Chapter 19

Ellipsis

Joanna Nykiel
University of Oslo

Jong-Bok Kim
Kyung Hee University, Seoul

This chapter provides an overview of the HPSG analyses of elliptical constructions. It first discusses three types of ellipsis (nonsentential utterances, predicate ellipsis, and non-constituent coordination) that have attracted much attention in HPSG. It then reviews existing evidence for and against the so-called direct interpretation or WYSIWYG (what you see is what you get) perspective to ellipsis, where no invisible material is posited at the ellipsis site. The chapter then recaps the key points of existing HPSG analyses applied to the three types of ellipsis.

1 Introduction

Ellipsis is a phenomenon that involves a non-canonical mapping between syntax and semantics. What appears to be a syntactically incomplete utterance still receives a semantically complete representation, based on the features of the surrounding context, be it linguistic or nonlinguistic. The goal of 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. Section 2 introduces three types of ellipsis (nonsentential utterances, predicate ellipsis, and non-constituent coordination) that have attracted considerable attention and received treatment within HPSG (our focus here is on standard HPSG rather than Sign-Based Construction Grammar; Sag 2012, see also Abeillé & Borsley 2020: Section 7.2, Chapter 1 of this volume

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and Müller 2020b: Section 1.4.2, Chapter 33 of this volume on SBCG and Abeillé & Chaves 2020: Section 7, Chapter 16 of this volume on non-constituent coordination). In Section 3 we overview existing evidence for and against the so-called WYSIWYG (what you see is what you get) approach to ellipsis, where no invisible material is posited at the ellipsis site. Finally in Sections 4–6, we walk the reader through three types of HPSG analyses applied to the three types of ellipsis presented in Section 2. Our purpose is to highlight the nonuniformity of these analyses, along with the underlying intuition that ellipsis is not a uniform phenomenon. Throughout the chapter, we also draw the reader's attention to the key role that corpus and experimental data play in HPSG theorizing, which sets it apart from frameworks that primarily rely on intuitive judgments.

2 Three types of ellipsis

Based on the type of analysis they receive in HPSG, elliptical phenomena can be broadly divided into three types: nonsentential utterances, predicate ellipsis, and non-constituent coordination.[1] We overview the key features of these types here before discussing in greater detail how they have been brought to bear on the question of whether there is invisible syntactic structure at the ellipsis site or not. We begin with stranded XPs, which HPSG treats as nonsentential utterances, and then move on to predicate and argument ellipsis, followed by phenomena known as non-constituent coordination.

2.1 Nonsentential utterances

This section introduces utterances smaller than a sentence, which we refer to as *nonsentential utterances* (NSUs). These range from *Bare Argument Ellipsis* (BAE)[2] as in (1), through fragment answers as in (2) to direct or embedded fragment questions (sluicing) as in (3)–(4):

(1) A: You were angry with them.
B: Yeah, angry with them and angry with the situation.

(2) A: Where are we?
B: In Central Park.

(3) A: So what did you think about that?
B: About what?

[1]For more detailed discussion, see Kim & Nykiel (2020).
[2]This term is used in Culicover & Jackendoff (2005).

(4) A: There's someone at the door.
B: Who?/I wonder who.

As illustrated by these examples, sluicing hosts stranded *wh*-phrases and has the function of an interrogative clause, while BAE hosts XPs representing various syntactic categories and typically has the function of a clause (Ginzburg & Sag 2000: 313, Culicover & Jackendoff 2005: 233).[3]

The key theoretical question NSUs raise is whether they are, on the one hand, parts of larger sentential structures or, on the other, nonsentential structures whose semantic and morphosyntactic features are licensed by the surrounding context. To adjudicate between these views, researchers have looked for evidence that NSUs in fact behave as if they were fragments of sentences. As we will see in Section 3, there is evidence to support both of these views. However, HPSG doesn't assume that NSUs are underlyingly sentential structures.

2.2 Predicate ellipsis and argument ellipsis

This section looks at four constructions whose syntax includes null or unexpressed elements. These constructions are *Post-Auxiliary Ellipsis* (PAE),[4] which a term we are using here for what is more typically referred to as *Verb Phrase Ellipsis* (VPE); pseudogapping; *Null Complement Anaphora* (NCA); and *argument drop* (or *pro*-drop). PAE features stranded auxiliary verbs as in (5), while pseudogapping, also introduced by an auxiliary verb, has a remnant right after the pseudo gap as in (6). NCA is characterized by omission of complements to some lexical verbs as in (7), while argument drop refers to omission of a pronominal subject or an object argument, as illustrated in (8) for Polish.

(5) A: I didn't ask George to invite you.
B: Then who did? (PAE)

(6) Larry might read the short story, but he won't the play. (Pseudogapping)

(7) Some mornings you can't get hot water in the shower, but nobody complains. (NCA)

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

[4] The term PAE was introduced by Sag (1976) and covers cases where a non-VP element is elided after an auxiliary verb, as in *You think I am a superhero, but I am not.*

(8) Pia późno wróciła do domu. Od razu poszła spać.
Pia late got to home immediately went sleep
'Pia got home late. She went straight to bed.' (argument drop)

One key question raised by such constructions is whether these unrealized null elements should be assumed to be underlyingly present in the syntax of these constructions, and the answer is rather negative (see Section 3). Another question is whether theoretical analyses of constructions like PAE should be enriched with usage preferences, since these constructions compete with *do it/that/so* anaphora in predictable ways (see Miller 2013 for a proposal).

2.3 Non-constituent coordination

We now focus on three instances of non-constituent coordination – gapping (Ross 1967), right node raising (RNR), and argument cluster coordination (ACC) – illustrated in (9), (10), and (11), respectively.

(9) Ethan [gave away] his CDs and Rasmus his old guitar. (Gapping)

(10) Ethan prepares and Rasmus eats [the food]. (RNR)

(11) Harvey [gave] a book to Ethan and a record to Rasmus. (ACC)

In RNR, a single constituent located in the right-peripheral position is associated with both conjuncts. In both ACC and gapping, a finite verb is associated with both (or more) conjuncts but is only present in the leftmost one. Additionally in ACC, the subject of the first conjunct is also associated with the second conjunct but is only present in the former. These phenomena illustrate what appears to be coordination of standard constituents with elements not normally defined as constituents (a cluster of NPs in (9), a stranded transitive verb in (10), and a cluster of NP and PP in (11)).

To handle such constructions, the grammar must be permitted to (a) coordinate non-canonical constituents, (b) generate coordinated constituents parts of which are subject to an operation akin to deletion, or (c) coordinate VPs with nonsentential utterances. As we will see, HPSG analyses of these constructions make use of all three options, which we will see throughout this chapter.

3 Evidence for and against invisible material at the ellipsis site

This section is concerned with NSUs and PAE, since this is where the contentious issues arise of whether there is invisible syntactic material in an ellipsis site (Sections 3.1 and 3.2) and of where ellipsis is licensed (Sections 3.3 and 3.4). Below, we consider evidence from the literature for and against invisible structure. 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 HPSG tradition.

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 preposition-stranding effects (for other examples of connectivity effects, see Ginzburg & Miller 2018). It's been known since Ross (1967) 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 a *wh*-phrase functioning as an NSU and its counterpart in the antecedent (Merchant 2005b: 663):

(12) Er will jemandem schmeicheln, aber sie wissen nicht wem /
he will someone.DAT flatter, but they know not who.DAT
* wen.
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 the 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 (Merchant 2001; 2005a). 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 *hasonlit* 'resembles' assigns either sublative (SUBL) or allative (ALL) case to its object, but if the sublative 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
'János.'

Jacobson (2016) notes that there is some speaker variation regarding the (un)acceptability of case mismatch here, while 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.

Similarly problematic for case-based parallels between NSUs and their sentential counterparts are some Korean data. Korean NSUs can drop case markers more freely than their counterparts in nonelliptical clauses can, a point made in Morgan (1989) and Kim (2015). Observe the example in (14) from Morgan (1989: 237).

(14) A: Nwukwu-ka ku chaek-ul sa-ass-ni?
who-NOM the book-ACC buy-PST-QUE
'Who bought the book?'
B: Yongsu-ka / Yongsu / * Yongsu-lul.
Yongsu-NOM Yongsu Yongsu-ACC
'Yongsu.'
B′: Yongsu-ka / * Yongsu ku chaek-ul sa-ass-e.
Yongsu-NOM Yongsu the book-ACC buy-PST-DECL
'Yongsu bought the book.'

When an NSU corresponds to a nominative subject in the antecedent (as in (14B)), it can either be marked for nominative or be caseless. However, replacing the same NSU with a full sentential answer, as in (14B′), rules out case drop from the subject. This strongly suggests that the case-marked and caseless NSUs couldn't have identical source sentences if they were to derive via PF-deletion (deletion

in the phonological component).[5] Data like these led Morgan (1989) to propose that not all NSUs have a sentential derivation, an idea later picked up in Barton (1998).

The same pattern is associated with semantic case. That is, in (15), if an NSU is case-marked, it needs to be marked for comitative case like its counterpart in the A-sentence, but it may also simply be caseless. However, being caseless is not an option for the NSU's counterpart in a sentential response to A (Kim 2015).

(15) A: Nwukwu-wa hapsek-ul ha-yess-e?
who-COM sitting.together-ACC do-PST-QUE
'With whom did you sit together?'
B: Mimi-wa. / Mimi.
Mimi-COM Mimi
'With Mimi.' / 'Mimi.'

The generalization for Korean is then that NSUs may be optionally realized as caseless, but may never be marked for a different case than is marked on their counterparts.

Overall, 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.[6]

The second kind of connectivity effects goes back to Merchant (2001; 2005a) and highlights apparent links between the features of NSUs and *wh-* and focus movement (leftward movement of a focus-bearing expression). The idea is that prepositions behave the same under *wh-* and focus movement as they do under clausal ellipsis, that is, they pied-pipe or strand in the same environments. If a language (e.g., English) permits preposition stranding under *wh-* and focus movement (*What did Harvey paint the wall with?* vs. *With what did Harvey paint the wall?*), then NSUs may surface with or without prepositions, as illustrated in (16) for sluicing and BAE (see Section 4 for a theoretical analysis of this variation).

