, see Vicente (2015).

'Mimi likes herself.'

In both English and Korean examples, the local anaphor *herself* and *calicasin* 'self' need to have a local binder. A natural way to account for such facts is to assume that NSUs in (14B) and (15B1) have clausal sources. Note, however, that violation of binding constraints or lack thereof is not an entirely reliable diagnostic of underlying structure for at least two reasons: fragments violating binding constraints are often found in English as in the following:

- (16) A: Who appeared to be the cause of John and Mary's problems?
 B: Each other. (*Each other appeared to be the cause of John and Mary's problems.) (Ginzburg and Sag 2000: 297)

Further, there are examples where plausible underlying sources are less obvious (Ginzburg and Sag 2000; Merchant 2004; Culicover and Jackendoff 2005).

- (17) A: Let's introduce Ozzie to someone interesting.
 B1: How about himself_i/*him_i?
 B2: It could be himself_i/*him_i, maybe. (Culicover and Jackendoff 2005: 251-252)

As such, connectivity effects at first glance seem to support the postulation of clausal sources for NSUs, but a closer look at empirical data questions this direction.

3.1 Island effects

One of the predictions of the view that NSUs are underlyingly sentential is that they should respect island constraints on long-distance movement. But as illustrated below, NSUs (both sluicing and BAE) exhibit island-violating behavior. The NSU in (18) would be illicitly extracted out of an adjunct (**Where does Harriet drink scotch that comes from?*) and the NSU in (19) would be extracted out of a complex NP (**The Gay Rifle Club, the administration has issued a statement that it is*

willing to meet with).³

- (18) A: Harriet drinks scotch that comes from a very special part of Scotland.
 B: Where? (Culicover and Jackendoff 2005: 245)
- (19) A: The administration has issued a statement that it is willing to meet with one of the student groups.
 B: Yeah, right—the Gay Rifle Club. (Culicover and Jackendoff 2005: 245)

Among Culicover and Jackendoff's (2005: 245) examples of well-formed island-violating NSUs are also sprouted NSUs (those that correspond to implicit phrases in the antecedent) like (20)-(21).

- (20) A: John met a woman who speaks French.
 B: With an English accent?
- (21) A: For John to flirt at the party would be scandalous.
 B: Even with his wife?

Other scholars assume that sprouted NSUs are one of the two kinds of NSUs that respect island constraints, the other kind being contrastive NSUs, illustrated in (22) (Chung et al. 1995; Merchant 2001; Griffiths and Lipták 2014).

- (22) A: Does Abby speak the same Balkan language that Ben speaks?
 B: *No, Charlie. (Merchant 2001)

Schmeh, Culicover, Hartmann, and Winkler (2015) further explore the acceptability of NSUs preceded by the response particle *no* like those in (22) compared to NSUs introduced by the response particle *yes* depicted in (23). (22) and (23) differ in terms of discourse function in that the latter supplements the antecedent rather than correcting it, a discourse function signaled by the

³ Merchant (2004) argued that BAE, unlike sluicing, does respect island constraints, an argument that was later challenged (see e.g., Culicover and Jackendoff 2005; Griffiths and Lipták 2014). However, Merchant (2004) focused specifically on pairs of *wh*-interrogatives and answers to them, running into the difficulty of testing for island-violating behavior, since a well-formed *wh*-interrogative antecedent could not be constructed.

response particle *yes*

(23) A: John met a guy who speaks a very unusual language.

B: Yes, Albanian. (Culicover and Jackendoff 2005: 245)

Schmeh et al. (2015) find that corrections cause lower acceptability ratings compared to supplementations and propose that this follows from the fact that corrections induce greater processing difficulty than supplementations do, and hence the acceptability difference between (22) and (23). This finding makes it plausible that the perceived degradation of island-violating NSUs could ultimately be attributed to nonsyntactic factors, e.g., the difficulty of successfully computing a meaning for them.

3.3 Structural mismatches

Because structural mismatches are believed to be absent in NSUs (see Merchant 2004, 2013), this section focuses on VPE and developments surrounding the question of which contexts license it. In a seminal study of anaphora, Hankamer and Sag (1976) classified VPE as a surface anaphor with syntactic features closely matching those of an antecedent present in the linguistic context. They argued in particular that VPE is not licensed if it mismatches its antecedent in voice. Compare (24a) and (24b) from Hankamer and Sag (1976: 327).

(24) a. The children asked to be squirted with the hose, so we did.

b. The children asked to be squirted with the hose, so they were.