[5] Nominative (in Korean) differs in this respect from three other structural cases in the language—dative, accusative, and genitive—in that these three may be dropped from nonelliptical clauses (see Morgan 1989; Lee 2016; Kim 2016). However, see Müller (2002) for a discussion of German dative and genitive as lexical cases.

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

(16) A: I know what Harvey painted the wall with.
B: (With) what?/(With) primer.

If there were indeed a link between preposition stranding and NSUs, then we would expect prepositionless NSUs to only be possible in languages with preposition stranding. This expectation is, however, disconfirmed by an ever-growing list of non-preposition stranding languages that do feature prepositionless NSUs: Brazilian Portuguese (Almeida & Yoshida 2007), Spanish and French (Rodrigues et al. 2009), Greek (Molimpakis 2018), Bahasa Indonesia (Fortin 2007), Russian (Philippova 2014), Polish (Szczegielniak 2008; Sag & Nykiel 2011; Nykiel 2013), Bulgarian (Abels 2017), Serbo-Croatian (Stjepanović 2008; 2012), Mauritian Abeillé & Hassamal (2019), and Arabic (Leung 2014; Alshaalan & Abels 2020). A few of these studies have presented experimental evidence that prepositionless NSUs are acceptable, though for reasons still poorly understood, they typically do not reach the same level of acceptability as their variants with prepositions do (see Nykiel 2013 for Polish, Molimpakis 2018 for Greek, and Alshaalan & Abels 2020 for Saudi Arabic). It is worth noting in this regard that the work on connectivity effects that follows the HPSG tradition is based on a solid foundation of empirical evidence to a larger extent than work grounded in the Minimalist tradition (see Sag & Nykiel 2011; Nykiel 2013 for experimental work on Polish, and Nykiel 2015; 2017; Nykiel & Hawkins 2020 for corpus work on English).

It is evident from this research that there is no grammatical constraint on NSUs that keeps track of what preposition-stranding possibilities exist in any given language. On the other hand, it doesn't seem sufficient to assume that NSUs can freely drop prepositions, given examples of sprouting like (17), in which prepositions are not omissible (see Chung et al. 1995).[7] As noted by Chung et al. (1995), the difference between the merger type of sluicing (16) and the sprouting type of sluicing (17) is that there is an explicit phrase that the NSU corresponds to in the former but not in the latter (in the HPSG literature, this phrase is termed a Salient Utterance by Ginzburg & Sag 2000: 313 or a Focus-Establishing Constituent by Ginzburg 2012).

(17) A: I know Harvey painted the wall.
B: *(With) what?/Yeah, *(with) primer.

The challenge posed by (17) is how to ensure that the NSU is a PP matching the implicit PP argument in the A-sentence (see the discussion around (??) for further

[7] However, as noted by Ginzburg & Sag (2000) and Hardt et al. (2020), there are cases where prepositions are dropped from NSUs that serve as adjuncts rather then arguments, as in *A: I am going to the concert tonight. B: (At) What time?*

detail). This challenge has not received much attention in the HPSG literature, though see Kim (2015).

3.2 Island effects

One of the predictions from the view that NSUs are underlyingly sentential is that they should respect island constraints on long-distance movement (see Chaves 2020, Chapter 15 of this volume for a discussion of islands in HPSG). But as illustrated below, NSUs (both sluicing and BAE) exhibit island-violating behavior.[8] 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*).[9]

(18) A: Harriet drinks scotch that comes from a very special part of Scotland.
B: Where? (Culicover & 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 & Jackendoff 2005: 245)

Among Culicover & 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 2005a; Griffiths & Lipták 2014).

[8] As hinted earlier, the derivational approaches need to move a remnant or NSU to the sentence initial position and delete a clausal constituent since only constitutents can be deleted. See Merchant (2001; 2010) for details.

[9] Merchant (2005a) argued that BAE, unlike sluicing, does respect island constraints, an argument that was later challenged (see, e.g., Culicover & Jackendoff 2005: 239), Griffiths & Lipták 2014. However, Merchant (2005a) 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 couldn't be constructed.

(22) A: Does Abby speak the same Balkan language that Ben speaks?
B: *No, Charlie. (Merchant 2005a: 688)

Schmeh et al. (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 response particle *yes*.

(23) A: John met a guy who speaks a very unusual language.
B: Yes, Albanian. (Culicover & Jackendoff 2005: 245)

Schmeh et al. (2015) find that corrections with *no* lead to lower acceptability ratings compared to supplementations with *yes* and propose that this follows from the fact that corrections induce greater processing difficulty than supplementations do, 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.

In contrast to NSUs, many instances of PAE appear to respect island constraints, as would be expected if there were unpronounced structure from which material was extracted. An example of a relative clause island is depicted in (24) (note that the corresponding sluicing NSU is fine).

(24) * They want to hire someone who speaks a Balkan language, but I don't remember which they do [~~want to hire someone who speaks~~ __]. (Merchant 2001: 6)

(24) contrasts with well-formed island-violating examples like (25a) and (25b), as observed by Miller (2014) and Ginzburg & Miller (2018).[10]

(25) a. He managed to find someone who speaks a Romance language, but a Germanic language, he didn't [~~manage to find someone who speaks~~ __]. (Ginzburg & Miller 2018: 90)

b. He was able to find a bakery where they make good baguette, but croissants, he couldn't [~~find a bakery where they make good~~ __]. (Ginzburg & Miller 2018: 90)

As Ginzburg & Miller (2018) rightly point out, we do not yet have a complete understanding of when or why island effects show up in PAE. Its behavior is at best inconsistent, failing to provide convincing evidence for silent structure.

[10] Miller (2014) cites numerous corpus examples of island-violating pseudogapping.

3.3 Structural mismatches

Because structural mismatches are rare or absent from NSUs (see Merchant 2005a; 2013),[11] this section focuses on PAE and developments surrounding the question of which contexts license it. In a seminal study of anaphora, Hankamer & Sag (1976) classified PAE as a surface anaphor with syntactic features closely matching those of an antecedent present in the linguistic context. They argued in particular that PAE is not licensed if it mismatches its antecedent in voice. Compare the following two examples from Hankamer & Sag (1976: 327).

(26) 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 PAE than on other verbal anaphors (e.g., *do it/that*) in terms of identity between an ellipsis site and its antecedent. This has prompted extensive evaluation in a number of corpus and experimental studies in the subsequent decades. Below are examples of acceptable structural mismatches reported in the literature, ranging from voice mismatch in (27a) to nominal antecedents in (27b) and to split antecedents in (27c).[12]

[11] Given the assumption that canonical sprouting NSUs have VP antecedents, as in (17), Ginzburg & Miller (2018: 95) cite examples—originally from Beecher (2008: 13)—of sprouting NSUs with nominal, hence mismatched, antecedents, e.g., (i).

(i) We're on to the semi-finals, though I don't know who against.

Further examples where NSUs refer to an NP or AP antecedent appear in COCA (Corpus of Contemporary American English):

(ii) A: Well, it's a defense mechanism. B: Defense against what?

(iii) Our Book of Mormon talks about the day of the Lamanite, when the church would make a special effort to build and reclaim a fallen people. And some people will say, Well, fallen from what?

The NSUs in (ii)–(iii) repeat the lexical heads whose complements are being sprouted (*defense* and *fallen*), that is, they contain more material than is usual for NSUs (cf. (i)). It seems that without this additional material it would be difficult to integrate the NSUs into the propositions provided by the antecedents and hence to arrive at the intended interpretations.

[12] Miller (2014: 87) also reports cases of structural mismatch with English comparative pseudo-gapping, as in (i) from COCA:

(i) These savory waffles are ideal for brunch, served with a salad as you would a quiche. (Mag).

See also Abeillé et al. (2016) for examples of voice mismatch in French RNR.

(27) a. This information could have been released by Gorbachev, but he chose not to __ . (Hardt 1993: 37)
b. Mubarak's survival is impossible to predict and, even if he does __ , his plan to make his son his heir apparent is now in serious jeopardy. (Miller & Hemforth 2014: 7)
c. Mary wants to go to Spain and Fred wants to go to Peru but because of limited resources only one of them can __ . (Webber 1979: 128)

There are two opposing views that have emerged from the empirical work regarding the acceptability and grammaticality of structural mismatches under PAE. The first view takes mismatches to be grammatical and connects degradation in acceptability to violation of certain independent constraints on discourse (Kehler 2002; Miller 2011; 2014; Miller & Hemforth 2014; Miller & Pullum 2014) or processing (Kim et al. 2011). Two types of PAE have been identified on this view through extensive corpus work—auxiliary choice PAE and subject choice PAE—each with different discourse requirements with respect to the antecedent (Miller 2011; Miller & Hemforth 2014; Miller & 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 et al. 2006; Grant et al. 2012). If we follow the first view, it is perhaps unexpected that voice mismatch should consistently incur a greater acceptability penalty under PAE than when no ellipsis is involved, as recently reported in Kim & Runner (2018).[13] Kim & 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 PAE. HPSG analyses take structurally mismatched instances of PAE to be unproblematic and fully grammatical, while also recognizing construction-specific constraints: discourse or processing constraints formulated for PAE may or may not extend to other elliptical constructions, such as NSUs (see Abeillé et al. 2016; Ginzburg & Miller 2018 for this point).

3.4 Nonlinguistic antecedents

Like structural mismatches, the availability of nonlinguistic (situational) antecedents for an ellipsis points to the fact that it needn't be interpreted by reference to

[13] But see Abeillé et al. (2016) for experimental results that show no acceptability penalty for voice mismatch in French Right Node Raising.

and licensed by a structurally identical antecedent. Although this option is somewhat limited, PAE does tolerate nonlinguistic antecedents, as shown in (28)–(29) (see also Hankamer & Sag 1976; Schachter 1977).