This proposal places tighter structural constraints on VPE than on other verbal anaphors (e.g., *do it/that*) in terms of identity between an ellipsis site and its antecedent and has prompted extensive evaluation in a number of corpus and experimental studies in the decades following Hankamer and Sag (1976). Below are examples of acceptable structural mismatches reported in the literature, ranging from voice mismatch (25a) to nominal antecedents (25b) to split antecedents (25c):

- (25) a. This information could have been released by Gorbachev, but he chose not to [~~release it~~]. (Hardt 1993: 37)
- b. Mubarak's survival is impossible to predict and, even if he does [~~survive~~], his plan to make his son his heir apparent is now in serious jeopardy. (Miller and Pullum 2014)
- c. Wendy is eager to sail around the world and Bruce is eager to climb Mt. Kilimanjaro, but neither of them can [~~do the things they want~~], because money is too tight. (Webber 1979)

There are two opposing views that have emerged from the empirical work regarding the acceptability and grammaticality of structural mismatches under VPE. The first view takes mismatches to be grammatical and connects degradation in acceptability to violation of certain independent discourse (Kehler 2002; Miller 2011; Miller and Pullum 2014) or processing constraints (Kim, Kobele, Runner, and Hale 2011). Two types of VPE have been identified on this view through extensive corpus work (a characteristic of the DI approach)—auxiliary choice VPE and subject choice VPE—each with different discourse requirements with respect to the antecedent (Miller 2011; Miller and Pullum 2014). The second view assumes that there is a grammatical ban on structural mismatch but violations thereof may be repaired under certain conditions; repairs are associated with differential processing costs compared to matching ellipses and antecedents (Arregui, Clifton, Frazier, and Moulton 2006; Grant, Clifton, and Frazier 2012). If we follow the first view, it is perhaps unexpected that voice mismatch should consistently incur a greater acceptability penalty under VPE than when no ellipsis is involved, as recently reported in Kim and Runner (2018). Kim and Runner (2018) stop short of drawing firm conclusions regarding the grammaticality of structural mismatches, but one possibility is that the observed mismatch effects reflect a construction-specific constraint on VPE. HPSG analyses take structurally mismatched instances of VPE to be unproblematic and fully grammatical, while also recognizing construction-specific constraints: discourse or processing constraints formulated for VPE may or may not extend to other elliptical constructions, such as NSUs (see Ginzburg and Miller 2018 for this point).

4. Analyses of NSUs

It is worth noting at the outset that the analyses of NSUs within the framework of HPSG are based on an elaborate theory of dialogue (Ginzburg and Cooper 2004; Purver 2006; Fernández and Ginzburg 2002) and on a wider range of data than is common practice in the ellipsis literature. Consider sluicing examples first:

- (26) a. Kim ate something, but she doesn't know what.
 b. Somebody is coming for dinner tonight. Who?

As shown here, sluicing occurs in both direct and indirect interrogative clauses and elides everything except the *wh*-expression. The key question is thus how to resolve the unpronounced parts. Fragment answers do not differ in this respect. Fragment answers, as illustrated in the B-sentences in the following, pose a challenge for linguistic theories of how form maps onto meaning (see, among others, Ginzburg and Sag 2000; Merchant 2004):

- (27) A: Who did Kim meet?
 B: Him.
 (28) A: Who is the guy standing next to Mimi?
 B: Someone she met at the library.

The B-sentences instantiate nonsentential XPs that receive sentential interpretations corresponding to sentential answers. This results in form-meaning mismatch.

Departing from the movement-and-deletion approaches that posit a clausal source for each sluicing example, the direct interpretation approach generates the meanings of the unpronounced material with no underlying syntactic structures (Ginzburg 2012; Sag and Nykiel 2011; Kim 2015a, 2015b; Abeillé, Blifflie, and Mouret 2014; Kim and Abeillé 2019). Within the DI approach, there is no syntactic structure at the ellipsis site and the fragment NSU is the sole daughter of an S-node, directly generated via the following construction:

(29) Head Fragment Construction:

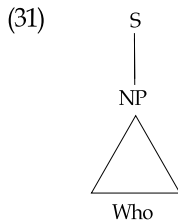
Any category can be projected onto an NSU (non-sentential utterance) when it functions as a salient utterance (SAL-UTT).

This can be formalized in the HPSG feature system as follows (Ginzburg and Sag 2000):

(30) Head-Fragment Construction:

$$\left[\begin{array}{l} \text{CAT } S \\ \text{CTXT} \left[\begin{array}{l} \text{MAX-QUD } \lambda \{ \pi^i \} \\ \text{SAL-UTT} \left\{ \left[\begin{array}{l} \text{CAT } [2] \\ \text{CONT} [\text{IND } i] \end{array} \right] \right\} \end{array} \right] \end{array} \right] \rightarrow \left[\begin{array}{l} \text{CAT } [2] \\ \text{CONT} [\text{IND } i] \end{array} \right]$$

The construction thus allows any maximal projection (functioning as a salient utterance) to serve as an NSU with no reference to deletion processes. This simple syntax, following the philosophy of Simpler Syntax Hypothesis (Culicover and Jackendoff 2005), posits no syntactic structure at the ellipsis site of Sluicing and the *wh*-phrase is the sole daughter of an S-node:



The resolution of the NSU is achieved by discourse-based machinery. That is, the interpretation of a fragment depends on the notion of ‘question-under-discussion’ (QUD) in the dialogue. Dialogues are described via a Dialogue Game Board (DGB) where the contextual parameters are anchored and where there is a record of who said what to whom, and what/who they were referring to (see Ginzburg 2012). DGB monitors which questions are under discussion, what answers have been provided by whom, etc. The conversational events are tracked by various conversational ‘moves’ that have specific preconditions and effects. The main claim is that non-sentential utterances,

functioning as salient utterances, are resolved to the contextual parameters of the DGB. Since the value of QUD is constantly being updated as the dialogue progresses, the relevant context offers the basis for the interpretation of fragments. In this system, DGB is part of the contextual information and has at least the attributes SAL-UTT (salient-utterance) and MAX-QUD (maximal-question-under-discussion), given in (32).