(28) Mabel shoved a plate into Tate's hands before heading for the sisters' favorite table in the shop. "You shouldn't have." She meant it. The sisters had to pool their limited resources just to get by. (Miller & Pullum 2014: ex. 23)

(29) Once in my room, I took the pills out. "Should I?" I asked myself. (Miller & Pullum 2014: ex. 22a)

Miller & Pullum (2014) note that such examples are exophoric PAE involving no linguistic antecedent for the ellipsis but just a situation where the speaker articulates their opinion about the action involved. Miller & Pullum (2014) provide an extensive critique of the earlier work on the ability of PAE to take nonlinguistic antecedents, arguing for a streamlined discourse-based explanation that neatly captures the attested examples as well as examples of structural mismatch like those discussed in Section 3.3. The important point here is again that PAE is subject to construction-specific constraints which limit its use with nonlinguistic antecedents.

NSUs appear in various nonlinguistic contexts as well. Ginzburg & Miller (2018) distinguish three classes of such NSUs: sluices (30), exclamative sluices (31), and declarative fragments (32).

(30) (In an elevator) What floor? (Ginzburg & Sag 2000: 298)

(31) It makes people "easy to control and easy to handle," he said, "but, God forbid, at what cost!" (Ginzburg & Miller 2018: 96)

(32) BOBADILLA turns, gestures to one of the other men, who comes forward and gives him a roll of parchment, bearing the royal seal. "My letters of appointment." (COCA)

In addition to being problematic from the licensing point of view, NSUs like these have been put forward as evidence against the idea that they are underlyingly sentential, because it is unclear what the structure that underlies them would be. There could be many potential sources for these NSUs (see Culicover & Jackendoff 2005: 306). [14]

[14] This is not to say that a sentential analysis of fragments without linguistic antecedents hasn't been attempted. For details of a proposal involving a "limited ellipsis" strategy, see Merchant (2005a) and Merchant (2010).

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 dialog and on a wider range of data than is common practice in the ellipsis literature (Ginzburg 1994; Ginzburg & Cooper 2004; 2014; Larsson 2002; Purver 2006; Fernández Rovira 2006; Fernández & Ginzburg 2002; Fernández et al. 2007; Ginzburg & Fernández 2010; Ginzburg et al. 2014; Ginzburg 2012; 2013; Kim & Abeillé 2019). Existing analyses of NSUs go back to Ginzburg & Sag (2000), who recognize declarative fragments as in (33) and two kinds of sluicing NSUs: direct sluices as in (34) and reprise sluices as in (35) (the relevant fragments are bolded). The difference between direct and reprise sluices lies in the fact that the latter are requests for clarification of any part of the antecedent. For instance, in (35), the referent of *that* is unclear to the interlocutor.

(33) "I was wrong." Her brown eyes twinkled. "Wrong about what?" "**That night**." (COCA)

(34) "You're waiting," she said softly. "**For what?**" (COCA)

(35) "Can we please not say a lot about that?" "**About what?**" (COCA)

These different types of NSUs are derived from the Ginzburg & Sag (2000: 333) hierarchy of clausal types depicted in Figure 1.

NSUs like declarative fragments (*decl-frag-cl*) are associated with type *hd-frag-ph* (headed-fragment phrase) and *decl-cl* (declarative clause), while direct sluices (*slu-int-cl*) and reprise sluices (*dir-is-int-cl*) are associated with type *hd-frag-ph* and *inter-cl* (interrogative clause). The type *slu-int-cl* is permitted to appear in independent and embedded clauses, hence it is underspecified for the head feature IC (independent clause). This specification contrasts with that of declarative fragments and reprise sluices, with both specified as [IC +], which Ginzburg & Sag (2000: 305) use to block declarative fragments and reprise sluices from appearing in embedded clauses (e.g., *A: What do they like? B: *I doubt bagels*).[15] Ginzburg & Sag (2000: 304) make use of the constraint shown in (36), in which the two contextual attributes SAL-UTT and MAX-QUD play key roles in ellipsis resolution (we have added information about the MAX-QUD to generate NSUs):

[15] This feature specification, however, needs to be remedied for the speakers who accept examples like *A: What does Kim take for breakfast? B: Lee says eggs.*

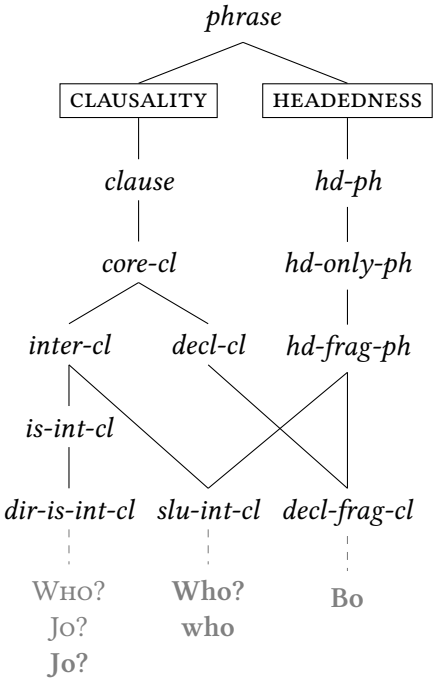

Figure 1: Clausal hierarchy for fragments (Ginzburg & Sag 2000: 333)

(36) Head-Fragment Construction:

$$\begin{bmatrix} \textsc{cat} & S \\ \textsc{ctxt} & \begin{bmatrix} \textsc{max-qud} & \left[\textsc{params}\ \textit{neset}\right] \\ \textsc{sal-utt} & \left\{\begin{bmatrix} \textsc{cat} & \boxed{2} \\ \textsc{cont}|\textsc{ind} & i \end{bmatrix}\right\} \end{bmatrix} \end{bmatrix} \rightarrow \begin{bmatrix} \textsc{cat} & \boxed{2}\left[\textsc{head}\ \textit{nonverbal}\right] \\ \textsc{cont} & \left[\textsc{ind}\ i\right] \end{bmatrix}$$

This constructional constraint first allows any non-verbal phrasal category (NP, AP, VP, PP, AdvP) to be mapped onto a sentential utterance as long as it corresponds to a Salient Utterance (SAL-UTT).[16] This means that the head daughter's syntactic category must match that of the SAL-UTT, which is an attribute supplied by the surrounding context as a (sub)utterance of another contextual attribute—the Maximal Question under Discussion (MAX-QUD). The context gets

[16] Ginzburg (2012) uses the notion of the Dialogue Game Board (DGB) to keep track of all information relating to the common ground between interlocutors. The DGB is also the locus of contextual updates arising from each new question-under-discussion that is introduced.

updated with every new question-under-discussion, and MAX-QUD represents the most recent question-under-discussion appropriately specified for the feature PARAMS, whose value is a nonempty set (*neset*) of parameters.[17] SAL-UTT is the (sub)utterance with the widest scope within MAX-QUD. To put it informally, SAL-UTT represents a (sub)utterance of a MAX-QUD that has not been resolved yet. Its feature CAT supplies information relevant for establishing morphosyntactic identity with an NSU, that is, syntactic category and case information, and (36) requires that an NSU match this information.

For illustration, consider the following exchange including a declarative fragment:

(37) A: What did Barry break?
B: The mike.

In this dialog, the fragment *The mike* corresponds to the SAL-UTT *what*. Thus the constructional constraint in (36) would license an NSU structure like Figure 2.

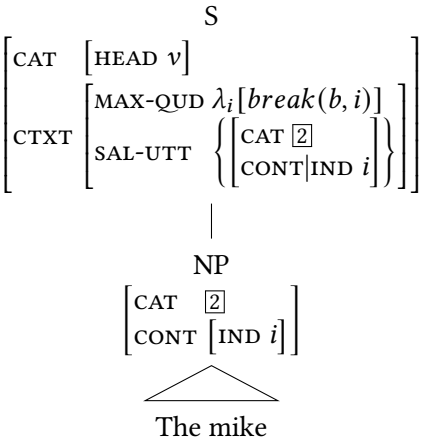

Figure 2: Structure of a declarative fragment clause

As illustrated in the figure, uttering the *wh*-question in (37A) evokes the QUD asking the value of the variable *i* linked to the object that Barry broke. The NSU *The mike* matches that value. The structured dialogue thus plays a key role in the retrieval of the propositional semantics for the NSU.

[17] As defined in Ginzburg & Sag (2000: 304), the feature MAX-QUD is also specified for PROP (proposition) as its value. For the sake of simplicity, we suppress this feature here and further represent the value of MAX-QUD as a lambda abstraction, as in Figure 2. See Ginzburg & Sag (2000: 304) for the exact feature formulations of MAX-QUD.

This constructional approach has the advantage that it gives us a way of capturing the problems that Merchant (2001; 2005a) faces with respect to misalignments between preposition stranding under *wh-* and focus movement and the realization of NSUs as NPs or PPs, as discussed in Section 3.1. Because the categories of SAL-UTT discussed in Ginzburg & Sag (2000) are limited to nonverbal, SAL-UTTs can surface either as NPs or PPs. As long as both of these syntactic categories are stored in the updated contextual information, an NSU's CAT feature will be able to match either of them (See Sag & Nykiel 2011 for discussion of this possibility with respect to Polish and Abeillé & Hassamal 2019 with respect to Mauritian).

Another advantage of this analysis of NSUs is that the content of MAX-QUD can be supplied by either linguistic or nonlinguistic context. MAX-QUD provides the propositional semantics for an NSU and is, typically, a unary question. In the prototypical case, MAX-QUD arises from the most recent *wh*-question uttered in a given context, as in (37), but can also arise (via accommodation) from other forms found in the context, such as constituents in direct sluicing as in (38), or from a nonlinguistic context as in (39).

(38) A: A friend of mine broke the mike.
B: Who?

(39) (Cab driver to passenger on the way to the airport) A: Which airline?