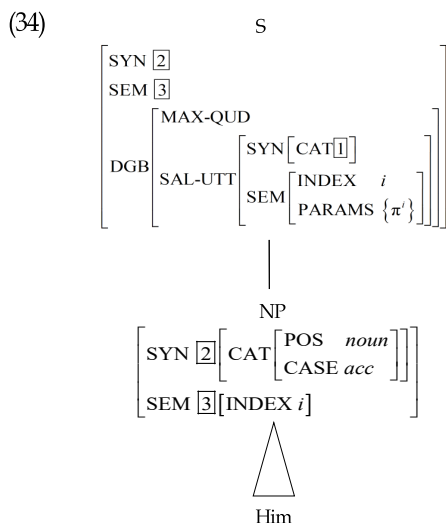
$$(32) \left[\text{DGB} \left[\begin{array}{l} \text{SAL-UTT ...} \\ \text{MAX-QUD ...} \end{array} \right] \right]$$

The feature MAX-QUD, representing the question currently under discussion, takes as its value questions. SAL-UTT, taking as its value syntactic as well as semantic information, represents the utterance which receives the widest scope within MAX-QUD. For example, uttering the question *Who did Kim meet?* in (27) will activate the feature structure with the appropriate DGB information, as in the following:

$$(33) \left[\begin{array}{l} \text{FORM} \langle \text{Who did Kim meet?} \rangle \\ \text{SYN S} \\ \text{SEM } \lambda \{ \pi^i \} [\text{meet}(k, i)] \\ \text{DGB} \left[\begin{array}{l} \text{MAX-QUD } \lambda \{ \pi^i \} [\text{meet}(k, i)] \\ \text{SAL-UTT} \left[\begin{array}{l} \text{SYN NP} \\ \text{SEM } \pi^i \end{array} \right] \end{array} \right] \end{array} \right]$$

The *wh*-question asks who the person that Kim met is (QUD) and this information functions as the SAL-UTT.

The Head-Fragment Construction allows any focal or salient utterance (SAL-UTT) to be projected to a sentential expression S. This SAL-UTT is associated with the remnant *wh*-expression in sluicing or the fragment answer (Ginzburg and Sag 2000; Kim 2015b). For instance, the fragment answer *Him* in (27) provides the value to this QUD, whose structure can be represented as follows:



The fragment answer is a stand-alone NSU, following the Head-Fragment Construction. It carries syntactic (SYN) information about its part of speech (POS) and case (CASE) values, and its semantic information introduces the index value i . If this fragment is preceded by the question *Who did Kim meet?* an appropriate QUD and SAL-UTT will be introduced. The QUD represents the information that there is someone that Kim met. The index value of the *wh*-expression functions as the SAL-UTT linked to that of the fragment *Him*. The Head-Fragment Construction requires the CAT value of the fragment to be matched to that of the SAL-UTT. Since the CAT value includes the POS and CASE values, we thus expect case connectivity effects between the overt SAL-UTT and the fragment.

This construction-based analysis, in which dialogue updating plays a key role in the licensing of NSUs, can also offer a direction for the account of sprouting examples like the following:

- (35) a. "You're waiting," she said softly. "For what?"
 b. She is complaining, but we don't know about what.

In both the direct and embedded sluice here, the preceding antecedent clause includes no overt correlate for the *wh*-remnant. The correlate is implicitly

provided by the argument structure of the predicate *wait* and *complain*. Adopting the analysis of Ginzburg and Sag (2000), Kim (2015b) suggests the following way of analyzing such sprouting sluices. Kim's analysis takes the unrealized oblique argument of the verb *wait* as an instance of indefinite null instantiation (*ini*) (see Ruppenhofer and Michaelis 2014), as represented in the lexical specification for *wait* in (36):

(36) Lexical item for *wait*:

$$\left[\begin{array}{l} \text{FORM } \langle \textit{wait} \rangle \\ \text{ARG-ST } \left\langle \text{NP}_i \left(\text{PP} \left[\begin{array}{l} \textit{ini} \\ \text{PFORM } \textit{for} \\ \text{IND } x \end{array} \right] \right) \right\rangle \\ \text{CAT } \left[\begin{array}{l} \text{SUBJ } \langle \text{NP}_i \rangle \\ \text{COMPS } \langle \rangle \end{array} \right] \\ \text{CONT } \textit{wait}(i,x) \end{array} \right]$$

The lexical information specifies that the second argument of *wait* can be an unrealized PP while the first argument needs to be an overt NP. Uttering the fragment *For what?* here would then activate this information, updating the DGB with a SAL-UTT represented by the unrealized PP, as in (37).

$$(37) \left[\begin{array}{l} \text{SAT-UTT } \left[\begin{array}{l} \text{CAT } \text{PP} \left[\begin{array}{l} \textit{ini} \\ \text{PFORM } \textit{for} \\ \text{IND } x \end{array} \right] \\ \text{CONT } \textit{wait.for}(i,x) \end{array} \right] \end{array} \right]$$

The NSU *For what?*, matching this SAL-UTT, projects a well-formed NSU in accordance with the Head-Fragment Construction. The implied PP *for someone* functioning as SAL-UTT here would appear as a noncanonical expression on the ARG-ST list of the verb *wait*, but not on the COMPS list, and thereby be able to provide appropriate morphosyntactic identity information.

Merger (with an overt correlate) and sprouting (with a covert correlate) give us an intriguing contrast with respect to the presence of prepositions in NSUs. Consider the following contrast in merger and sprouting (Chung et al. 1995;

Merchant 2004):

- (38) a. Kim was talking with someone, but I don't know (with) who.
 b. Kim is jealous, but we don't know *(of) who.

The contrast demonstrates that, as in (38a), when there is an overt correlate (merger), the remnant can be either a PP or an NP (Merchant 2001, 2004).⁴ But, as in (38b), when there is a covert one (sprouting), the remnant must match the syntactic category of the implicit argument. The HPSG analysis presented so far offers a simple solution for such a contrast. Compare the lexical specifications of the predicates *talking* and *jealous*.

- (39) a. Lexical entry for *talking*

FORM	⟨ <i>talking</i> ⟩						
ARG-ST	⟨NP _i , [2]PP _x ⟩						
CAT	<table style="border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">SUBJ</td> <td style="padding-left: 5px;">[]</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">COMPS</td> <td style="padding-left: 5px;">⟨PP [PFORM <i>with</i>]⟩</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 5px;"></td> <td style="padding-left: 5px;">[IND <i>x</i>]</td> </tr> </table>	SUBJ	[]	COMPS	⟨PP [PFORM <i>with</i>]⟩		[IND <i>x</i>]
SUBJ	[]						
COMPS	⟨PP [PFORM <i>with</i>]⟩						
	[IND <i>x</i>]						
CONT	<i>talk</i> ⟨ <i>i, x</i> ⟩						

- b. Lexical entry for *jealous*

FORM	⟨ <i>jealous</i> ⟩				
ARG-ST	⟨NP _i , PP _x [<i>pro</i>]⟩				
CAT	<table style="border-collapse: collapse;"> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">SUBJ</td> <td style="padding-left: 5px;">⟨NP_i⟩</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 5px;">COMPS</td> <td style="padding-left: 5px;">⟨ ⟩</td> </tr> </table>	SUBJ	⟨NP _i ⟩	COMPS	⟨ ⟩
SUBJ	⟨NP _i ⟩				
COMPS	⟨ ⟩				
CONT	<i>jealous</i> ⟨ <i>i, x</i> ⟩				

⁴ If a language (e.g., English) permits preposition stranding under *wh*- and focus movement (e.g., *What did Harvey paint the wall with?* vs. *With what did Harvey paint the wall?*), then NSUs may surface with or without prepositions. If there indeed was a link between preposition stranding and NSUs, then we would not expect prepositionless NSUs in languages without preposition stranding. This expectation is disconfirmed by an ever-growing list of nonpreposition-stranding languages that do feature prepositionless NSUs: Brazilian Portuguese (Almeida and Yoshida 2007), Spanish and French (Rodrigues, Nevins, and Vicente 2009), Greek (Molimpakis 2017), Polish (Nykiel 2013; Sag and Nykiel 2011), Bulgarian (Abels 2017), and so forth. It is clear from this research that there is no grammatical constraint on NSUs that keeps track of what preposition-stranding possibilities exist in any given language.

The verb *talking* in as in (38a) selects a PP argument which is realized as an overt COMPS element. Meanwhile, in (38b), the PP argument is an optional one, not realized at syntax. This implies that when a fragment refers to a covert argument, the discourse needs to activate this covert argument to a full extent. This requirement with no covert correlate must match that of the implicit correlate (no omission of the preposition) is further motivated by a discourse-based constraint like the following suggested by Kim (2015b):

(40) Full Instantiation Constraint (FIC):

The syntactic information (e.g., case features) not available at surface but updated in the DGB needs to be fully specified in the subsequent syntax.