The analysis of such direct sluices differs only slightly from that illustrated for (37), and in fact all existing analyses of NSUs (Sag & Nykiel 2011; Ginzburg 2012; Abeillé et al. 2014; Kim 2015; Abeillé & Hassamal 2019; Kim & Abeillé 2019) are based on (36). The direct sluice would have the structure given in Figure 3. The analyses in Figures 2 and 3 differ only in the value of the feature CONT (Content): in the former it is a proposition and in the latter a question.[18]

This construction-based analysis, in which dialogue updating plays a key role in the licensing of NSUs, also offers a direction for handling the contrast between merger (40a) and sprouting (40b) examples (recall the discussion in Section 3.1).

[18] In-situ languages like Korean and Mandarin allow pseudosluices (sluices with a copula verb), which has lead to proposals that posit cleft clauses as their sources (Merchant 2001). However, Kim (2015) suggests that a cleft-source analysis does not hold for languages like Korean since there is one clear difference between sluicing and cleft constructions: the former allows multiple remnants, while clefts do not license multiple foci. See Kim (2015) for a detailed discussion that differentiates sluicing in embedded clauses (pseudosluices with the copula verb) from direct sluicing in root clauses, as Ginzburg & Sag (2000: 329) do.

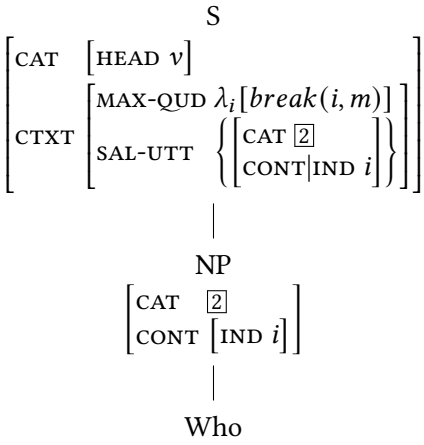

Figure 3: Structure of a sluiced interrogative clause

(40) a. A: I heard that the boy painted the wall with something. B: (With) what?

b. A: I heard that the boy painted the wall. B: *(With) what?

The difference between (40a) and (40b) is that the preceding antecedent clause in the former includes an overt correlate for the NSU, but in (40b), all there is is just a PP that is implicitly provided by the argument structure of the verb *paint*. Kim (2015) suggests the following way of analyzing the contrast. Consider the argument structure of the lexeme *paint*:

(41) Lexemic *paint*:

$$\begin{bmatrix} \textsc{phon} & \langle\ paint\ \rangle \\ \textsc{cat} & \left[\textsc{arg-st}\ \left\langle \mathrm{NP}_i, \mathrm{NP}_j, \mathrm{PP}\begin{bmatrix}\textsc{pform} & with \\ \textsc{ind} & x\end{bmatrix}\right\rangle\right] \\ \textsc{cont} & paint(i,j,x) \end{bmatrix}$$

As represented in (41), the verb *paint* takes three arguments. But note that the PP argument can be realized either as an overt PP or a *pro* expression. In the framework of HPSG, this optionality of an argument to be either realized as a complement or not expressed is represented as the Argument Realization Principle (ARP; Ginzburg & Miller 2018; Abeillé & Borsley 2020: 17, Chapter 1 of this volume):[19]

[19]This ARP is an extended version of Ginzburg & Sag (2000: 171) and Bouma et al. (2001: 11)

AVM: For Stefan, take care of the space after ⊕

(42) Argument Realization Principle:

$$v\text{-}wd \Rightarrow \begin{bmatrix} \textsc{subj} & \boxed{1} \\ \textsc{comps} & \boxed{2} \\ \textsc{arg-st} & \boxed{1} \oplus \boxed{2} \oplus \mathit{list}(\mathit{noncanon\text{-}ss}) \end{bmatrix}$$

The ARP tells us that the elements in the ARG-ST are realized as the SUBJ and COMPS elements and further that a noncanonical element with syntactic-semantic information (including *gap-ss* (gap-synsem) and *pro*) in the argument structure need not be realized in the syntax, permitting mismatch between argument structure and syntactic valence features (see Section 5).

In accordance with the ARP, the lexeme in (41) will then have at least the following two realizations, depending on the realization of the optional PP argument:

(43)
$$\begin{bmatrix} \textsc{phon} & \langle \mathit{painted} \rangle \\ \textsc{cat} & \begin{bmatrix} \textsc{subj} & \langle \boxed{1}\mathrm{NP}_i \rangle \\ \textsc{comps} & \left\langle \boxed{2}\mathrm{NP}_j, \boxed{3}\mathrm{PP}\begin{bmatrix} \textsc{pform} & \mathit{with} \\ \textsc{ind} & x \end{bmatrix} \right\rangle \\ \textsc{arg-st} & \langle \boxed{1}\mathrm{NP}, \boxed{2}\mathrm{NP}, \boxed{3}\mathrm{PP} \rangle \end{bmatrix} \\ \textsc{cont} & \mathit{paint}(i, j, x) \end{bmatrix}$$

(44)
$$\begin{bmatrix} \textsc{phon} & \langle \mathit{painted} \rangle \\ \textsc{cat} & \begin{bmatrix} \textsc{subj} & \langle \boxed{1}\mathrm{NP}_i \rangle \\ \textsc{comps} & \langle \boxed{2}\mathrm{NP}_j \rangle \\ \textsc{arg-st} & \langle \boxed{1}\mathrm{NP}_i, \boxed{2}\mathrm{NP}_j, \boxed{3}\mathrm{PP}_x[\mathit{pro}] \rangle \end{bmatrix} \\ \textsc{cont} & \mathit{paint}(i, j, x) \end{bmatrix}$$

The realization with an overt PP complement in (43) would project a merger sentence like (40a) while the one with a covert PP in (44) would license the sprouting example in (40b). Each of these two realizations would then license the following partial VP structures, as given in Figure 4 and Figure 5.

Let us consider the NSU with the merger antecedent in (40a). In this case, the NSU can be either the NP *What?* or the PP *With what?* because of the available DGB information triggered by the previous discourse. As seen from the structure

where *noncanon-ss* is specified to be one of its subtypes, *gap-ss*.

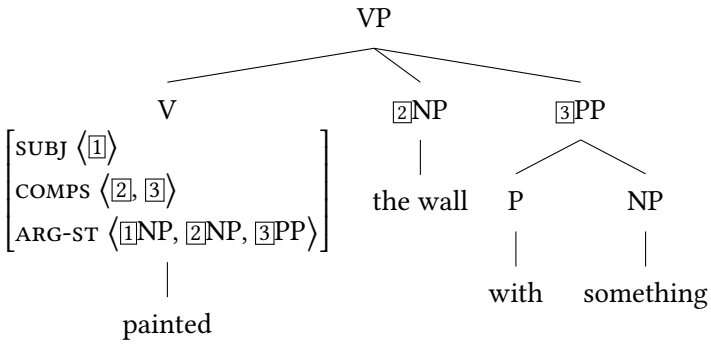

Figure 4: Structure of a merger antecedent

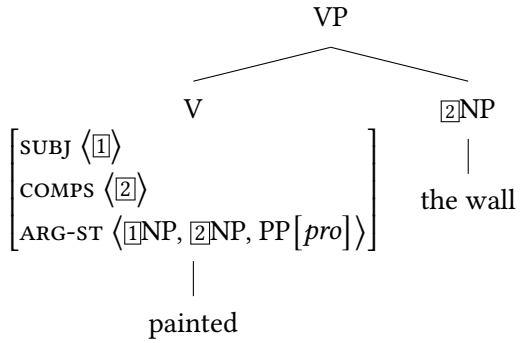

Figure 5: Structure of a sprouting antecedent

in Figure 4, the antecedent clause activates not only the PP information but also its internal structure, including the NP within it. The NSU can thus be anchored to either of these two, as given in the following:

(45) a. $\left[\textsc{ctxt}|\textsc{sal-utt}\left\{\left[\begin{array}{ll}\textsc{cat} & \textsc{pp}\begin{bmatrix}\textsc{pform} & \textit{with}\\ \textsc{ind} & x\end{bmatrix}\\ \textsc{cont} & \textit{paint}(i,j,x)\end{array}\right]\right\}\right]$

b. $\left[\textsc{ctxt}|\textsc{sal-utt}\left\{\left[\begin{array}{ll}\textsc{cat} & \textsc{np}\left[\textsc{ind}\ x\right]\\ \textsc{cont} & \textit{paint}(i,j,x)\end{array}\right]\right\}\right]$

The SAL-UTT in (45a) is the PP *with something*, projecting *With what?* as a well-formed NSU in accordance with (36). Since the overt PP also activates its prepo-

sitional NP object, the discourse can supply the NP as another possible SAL-UTT value as in (45b). This information then projects *What?* as a well-formed NSU in accordance with (36). Now consider (40b). Note that in Figure 5 the PP argument is not realized as a complement even though the verb *painted* takes a PP as its argument value. The interlocutor can have access to this ARG-ST information, but nothing further: the PP argument has no further specifications other than being served as an implicit argument of *painted*. This means that, only this implicit PP can be picked up as the SAL-UTT. This is why the sprouting example allows only a PP as a possible NSU. Thus the key difference between merger and sprouting examples lies in what the previous discourse activates via syntactic realizations.[20]

The advantages of the discourse-based analyses sketched here thus follow from their ability to capture limited morphosyntactic parallelism between NSUs and SAL-UTT without having to account for why NSUs behave differently from constituents of sentential structures. The island-violating behavior of NSUs is unsurprising on this analysis, as are attested cases of structural mismatch and situationally controlled NSUs.[21] However, some loose ends still remain. (36) incorrectly rules out case mismatch in languages like Hungarian for speakers that do accept it (see discussion around example (13)).[22]

5 Analyses of predicate/argument ellipsis

The first issue in the analysis of PAE is the status of the elided expression. It is assumed to be a *pro* element due to its pronominal properties (see Lobeck 1995; López 2000; Kim 2006; Aelbrecht & Harwood 2015; Ginzburg & Miller 2018). For instance, PAE applies only to phrasal categories (47), with the exception of pseudogapping as shown in (46); it can cross utterance boundaries (48); it can override island constraints ((49)–(50)); and it is subject to the Backwards Anaphora Constraint ((51)–(52)).