This condition has the effect of Chung's (2006) 'No new words constraint' specifying that an ellipsis site cannot contain any 'new' words, as in the *jealous* example in (38b). We have seen that merger type of sluicing examples contain an indefinite correlate in the antecedent clause which introduces an issue (QUD) into the discourse and an interrogative clause which anaphorically retrieves this issue (see AnderBois 2014 also). The linguistic or contextual discourse thus needs to make this issue salient. With the merger case with an overt correlate, we have no difficulties in identifying this issue. However, sprouting examples with no overt correlate make it difficult to pick out the issue, as seen from the following contrastive English examples:

- (41) a. *[The cake was eaten], and I want to find out [who] <ate the cake>.
 b. [The cake was eaten by someone], and I want to find out [who] <the cake was eaten by>.

The overt indefinite in (41b) raises the issue of what individual ate the cake, but (41a) has no such an overt indefinite. The sentence (41a) with an implicit passive agent cannot raise this issue, not being able to make salient the issue of which alternatives hold. The FIC thus helps the interlocutors to identify the issue in question by making the relevant syntactic information salient.

In sum, the DI approach to NSUs generates the fragments 'as is' and assigns an interpretation on the basis of the surrounding context. The DI approach

receives strong support from the fact that NSUs are a fundamentally semantic and context-driven phenomenon whose remnant constituents are directly generated without extraction or deletion. As noted earlier, there are a variety of examples with no definite putative source sentence as in *Where to?* (uttered by a taxi driver). Island amnesty also accounts for its non-syntax-based generation. The incongruous mapping from the incomplete *wh*-remnant in sluicing or the fragment answer to a complete propositional meaning follows from the interplay of the constructional constraints and the organized discourse structure, not from syntax-dependent clausal sources and deletion.

5. Analyses of VP ellipsis

The first issue in the analysis of VPE is the status of an elided VP. It is assumed to be a *pro* element due to its pronominal properties (see Lobeck 1995; López 2000; Kim 2006; Aelbrecht and Harwood 2015; Ginzburg and Miller 2018; Kim and Michaelis 2020). For instance, VPE applies only to phrasal categories (42-43), can cross utterance boundaries (44), can override island constraints (45-46), and is subject to the Backwards Anaphora Constraint (47-48).

(42) *Mary will meet Bill at Stanford because she didn't __ John.

(43) Mary will meet Bill at Stanford because she didn't __ at Harvard.

(44) A: Tom won't leave Seoul soon.

B: I don't think Mary will either.

(45) John didn't hit a home run, but I know a woman who did __ . (CNPC)

(46) That Betsy won the batting crown is not surprising, but that Peter didn't know she did __ is indeed surprising. (SSC)

(47) *Sue didn't [e] but John ate meat.

(48) Because Sue didn't [e], John ate meat.

One way to account for VPE closely tracks analyses of *pro*-drop phenomena. We do not need to posit a phonologically empty pronoun if a level of argument structure is available where we can encode the required pronominal properties (see Bresnan 1982; Kim 2006; Ginzburg and Miller 2018). In the framework of

HPSG, we represent this possibility as the Argument Realization Constraint in (49), permitting mismatch between argument-structure and syntactic-valence features:⁵

(49) Argument Realization Constraint (ARC):

$$v\text{-word} \Rightarrow \left[\begin{array}{l} \text{SYN|VAL} \left[\begin{array}{l} \text{SUBJ } \boxed{A} \\ \text{COMPS } \boxed{B}! \text{ list}(pro) \end{array} \right] \\ \text{ARG-ST } \boxed{A} \oplus \boxed{B} \end{array} \right]$$

The Argument Realization Constraint tells us that a *pro* element in the argument structure need not be realized in the syntax. For example, as represented in (50), the auxiliary verb *can* in examples like *John can't dance, but Sandy can* has a *pro* VP as its second argument, that is, this VP is not instantiated as the syntactic complement of the verb (Kim 2006):

(50) Lexical entry for *can*

$$\left[\begin{array}{l} v\text{-word} \\ \text{FORM} \langle \text{can} \rangle \\ \text{SYN} \left[\begin{array}{l} \text{HEAD|VFORM } fin \\ \text{VAL} \left[\begin{array}{l} \text{SUBJ } \langle \boxed{1} \rangle \\ \text{COMPS } \langle \rangle \end{array} \right] \end{array} \right] \\ \text{ARG-ST} \langle \boxed{1} \text{NP}, \text{VP}[pro] \rangle \end{array} \right]$$

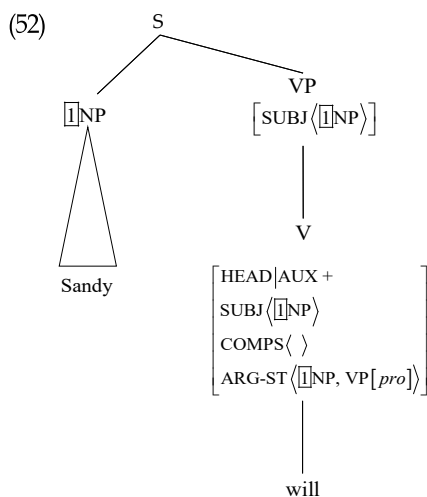
Given this, English VPE can be analyzed as a language-particular VP *pro* drop phenomenon, triggered by a constraint like (51).

(51) VP Ellipsis Construction:

$$\left[\begin{array}{l} aux\text{-v-}lxm \\ \text{SYN|HEAD|AUX+} \\ \text{ARG-ST} \langle \boxed{1} \text{XP}, \boxed{2} \text{YP} \rangle \end{array} \right] \mapsto \left[\begin{array}{l} vpe\text{-}wd \\ \text{ARG-ST} \langle \boxed{1} \text{XP}, \boxed{2} \text{YP}[pro] \rangle \end{array} \right]$$

5 Expressions have two subtypes: overt and covert ones, the latter of which has two subtypes, *pro* and *gap*. See Sag (2012) for details.

What this tells us is that an auxiliary verb selecting two arguments can be projected onto an elided auxiliary verb whose second argument is realized as a small *pro*. This argument is not mapped onto any grammatical function on the COMPS list. The output auxiliary in (50) will then project a structure like the one in the following:



In the structure here, the auxiliary's COMPS list (VP[*tsd*]) is empty because the second element in the ARG-ST is a *pro*. The projected VP then combines with its subject NP, forming a well-formed head-subject construct.⁶

We have seen that VPE involves an identity condition with its antecedent, but the understood VP needs to look for its antecedent VP in the context provided. That is, ellipsis resolution in the DI account is not based on syntactic reconstruction but rather discourse-based. For this purpose, the DI analysis adopts the view of Ginzburg and Sag (2000) that all elliptical constructions refer to structured discourse. VPE is not an exception. The discourse-based analysis then allows syntactic mismatches between the *pro*form and its antecedent since

6 The VPE is basically different from NCA as in examples like *I asked Trace to bring the horses into the barn but she refused* where the infinitival VP complement of *refused* is unexpressed. The deep anaphor NCA is sensitive only to a limited set of main verbs, whose exact nature is still controversial. NCA has received relatively little attention in modern syntactic theory including HPSG.

the key information to refer to is the relevant semantic or discourse information. Literature has noted examples with voice mismatches between an elided VP and its antecedent VP (Sag 1976; Dalrymple et al. 1991; Hardt 1993; Johnson 2001; Kehler 2002; Kim et al. 2011; Merchant 2013; Kim and Runner 2018). Observe the following examples from Merchant (2013):

- (53) Active antecedent, passive ellipsis
- a. We also use the xpdf package in our examples, so you may want to install that now if it isn't already __. <installed>
 - b. The janitor must remove the trash whenever it is apparent that it should be __. <removed>
 - c. It engaged them in a way that I did not think they could be __ that early in the morning. <engaged>
- (54) Passive antecedent, active ellipsis
- a. The system can be used by anyone who wants to __. <use it>
 - b. This problem was to have been looked into, but obviously nobody did __. <look into this problem>
 - c. The system can be used by anyone who wants to __. <use it>

In each of these examples, there is voice mismatch between the understood (or elided) ellipsis and its putative antecedent. In (53), the elided passive VP is linked to the active antecedent, while in (54), the elided active VP is associated with the passive antecedent. Our *pro* analysis expects this kind of mismatch. For instance, the DGB evoked in (53a) and (54a) would be something like the following, respectively (ignoring the value of the variables here):

- (55) a. QUD: $\lambda x \lambda y [\text{install}(x, y)]$
 b. QUD: $\lambda x \lambda y [\text{use}(x, y)]$

Since the understood *pro* refers to this DGB information, the present analysis enforces no voice matching requirement between the understood VP and its antecedent VP.⁷

⁷ In the derivational analysis of Merchant (2013), this kind of voice mismatching is licensed by the postulation of the functional projection VoiceP above an IP: the understood VP is linked to its

Note that this direction also can account for sloppy readings in examples like the following:

- (56) a. John read his paper, and Bill did, too.
 b. John realizes that he is a fool, but Bill does not.

The syntactic identity condition for a deletion process yields only the strict reading, but the discourse-based approach would also allow sloppy interpretations:

- (57) a. John_i read his_i paper, and Bill_j read his_j paper, too.
 b. John_i realizes that he_i is a fool, but Bill_j realizes that he_j is a fool too.

This is possible because the auxiliary in (56) introduces a *pro*-VP that looks for its antecedent in DGB introducing semantic representations with a variable (e.g., read(*h*)), fool(*l*)). This variable evoked from the pronominal VP can be context dependent.

6. Analyses of gapping and pseudo-gapping

Gapping and pseudogapping have received relatively little attention in the research of elliptical constructions, possibly because of their syntactic and semantic complexities. In this section, we briefly discuss the direction of surface-based HPSG analyses for these two phenomena.

6.1 Gapping

As noted, gapping is also a type of ellipsis that allows either a finite verb or a non-finite verb to be unexpressed in the non-initial conjuncts of coordination:

- (58) a. Some ate bread, and others rice.

antecedent under the IP.