(46) Your weight affects your voice. It does mine, anyway. (Miller 2014: 78)

(47) Mary will meet Bill at Stanford because she didn't _ at Harvard.

[20] We owe most of the ideas expressed here to the discussion with Anne Abeillé.

[21] The rarity of NSUs with nonlinguistic antecedents can be understood as a function of how easily a situational context can give rise to a MAX-QUD and thus license ellipsis. See Miller & Pullum (2014) for this point with regard to PAE.

[22] See, however, Kim (2015) for a proposal that introduces a case hierarchy specific to Korean to explain limited case mismatch in this language.

(48) A: Tom won't leave Seoul soon.
B: I don't think Mary will __ either.

(49) John didn't hit a home run, but I know a woman who did. (CNPC: Complex Noun Phrase Constraint)

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

(51) * Sue didn't __ but John ate meat.

(52) Because Sue didn't __ , John ate meat.

One way to account for PAE 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; Ginzburg & Sag 2000). As we have seen, the ARP in (42) allows an argument to be a noncanonical *synsem* such as *pro* which need not be mapped onto COMPS. For instance, the auxiliary verb *can*, bearing the feature AUX, has a *pro* VP as its second argument in a sentence like *John can't dance, but Sandy can.*, that is, this VP is not instantiated as a syntactic complement of the verb.[23] This possibility is represented formally in (53) (see Kim 2006; Ginzburg & Miller 2018):

(53) Lexical description for *can*:

$$\begin{bmatrix} \textit{v-wd} \\ \textsc{phon} \langle\ \textit{can}\ \rangle \\ \textsc{cat} \begin{bmatrix} \textsc{head} & \begin{bmatrix} \textsc{vform} & \textit{fin} \\ \textsc{aux} & + \end{bmatrix} \\ \textsc{subj} & \langle \boxed{1} \rangle \\ \textsc{comps} & \langle\rangle \\ \textsc{arg-st} & \langle \boxed{1}\ \textsc{np},\ \textsc{vp}[\textit{pro}] \rangle \end{bmatrix} \end{bmatrix}$$

The output auxiliary in (53) will then project a structure like the one in Figure 6. The head daughter's COMPS list (VP[*bse*]) is empty because the second element on the ARG-ST list is a *pro*.[24]

[23] The rich body of HPSG work on English auxiliaries takes them not as special Infl categories, but as verbs bearing the feature AUX. See Kim (2000); Kim & Sag (2002); Sag et al. (2003; 2020);

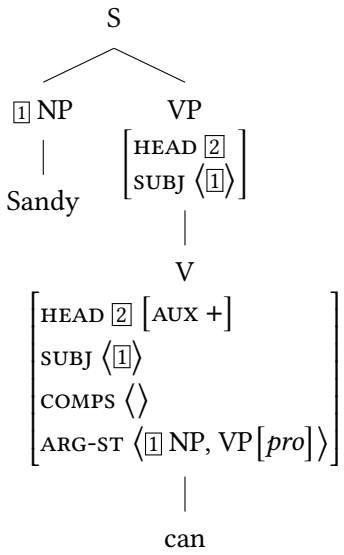

Figure 6: Structure of a VPE

We saw in Section 3.3 that PAE does not require structural identity with its antecedent, which is supplied by the surrounding context. Therefore, ellipsis resolution is not based on syntactic reconstruction in HPSG analyses, but rather on structured discourse information (see Ginzburg & Sag 2000: 295). The *pro* analysis outlined above expects structural mismatches (and island violations), because the relevant antecedent information is the information that the DGB provides via the MAX-QUD in each case, and hence no structural-match requirement is enforced on PAE.[25] This means in turn that HPSG analyses of PAE do not face the problem of having to rule out, or rule in, cases of structural mismatch or nonlinguistic antecedents, because their acceptability can be captured as reflecting discourse-based and construction-specific constraints on PAE.

Kim & Michalies (2020).

[24]The same line of analysis could be extended to NCA, which has received relatively little attention in modern syntactic theory, including in HPSG. However, NCA is sensitive only to a limited set of main verbs and its exact nature remains controversial.

[25]In the derivational analysis of Merchant (2013), cases of structural mismatch are licensed by the postulation of the functional projection VoiceP above an IP: the understood VP is linked to its antecedent under the IP.

6 Analyses of non-constituent coordination and gapping

Constructions such as gapping, RNR, and ACC have also often been taken to belong to elliptical constructions. Each of these constructions has received relatively little attention in the research on elliptical constructions, possibly because of their syntactic and semantic complexities. In this section, we briefly review HPSG analyses of these three constructions, leaving more detailed discussion to Abeillé & Chaves 2020, Chapter 16 of this volume and references therein.[26]

6.1 Gapping

Gapping allows a finite verb to be unexpressed in the non-initial conjuncts, as exemplified below.

(54) a. Some ate bread, and others rice.
b. Kim can play the guitar, and Lee the violin.

HPSG analyses of gapping fall into two kinds: one kind draws on Beavers & Sag's (2004) deletion-like analysis of non-constituent coordination (Chaves 2009) and the other on Ginzburg & Sag's (2000) analysis of NSUs (Abeillé et al. 2014).[27] The latter analyses align gapping with analyses of NSUs, as discussed in Section 4, more than with analyses of non-constituent 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, offer a construction- and discourse-based HPSG approach to gapping where the second headless gapped conjunct is taken to be an NSU. Their analysis places no syntactic parallelism requirements on the first conjunct and the gapped conjunct, given English data like (55) (note that the bracketed phrases differ in syntactic category).

(55) Pat has become [crazy]$_{\text{AP}}$ and Chris [an incredible bore]$_{\text{NP}}$. (Abeillé et al. 2014: 248)

[26] We also leave out discussion of HPSG analyses for pseudogapping: readers are referred to Miller (1992); Kim & Nykiel (2020) and Abeillé 2020: Section 4, Chapter 12 of this volume.
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[27] For a semantic approach to gapping, the reader is referred to Park et al. (2019), 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.

Instead of requiring 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 (i.e., the leftmost conjunct) and absent from the rightmost conjunct, which reflects the intuition articulated in Hankamer (1971). This analysis thus also licenses gapping remnants with implicit correlates, as illustrated in the following Italian example, where the subject is implicit in the leftmost conjunct and overt in the rightmost conjunct (Abeillé et al. 2014: 251).[28]

(56) Mangio la pasta e Giovanni il riso.
eat.1SG DET pasta and Giovanni DET rice
'I eat pasta and Giovanni eats rice.'

The subject in the leftmost conjunct in (56) would be analyzed as a noncanonical *synsem* of type *pro* and the correlate for the remnant *Giovanni*.

Abeillé et al. (2014) adopt two key assumptions in their analysis: (a) coordination phrases are nonheaded constructions in which each conjunct shares the same valence (SUBJ and COMPS) and nonlocal (SLASH) features, while its head (HEAD) value is not fixed but contains an upper bound (supertype) to accommodate examples like (55), and (b) gapping is a special coordination construction in which the first (full) clause serves as the head and some symmetric discourse relation holds between the conjuncts. To illustrate, the gapped conjunct *Chris an incredible bore* in (55) is an NSU with two cluster daughters, as represented by the simplified structure in Figure 7:

The NSU that consists of the gapped conjunct in Figure 7 has a single daughter, a cluster phrase with two cluster daughters.[29] The required syntactic parallelism between gapping remnants and their correlates in the antecedent is operationalized by adopting the contextual attribute SAL-UTT, which is introduced for all NSUs, as in (57) (Abeillé et al. 2014: (53)) (for the definition of SAL-UTT, see Section 4).

(57) Syntactic constraints on *head-fragment-ph*:

$$\textit{head-fragment-ph} \Rightarrow \begin{bmatrix} \textsc{cnxt}|\textsc{sal-utt} \left\langle \begin{bmatrix} \textsc{head} & \mathrm{H}_1 \\ \textsc{major} & + \end{bmatrix}, \ldots, \begin{bmatrix} \textsc{head} & \mathrm{H}_n \\ \textsc{major} & + \end{bmatrix} \right\rangle \\ \textsc{cat}|\textsc{head}|\textsc{cluster} \left\langle \begin{bmatrix} \textsc{head} & \mathrm{H}_1 \end{bmatrix}, \ldots, \begin{bmatrix} \textsc{head} & \mathrm{H}_n \end{bmatrix} \right\rangle \end{bmatrix}$$

[28] Gapping is possible outside coordination constructions like comparatives as well as in subordinate clauses. See Abeillé & Chaves (2020: Section 7), Chapter 16 of this volume.

[29] The notion of a cluster refers to any sequence of dependents and was introduced in Mouret (2006)'s analysis of ACC. In addition, see Kubota (2020), Chapter 30 of this volume

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for semantic issues arising from ACC.

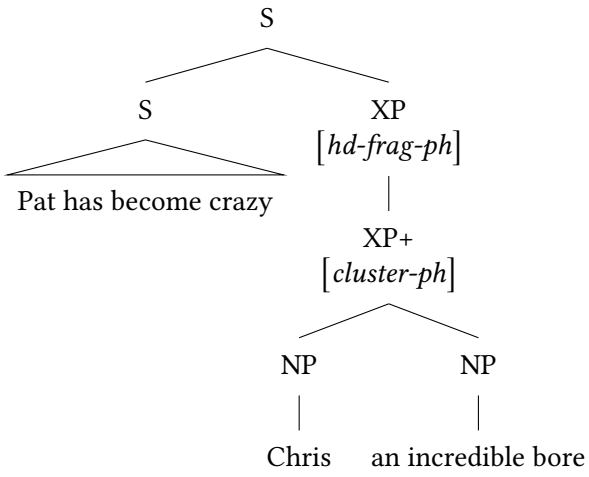

Figure 7: Simplified structure of a gapping construction

Syntactic parallelism between gapping remnants and their counterparts is achieved here by ensuring that each list member of the SAL-UTT structure-shares its HEAD value with the corresponding cluster element.[30] This analysis thus does not reconstruct a syntactic gapped clause and predicts that a gapped clause may appear in contexts where a full finite clause cannot, as illustrated in (58).

(58) Bill wanted to meet Jane as well as Jane (*wanted to invite) him. (Abeillé et al. 2014: 242)

With syntactic parallelism between the first and the gapped conjuncts captured this way, Abeillé et al. (2014) also allow gapping remnants to appear in a different order than their counterparts in the antecedent (59) (see Sag et al. 1985: 156–158):

(59) A policeman walked in at 11, and at 12, a fireman.

This ordering flexibility is licensed as long as some symmetric discourse relation holds between the two conjuncts. Abeillé et al. (2014) localize this symmetric discourse relation to the BACKGROUND contextual feature of the Gapping Construction, which is a sub-construction of coordination.

[30] The feature MAJOR makes each expression a major constituent functioning as a dependent of some verbal projection, blocking remnants from being deeply embedded in the gapped clause.

6.2 Right Node Raising

In typical examples of RNR, as shown below, the element to the immediate right of a parallel structure is shared with the left conjunct:

(60) a. Kim prepares and Lee eats [the pasta].
b. Kim played and Lee sang [some Rock and Roll songs at Jane's party].

The bracketed shared material can be either a constituent, as in (60a), or a non-constituent, as in (60b).

RNR has consistently attracted HPSG analyses involving silent material (a detailed discussion of these can be found in Abeillé & Chaves 2020, Chapter 16 of this volume). All existing analyses of RNR (Abeillé et al. 2016; Beavers & Sag 2004; Chaves 2014; Crysmann 2008; Shiraishi et al. 2019; Yatabe 2001; 2012) agree on this point, although some of them propose more than one mechanism for accounting for different kinds of non-constituent coordination (Chaves 2014; Yatabe 2001; 2012; Yatabe & Tam 2019). One strand of research within the RNR literatures adopts a linearization-based approach employed more generally in analyses of non-constituent coordination (NCC) (see Yatabe 2001; 2012, for a general introduction to order domains see Müller 2020a: Section 6, Chapter 10 of this volume) and another proposes a deletion-like operation (Abeillé et al. 2016; Chaves 2014; Shiraishi et al. 2019).

The kind of material that may be RNRaised and the range of structural mismatches permitted between the left and right conjuncts have been the subject of recent debate.[31] For instance, Chaves (2014: 839–840) demonstrates that, besides more typical examples like (60), there is a range of phenomena classifiable as RNR that exhibit various argument-structure mismatches as in (61a)–(61b), and that can target material below the word level as in (61c)–(61d).

(61) a. Sue gave me—but I don't think I will ever read—[a book about relativity].
b. Never let me—or insist that I—[pick the seats].
c. We ordered the hard- but they got us the soft-[cover edition].
d. Your theory under- and my theory over[generates].

Furthermore, RNR can target strings that are not subject to any known syntactic operations, such as rightward movement (Chaves 2014: 865).

[31] Although we refer to the material on the left and right as conjuncts, it is been known since Hudson (1976; 1989) that RNR extends to other syntactic environments than coordination (see Chaves 2014).

(62) a. I thought it was going to be a good but it ended up being a very bad [reception].
b. Tonight a group of men, tomorrow night he himself, [would go out there somewhere and wait].

RNRaised material can also be discontinuous, as in (63) (Chaves 2014: 868; Whitman 2009: 238–240).

(63) a. Please move from the exit rows if you are unwilling or unable [to perform the necessary actions] without injury.
b. The blast upended and nearly sliced [an armored Chevrolet Suburban] in half.

This evidence leads Chaves (2014) to propose that RNR is a nonuniform phenomenon, comprising extraposition, VP- or N′-ellipsis, and true RNR. Of the three, only true RNR should be accounted for via the mechanism of optional surface-based deletion that is sensitive to morph form identity and targets any linearized strings, whether constituents or otherwise.[32] Chaves' (2014: 874) constraint licensing true RNR is given in (64) as an informal version (where α means a morphophonological constituent, and $^+$ the Kleene star (operator)):

(64) Backward Periphery Deletion Construction:
Given a sequence of morphophonologic constituents $\alpha_1^+\ \alpha_2^+\ \alpha_3^+\ \alpha_4^+\ \alpha_5^*$, then the output $\alpha_1^+\ \alpha_3^+\ \alpha_4^+\ \alpha_5^*$ iff α_2^+ and α_4^+ are identical up to morph forms.

(64) takes the morphophonology of a phrase to be computed as the linear combination of the phonologies of the daughters, allowing deletion to apply locally.[33]

Another deletion-based analysis of RNR is due to Abeillé et al. (2016); Shiraishi et al. (2019), differing from Chaves (2014) in terms of identity conditions on deletion. Abeillé et al. (2016) argue for a finer-grained analysis of French RNR without morphophonological identity. Their empirical evidence reveals a split between functional and lexical categories in French such that the former permit mismatch between the two conjuncts (where determiners or prepositions differ)

[32] Whenever RNR can instead be analyzed as either VP or N′-ellipsis or extraposition, Chaves (2014) proposes separate mechanisms for deriving them couched upon the direct interpretation approach described in the previous sections for NSUs and predicate/argument ellipsis, and an analysis employing the feature EXTRA to record extraposed material along the lines of Kim & Sag (2005); Kay & Sag (2012).

[33] For further detail on linearization-based analyses of RNR, the interested reader is referred to Yatabe (2001; 2012) and to Müller 2020a: Section 6, Chapter 10 of this volume for details of linearization-based approaches in general.

under RNR, while the latter do not. Shiraishi et al. (2019) provide further corpus and experimental evidence that morphophonological identity is too strong a constraint on RNR, given the range of acceptable mismatches between the verbal forms of the material missing from the left conjunct and those of the material that is shared between both conjuncts.

6.3 Argument Cluster Coordination

ACC is a type of non-constituent coordination (NCC), as illustrated in (65):

(65) a. John gave [a book to Mary] and [a record to Jane].
b. John gave [Mary a book] and [Jane a record].

As for the treatment of ACC, the existing HPSG analyses have articulated two main views: ellipsis (Yatabe 2001; Crysmann 2008; Beavers & Sag 2004) and non-standard constituents (Mouret 2006). For discussion of the nonelliptical view, which takes ACC to be a special type of coordination, we refer the reader to Abeillé & Chaves 2020, Chapter 16 of this volume and references therein. Here we just focus on the ellipsis view, which better fits this chapter.

The ellipsis analysis set forth by Beavers & Sag (2004) gains its motivation from examples like (66):

(66) a. Jan travels to Rome tomorrow, [to Paris on Friday], and will fly to Tokyo on Sunday.
b. Jan wanted to study medicine when he was 11, [law when he was 13], and to study nothing at all when he was 18.

As pointed out by Beavers & Sag (2004), such examples challenge non-ellipsis analyses within the assumption that only constituents of like category can coordinate.[34] The status of the bracketed conjuncts in (66) is quite questionable, since they are not VPs like the other two fellow conjuncts. Beavers & Sag's (2004) proposal is to treat such examples as standard VP coordination with ellipsis of the verb in the second conjunct, as given in the following:

(67) Jan [[travels to Rome tomorrow], [[~~travels~~] to Paris on Friday], and [will fly to Tokyo on Sunday]]].

[34] As discussed in Abeillé & Chaves 2020: Section 6, Chapter 16 of this volume and references therein, there are numerous examples (e.g., *Fred became wealthy and a Republican*) where unlike categories are coordinated.

Beavers & Sag (2004) further adopt the DOM list machinery proposed as part of the linearization theory (see Crysmann 2003 for this proposal), and allow some elements in the daughters' DOM lists to be absent from the mother's DOM list (Yatabe 2001; Crysmann 2003).[35] This idea is encoded in the Coordination Construction, given in (68), which is a simplified version of the one in (Beavers & Sag 2004: 27):[36]

(68) Syntactic constraints on *cnj-cxt* (Beavers & Sag 2004: 27):

$$\textit{cnj-cxt} \Rightarrow \begin{bmatrix} \text{MTR} & \left[\text{DOM } \boxed{A} \oplus \boxed{B_1} \oplus \boxed{C} \oplus \boxed{B_2} \oplus \boxed{D}\right] \\ \text{DTRS} & \left\langle \left[\text{DOM } \boxed{A} \oplus \boxed{B_1}\left[\textit{ne-list}\right] \oplus \left(\boxed{D}\right)\right], \right. \\ & \left. \left[\text{DOM } \boxed{C}\left[\left(\textit{conj}\right)\right] \oplus \left(\boxed{A}\right) \oplus \boxed{B_2}\left[\textit{ne-list}\right] \oplus \boxed{D}\right] \right\rangle \end{bmatrix}$$

As specified in this construction, there are two conjuncts with the DOM value. The mother DOM value has the potentially empty material A from the left conjunct (the corresponding material in the right conjunct is elided), a unique element B_1 from the left conjunct, the coordinator C, a unique element B_2 from the right conjunct, and some material D from the right conjunct (the corresponding material in the left conjunct is elided). (68) licenses various types of coordination. For instance, when A is empty, it licenses examples like *Kim and Pat*, but when A is non-empty, it licenses examples like *John gave a book to Mary and a record to Jane*. When both A and D are non-empty, it allows examples like (67). The content of the DOM list consists of prosodic constituents (i.e., constituents with no information about their internal morphosyntax) and this offers a way of accounting for coordination of noncanonical constituents as a type of ellipsis.