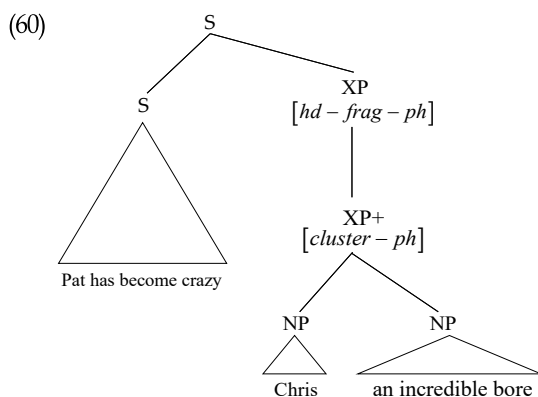
b. Kim can play the guitar, and Lee the violin.

HPSG analyses of gapping fall into two kinds: ellipsis-based (Beavers and Sag 2004; Chaves 2009) and nonconstituent coordination-based analysis (Ginzburg and Sag 2000; Abeillé et al. 2014).⁸ The latter analyses align gapping with analyses of NSUs, as discussed in Section 4, more than with analyses of nonconstituent coordination, and for this reason gapping could be classified together with other NSUs. We use the analysis in Abeillé et al. (2014) for illustration below. Abeillé et al. (2014), focusing on French and Romanian, argue for a construction and discourse-based HPSG approach of gapping where the second headless gapped conjunct is taken to be an NSU type of fragment. The analysis imposes no syntactic parallelism between the first conjunct and the gapped conjunct, given data like the following:

(59) Pat has become [crazy]_{AP} and Chris [an incredible bore]_{NP}.

Instead of requiring strong syntactic parallelism between the two clauses, their analysis limits gapping remnants to elements of the argument structure of the verbal head present in the antecedent and absent from the rightmost conjunct, which reflects the intuition articulated in Hankamer (1971). Their analysis starts with the assumption that coordination phrases are nonheaded constructions in which each conjunct shares the same valence (SUBJ and COMPS) and nonlocal features while its head (HEAD) value is not fixed but share an upper bound (supertype) to allow examples like (59). With this widely accepted assumption of coordination structure, their analysis takes the gapped conjunct *Chris an incredible bore* in (59) to be an NSU fragment with two cluster daughters, as simplified in the following:

8 For a semantic approach to gapping, the reader is referred to Park, Koenig, and Chaves (2004), who offer an analysis of scope ambiguities under gapping where the syntax assumed is of the NSU type and the semantics is cast in the framework of Lexical Resource Semantics.



As represented in the structure, the gapped conjunct functions as a fragment whose single daughter is a cluster phrase with two cluster daughters. The required syntactic parallelism is operationalized by adopting the contextual attribute SAL-UTT, which is introduced for all NSUs, as we have seen. The syntactic identity between gapping remnants and their counterparts is achieved by requiring that each list member of the SAL-UTT bears the specification [MAJOR +] as part of its HEAD feature and is coindexed with the gapping remnants.⁹

6.2 Pseudogapping

Gapping minimally elides a finite verb and further any non-finite verbs that are present, but pseudogapping elides most but not all of a non-finite verb phrase. Its remnant can be any kind of maximal phrase (Miller 1990; Gengel 2013; Kubota 2014):

- (61) a. You can't count on a stranger, but you can __ on a friend.
 b. John spoke to Mary more often than Peter did __ Anne.
 c. Although I wouldn't introduce these people to Tom and Sally, I would __ to each other.

⁹ The feature MAJOR ensures that each expression is a major constituent functioning as a dependent of some verbal projection, blocking remnants from being deeply embedded in the gapped clause.

Pseudogapping shares one key property with VPE in that it is sensitive to the presence of an auxiliary verb. In this sense, it has often taken to be a special type of VPE, but there are several differences including restriction to the present of a finite auxiliary verb, as seen from the contrast:

- (62) a. I don't play chess as often as I would like to.
 b. *I don't play chess as often as I would like to checkers.

VPE can occur in the nonfinite context as in (62a), but pseudogapping cannot, as in (62b).

There is also a key difference between gapping and pseudogapping in English. The former occurs in the non-initial conjuncts of coordinate structures while the latter can also occur in subordinate clauses:

- (63) a. *He will consider your proposal, although he mine.
 b. He will consider your proposal, although he won't consider mine.

A supporting argument for deletion can be found from syntactic connectivity between the antecedent and pseudogapped clauses. For example, consider the following contrasts (Miller and Pullum 2014):

- (64) a. *John spoke to Mary more often than Peter did for Anne.
 b. John spoke to Mary more often than Peter did to Anne.
 (65) a. *John will accuse Bill of perjury more readily than he would Mary with forgery.
 b. John will accuse Bill of perjury more readily than he would Mary of forgery.