7 Summary

This chapter has reviewed three types of ellipsis—nonsentential utterances, predicate ellipsis, and non-constituent coordination—which correspond to three kinds of analysis within HPSG. The pattern that emerges from this overview is that HPSG favors the "what you see is what get" approach to ellipsis, accouting for a wider variety of data, from corpora as well as from experiments, than other derivation-based approaches common in the minimalist literature.

[35] For detailed discussion of the feature DOM, see Müller 2020a: Section 6, Chapter 10 of this volume).

[36] For simplicity, we represent only the DOM value, suppressing all the other information and further add the parentheses for A and D. For the exact formulation, see Beavers & Sag (2004). Further, for more details on the role of the DOM list in HPSG accounts of constituent order, the reader is referred to Müller 2020a, Chapter 10 of this volume.

Abbreviations

ACC	Argument Cluster Coordination
BAE	Bare Argument Ellipsis
DGB	Dialogue Game Board
IND	Index
MAX-QUD	Maximal-Question-under-Discussion
NCA	Null Complement Anaphora
NCC	Non-constituent Coordination
NSU	Nonsentential utterance
PAE	Predicate Argument Ellipsis
RNR	Right-Node Raising
SAL-UTT	Salient Utterance
VPE	Verb Phrase Ellipsis

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References

Abeillé, Anne. 2020. Control and Raising. In Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.), *Head-Driven Phrase Structure Grammar: The handbook*, 467–511. Berlin: Language Science Press. DOI: ??.

Abeillé, Anne, Gabriela Bîlbîie & François Mouret. 2014. A Romance perspective on gapping constructions. In Hans Boas & Francisco Gonzálvez-García (eds.), *Romance perspectives on construction grammar* (Constructional Approaches to Language 15), 227–267. Amsterdam: John Benjamins Publishing Co. DOI: 10.1075/cal.15.07abe.

Abeillé, Anne & Robert D. Borsley. 2020. Basic properties and elements. In Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.), *Head-Driven Phrase Structure Grammar: The handbook*, 3–45. Berlin: Language Science Press. DOI: ??.

Abeillé, Anne & Rui Chaves. 2020. Coordination. In Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.), *Head-Driven Phrase Structure Grammar: The handbook*, 689–739. Berlin: Language Science Press. DOI: ??.

Abeillé, Anne, Berthold Crysmann & Aoi Shiraïshi. 2016. Syntactic mismatch in French peripheral ellipsis. In Christopher Piñón (ed.), *Empirical issues in syntax and semantics*, vol. 11, 1–30. Paris: CSSP.

Abeillé, Anne & Shrita Hassamal. 2019. Sluicing in Mauritian: A fragment analysis. In Christopher Piñón (ed.), *Empirical issues in syntax and semantics*, vol. 12, 1–30. Paris: CSSP.

Abels, Klaus. 2017. On the interaction of P-stranding and sluicing in Bulgarian. In Olav Mueller-Reichau & Marcel Guhl (eds.), *Aspects of Slavic linguistics: Formal grammar, lexicon and communication* (Language, Context and Cognition 16), 1–28. Berlin: De Gruyter Mouton. DOI: 10.1515/9783110517873-002.

Aelbrecht, Lobke & William Harwood. 2015. To be or not to be elided: VP ellipsis revisited. *Lingua* 153. 66–97. DOI: 10.1016/j.lingua.2014.10.006.

Almeida, Diogo & Masaya Yoshida. 2007. A problem for the preposition stranding generalization. *Linguistic Inquiry* 38(2). 349–362.

Alshaalan, Yara & Klaus Abels. 2020. Resumption as a sluicing source in saudi arabic: evidence from sluicing with prepositional phrases. *Glossa: a journal of general linguistics* 5. 8.1–36.

Arregui, Ana, Charles Jr. Clifton, Lyn Frazier & Keir Moulton. 2006. Processing elided verb phrases with flawed antecedents: The recycling hypothesis. *Journal of Memory and Language* 55(2). 232–246. DOI: 10.1016/j.jml.2006.02.005.

Barton, Ellen. 1998. The grammar of telegraphic structures: Sentential and non-sentential derivation. *Journal of English Linguistics* 26(1). 37–67. DOI: 10.1177/007542429802600103.

Beavers, John & Ivan A. Sag. 2004. Coordinate ellipsis and apparent non-constituent coordination. In Stefan Müller (ed.), *Proceedings of the 11th International Conference on Head-Driven Phrase Structure Grammar, Center for Computational Linguistics, Katholieke Universiteit Leuven*, 48–69. Stanford, CA: CSLI Publications. http://csli-publications.stanford.edu/HPSG/2004/ (18 August, 2020).

Beecher, Henry. 2008. Pragmatic inference in the interpretation of sluiced prepositional phrases. *San Diego Linguistics Papers* 3. 2–10.

Bouma, Gosse, Robert Malouf & Ivan A. Sag. 2001. Satisfying constraints on extraction and adjunction. *Natural Language & Linguistic Theory* 19(1). 1–65. DOI: 10.1023/A:1006473306778.

Bresnan, Joan (ed.). 1982. *The mental representation of grammatical relations* (MIT Press Series on Cognitive Theory and Mental Representation). Cambridge, MA: MIT Press.

Chaves, Rui. 2014. On the disunity of right-node raising phenomena: Extraposition, ellipsis, and deletion. *Language* 90(4). 834–886.

Chaves, Rui. 2020. Island phenomena and related matters. In Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.), *Head-Driven Phrase Structure Grammar: The handbook*, 633–687. Berlin: Language Science Press. DOI: ??.

Chaves, Rui P. 2009. A linearization-based approach to gapping. In James Rogers (ed.), *Proceedings of FG-MoL 2005: The 10th conference on Formal Grammar and The 9th Meeting on Mathematics of Language Edinburgh*, 205–218. Stanford, CA: CSLI Publications. http://cslipublications.stanford.edu/FG/2005/chaves.pdf (28 August, 2020).

Chung, Sandra, William A. Ladusaw & James McCloskey. 1995. Sluicing and logical form. *Natural Language Semantics* 3(3). 239–282. DOI: 10.1007/BF01248819.

Crysmann, Berthold. 2003. *On the treatment of word order in a computational grammar of German.* Talk presented at the HPSG-Workshop on Germanic at the University of Bremen 07.08.–08.08.2003.

Crysmann, Berthold. 2008. An asymmetric theory of peripheral sharing in HPSG: Conjunction reduction and coordination of unlikes. In Gerhard Jäger, Paola Monachesi, Gerald Penn & Shuly Wintner (eds.), *Proceedings of FGVienna: The 8th conference on Formal Grammar*, 47–62. Stanford, CA: CSLI Publications.

Culicover, Peter W. & Ray S. Jackendoff. 2005. *Simpler Syntax.* Oxford: Oxford University Press. DOI: 10.1093/acprof:oso/9780199271092.001.0001.

Fernández, Raquel & Jonathan Ginzburg. 2002. Non-sentential utterances: A corpus study. *Traîtement Automatique de Languages* 43(2). 13–42.

Fernández, Raquel, Jonathan Ginzburg & Shalom Lappin. 2007. Classifying ellipsis in dialogue: A machine learning approach. *Computational Linguistics* 33(3). 397–427. DOI: 10.3115/1220355.1220390.

Fernández Rovira, Raquel. 2006. *Non-sentential utterances in dialogue: Classification, resolution and use.* London: Department of Computer Science, King's College. (Doctoral dissertation).

Fortin, Catherine. 2007. *Indonesian sluicing and verb phrase ellipsis: Description and explanation in a Minimalist framework.* Ann Arbor, MI: University of Michigan. (Doctoral dissertation).

Ginzburg, Jonathan. 1994. An Update Semantics for dialogue. In Harry Bunt, Reinhard Muskens & Gerrit Rentier (eds.), *Proceedings of the 1st International Workshop on Computational Semantics*, 235–255. Tilburg: ITK, Tilburg University.

Ginzburg, Jonathan. 2012. *The interactive stance: Meaning for conversation.* Oxford: Oxford University Press.

Ginzburg, Jonathan. 2013. Rethinking deep and surface: Towards a comprehensive model of anaphoric processes in dialogue. In *Structure and evidence in linguistics*. Stanford.

Ginzburg, Jonathan & Robin Cooper. 2004. Clarification, ellipsis, and the nature of contextual updates in dialogue. *Linguistics and Philosophy* 27(3). 297–365. DOI: 10.1023/B:LING.0000023369.19306.90.

Ginzburg, Jonathan & Robin Cooper. 2014. Quotation via dialogical interaction. *Journal of Logic, Language and Information* 23(3). 287–311. DOI: 10.1007/s10849-014-9200-5.

Ginzburg, Jonathan & Raquel Fernández. 2010. Computational models of dialogue. In Alexander Clark, Chris Fox & Shalom Lappin (eds.), *The handbook of computational linguistics and natural language processing*, vol. 28 (Blackwell Handbooks in Linguistics), 429–481. Oxford: Wiley-Blackwell.

Ginzburg, Jonathan, Raquel Fernández & David Schlangen. 2014. Disfluencies as intra-utterance dialogue moves. *Semantics and Pragmatics* 7(9). 1–64. DOI: 10.3765/sp.7.9.

Ginzburg, Jonathan & Philip Miller. 2018. Ellipsis in Head-Driven Phrase Structure Grammar. In Jeroen van Creanen & Tanja Temmerman (eds.), *The oxford handbook of ellipsis* (Oxford Handbooks in Linguistics 15), 75–121. Oxford: Oxford University Press. DOI: 10.1093/oxfordhb/9780198712398.013.4.

Ginzburg, Jonathan & Ivan A. Sag. 2000. *Interrogative investigations: The form, meaning, and use of English interrogatives* (CSLI Lecture Notes 123). Stanford, CA: CSLI Publications.

Grant, Margaret, Charles Clifton & Lyn Frazier. 2012. The role of non-actuality implicatures in processing elided constituents. *Journal of Memory and Language* 66(1). 326–343. DOI: 10.1016/j.jml.2011.09.003.