The verb *speak* can take a PP headed by *to* or *for*, but in (64), only *to Mary* is possible. In the same manner, *accuse* can have a PP argument headed by *of* or *with*, but (65), only the former is licit. This contrast suggests a requirement of syntactic connectivity between the antecedent and pseudogapped clauses. However, a simple deletion analysis is challenged by empirical facts. For instance, the purportedly deleted expression is not a constituent as in (66a) or

even it can be discontinuous as in (66b):

- (66) a. You can't [take the lining out of] that coat. You can ___ this one.
 b. I would give more kudos to Terry for what he did than I would ___ Robin ___.

A further issue arises from data that allows a syntactic mismatch between the antecedent clause and the pseudogapped clause. Note the following example from Miller and Pullum (2014):

- (67) Ask Doll, who spoke as much about his schoolboy career ending as he did of the season in general. (Miller and Pullum 2014, (15a))

In this example, the pseudogapped verb has a different valence from the token which appears in the antecedent clause.

A possible HPSG approach for pseudogapping is to take it to be a special type of VPE that combines with a remnant focus phrase, as defined in the following:¹⁰

- (68) Pseudogapping Construction in English:

$$\left[\begin{array}{l} \text{pseudogapping} - \text{cxt} \\ \text{AUX} + \\ \text{SAL-UTT} \left\{ \left[\begin{array}{l} \text{SYN} [\text{CAT} \langle \Pi \rangle] \\ \text{SEM} [\text{INDEX } i] \end{array} \right] \right\} \\ \text{CTXT } i \in s_0 \end{array} \right] \rightarrow \text{H} \left[\begin{array}{l} \text{vpe} - \text{cxt} \\ \text{AUX} + \\ \text{VFORM } \textit{fin} \\ \text{INDEX } s_0 \end{array} \right], \Pi \text{XP} \left[\begin{array}{l} \text{INDEX } i \\ \text{FOC} \langle \Pi \rangle \end{array} \right]$$

The construction indicates that a pseudogapping is analyzed in an analogous manner to VPE, with the remnant functioning as a focus expression.¹¹ It also occurs only in the finite environment. The index restriction is meant to guarantee that the focused expression is involved in the situation denoted by the VPE. With this constructional constraint, consider (61a). Uttering the first conjunct

¹⁰ The VPE Construction is the one projected from a *vpe-wd*

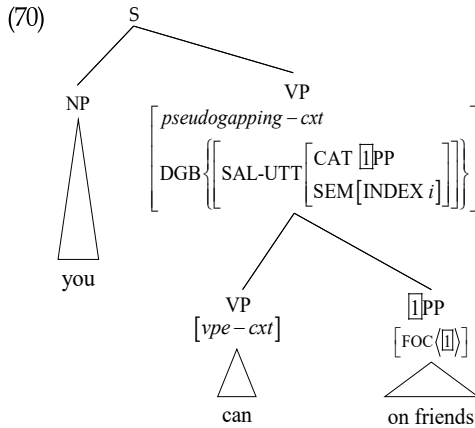
¹¹ There are no formal HPSG analyses for pseudogapping in English we can refer to, we suggest a possible DI approach here inspired by Miller and Pullum (2014).

would evoke a QUD like the following (all declarative sentences evoke a QUD):

- (69) QUD introduced from A's utterance in (61a):

$$[DGB | MAX\text{-}QUD \lambda \{ \} [\neg \text{count-on}(y, s)]]$$

That is, the introduced QUD would be something like if it is true or not that you cannot count on a stranger. This QUD information also holds in the second conjunct clause, whose structure would be something like the following:



Intuitively, the second conjunct introduces an open proposition that you can count on someone, who is a friend. That means, the remnant in the second clause bears a focus value. This is what the structure tells us. As in the structure, the remnant *on friends* is adjoined to the VPE Construction, forming a pseudogapping construct. Since the SAL-UTT is linked to the DGB introduced by the antecedent clause, its syntactic category value is restricted to be only a PP headed by the preposition *on*.

- (71) a. *You can't count on a stranger, but you can for/in a friend.
 b. You can't count on a stranger, but you can on a friend.

The verb *count* can combine with a PP headed by *on*, *for* or *in*, but only the first preposition possible. This kind of connectivity can be followed from the

interaction of the lexicon and the structured discourse.

7. Conclusion

This position paper reviewed three key types of elliptical constructions: nonsentential utterances, predicate ellipsis, and (pseudo)gapping. All these constructions involve non-corresponding mapping relations between syntax and semantics.

One prevailing analysis is to posit invisible sentential syntax for these constructions. The paper first discussed arguments for and against the postulation of invisible syntactic material. It discussed connectivity effects, island effects, and structural mismatches. These phenomena at first glance seem to support deletion-based views, but further empirical data point to the fact that there are many real-life examples where we cannot introduce any unpronounced syntax in the ellipsis site. While discussing key phenomena that defend direct interpretation approaches, the paper focused on HPSG analyses in which no invisible material is posited at the ellipsis site.

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