Griffiths, James & Anikó Lipták. 2014. Contrast and island sensitivity in clausal ellipsis. *Syntax* 17(3). 189–234. DOI: 10.1111/synt.12018.

Hankamer, Jorge. 1971. *Constraints on deletion in syntax*. Yale University. (Doctoral dissertation).

Hankamer, Jorge & Ivan A. Sag. 1976. Deep and surface anaphora. *Linguistic Inquiry* 7(3). 391–428.

Hardt, Daniel. 1993. *Verb phrase ellipsis: form, meaning, and processing*. Distributed as IRCS Report 93 (23). Philadelphia, PA: University of Pennsylvania. (Doctoral dissertation).

Hardt, Daniel, Pranav Anand & James McCloskey. 2020. *Sluicing: Antecedence and the landscape of mismatch*. Paper presented at the workshop of Experimental and Corpus-based Approaches to Ellipsis 2020, Jul 15–16, 2020.

Hudson, Richard. 1976. Conjunction reduction, gapping, and right-node raising. *Language* 52(3). 535–562.
Hudson, Richard. 1989. Gapping and grammatical relations. *Journal of Linguistics* 25(1). 57–94. DOI: 10.1017/S002222670001210X.
Jacobson, Pauline. 2016. The short answer: Implications for direct compositionality (and vice versa). *Language* 92(2). 331–375. DOI: 10.1353/lan.2016.0038.
Kay, Paul & Ivan A. Sag. 2012. Cleaning up the big mess: Discontinuous dependencies and complex determiners. In Hans C. Boas & Ivan A. Sag (eds.), *Sign-Based Construction Grammar* (CSLI Lecture Notes 193), 229–256. Stanford, CA: CSLI Publications.
Kehler, Andrew. 2002. *Coherence, reference, and the theory of grammar*. Stanford, CA: CSLI Publications.
Kim, Christina S., Gregory M. Kobele, Jeffrey T. Runner & John T. Hale. 2011. The acceptability cline in VP ellipsis. *Syntax* 14(4). 318–354. DOI: 10.1111/j.1467-9612.2011.00160.x.
Kim, Christina S. & Jeffrey T. Runner. 2018. The division of labor in explanations of verb phrase ellipsis. *Linguistics and Philosophy* 41(1). 41–85. DOI: 10.1007/s10988-017-9220-0.
Kim, Jong-Bok. 2000. *The grammar of negation: A constraint-based grammar*. Stanford, CA: CSLI Publications.
Kim, Jong-Bok. 2006. Similarities and differences between English VP ellipsis and vp fronting: An HPSG analysis. *Studies in Generative Grammar* 13(3). 429–460.
Kim, Jong-Bok. 2015. Syntactic and semantic identity in Korean sluicing: A direct interpretation approach. *Lingua* 166(B). 260–293. DOI: 10.1016/j.lingua.2015.08.005.
Kim, Jong-Bok. 2016. *The syntactic structures of Korean: A Construction Grammar perspective*. Cambridge, UK: Cambridge University Press.
Kim, Jong-Bok & Anne Abeillé. 2019. Why-stripping in English. *Linguistic Research* 36. 365–387.
Kim, Jong-Bok & Laura A. Michalies. 2020. *Syntactic constructions in English*. Cambridge, UK: Cambridge University Press.
Kim, Jong-Bok & Joanna Nykiel. 2020. The syntax and semantics of elliptical constructions: A direct interpretation perspective. *Linguistic Research* 37(2). 327–358. DOI: 10.17250/khisli.37.2.202006.006.
Kim, Jong-Bok & Ivan A. Sag. 2002. Negation without head-movement. *Natural Language & Linguistic Theory* 20(2). 339–412. DOI: 10.1023/A:1015045225019.
Kim, Jong-Bok & Ivan A. Sag. 2005. English object extraposition: A constraint-based approach. In Stefan Müller (ed.), *Proceedings of the 12th International Con-*

ference on Head-Driven Phrase Structure Grammar, Department of Informatics, University of Lisbon. Stanford, CA: CSLI Publications. http://csli-publications.stanford.edu/HPSG/2005/ (18 August, 2020).

Kubota, Yusuke. 2020. HPSG and Categorial Grammar. In Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.), *Head-Driven Phrase Structure Grammar: The handbook*, 1277–1338. Berlin: Language Science Press. DOI: ??.

Larsson, Steffan. 2002. *Issue based dialogue management*. Göteborg: Department of linguistics, Göteborg University. (Doctoral dissertation).

Lee, Hanjung. 2016. Usage probability and subject–object asymmetries in Korean case ellipsis: Experiments with subject case ellipsis. *Journal of Linguistics* 52(1). 70–110. DOI: 10.1017/S0022226715000079.

Leung, Tommi. 2014. The preposition stranding generalization and conditions on sluicing: Evidence from Emirati Arabic. *Linguistic Inquiry* 45(2). 332–340. DOI: 10.1162/LING_a_00158.

Lobeck, Anne. 1995. *Ellipsis: Functional heads, licensing, and identification*. Oxford: Oxford University Press.

López, Luis. 2000. Ellipsis and discourse-linking. *Lingua* 110(3). 183–213. DOI: 10.1016/S0024-3841(99)00036-4.

Merchant, Jason. 2001. *The syntax of silence: Sluicing, islands, and the theory of ellipsis*. Oxford: Oxford University Press.

Merchant, Jason. 2005a. Fragments and ellipsis. *Linguistics and Philosophy* 27(6). 661–738. DOI: 10.1007/s10988-005-7378-3.

Merchant, Jason. 2005b. Revisiting syntactic identity conditions. In *Workshop on identity in ellipsis*. University of California, Berkeley.

Merchant, Jason. 2010. Three kinds of ellipsis. In Francois Recanati, Isidora Stojanovic & Neftali Villanueva (eds.), *Context-dependence, perspective, and relativity*, 141–192. Berlin: Walter de Gruyter.

Merchant, Jason. 2013. Voice and ellipsis. *Linguistic Inquiry* 44(1). 77–108. DOI: 10.1162/LING_a_00120.

Miller, Philip. 2011. The choice between verbal anaphors in discourse. In Iris Hendrickx, Sobha Lalitha Devi, António Branco & Ruslan Mitkov (eds.), *Anaphora processing and applications. 8th Discourse Anaphora and Anaphor Resolution Colloquium, DAARC 2011* (Lecture Notes in Computer Science 7099), 82–95. Berlin, Heidelberg: Springer. DOI: 10.1007/978-3-642-25917-3_8.

Miller, Philip. 2013. Usage preferences: The case of the English verbal anaphor *do so*. In Stefan Müller (ed.), *Proceedings of the 20th International Conference on Head-Driven Phrase Structure Grammar, Freie Universität Berlin*, 121–139. Stan-

ford, CA: CSLI Publications. http://cslipublications.stanford.edu/HPSG/2013/miller.pdf (17 August, 2018).

Miller, Philip. 2014. A corpus study of pseudogapping and its theoretical consequences. In Christopher Piñón (ed.), *Empirical issues in syntax and semantics*, vol. 10, 73–90. Paris: CNRS. http://www.cssp.cnrs.fr/eiss10/eiss10_miller.pdf (28 August, 2020).

Miller, Philip & Geoffrey K. Pullum. 2014. Exophoric VP ellipsis. In Philip Hofmeister & Elisabeth Norcliffe (eds.), *The core and the periphery: Data-driven perspectives on syntax inspired by Ivan A. Sag* (CSLI Lecture Notes 210), 5–32. Stanford, CA: CSLI Publications.

Miller, Philip H. 1992. *Clitics and constituents in Phrase Structure Grammar*. Published version of 1991 Ph. D. thesis, University of Utrecht, Utrecht. New York: Garland Publishing.

Miller, Philip Harold & Barbara Hemforth. 2014. Verb phrase ellipsis with nominal antecedents. Submitted.

Molimpakis, Emilia. 2018. P-stranding under sluicing: Acceptability and processing. In *Workshop relating elliptical utterances to information in context. DGfS 2018 – AG12*. Stuttgart.

Morgan, Jerry. 1989. Sentence fragments revisited. In Bradley Music, Randolph Graczyk & Caroline Wiltshire (eds.), *Cls 25: Papers from the 25th Annual Regional Meeting of the Chicago Linguistic Society*, 228–241. Chicago, IL: Chicago Linguistic Society.

Mouret, François. 2006. A phrase structure approach to argument cluster coordination. In Stefan Müller (ed.), *Proceedings of the 13th International Conference on Head-Driven Phrase Structure Grammar*, 247–267. Stanford, CA: CSLI Publications. http://csli-publications.stanford.edu/HPSG/2006/ (18 August, 2020).

Müller, Stefan. 2002. *Complex predicates: Verbal complexes, resultative constructions, and particle verbs in German* (Studies in Constraint-Based Lexicalism 13). Stanford, CA: CSLI Publications.

Müller, Stefan. 2020a. Constituent order. In Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.), *Head-Driven Phrase Structure Grammar: The handbook*, 353–397. Berlin: Language Science Press. DOI: ??.

Müller, Stefan. 2020b. HPSG and Construction Grammar. In Stefan Müller, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.), *Head-Driven Phrase Structure Grammar: The handbook*, 1437–1490. Berlin: Language Science Press. DOI: ??.

Nykiel, Joanna. 2013. Clefts and preposition omission under sluicing. *Lingua* 123. 74–117. DOI: 10.1016/j.lingua.2012.10.011.

Nykiel, Joanna. 2015. Constraints on ellipsis alternation: a view from the history of english. *Language Variation and Change* 27. 227–254. DOI: 10.1017/S0954394515000071.

Nykiel, Joanna. 2017. Preposition stranding and ellipsis alternation. *English Language and Linguistics* 21. 27–45. DOI: 10.1017/S1360674315000477.

Nykiel, Joanna & John A. Hawkins. 2020. English fragments, minimize domains and minimize forms. *Language and Cognition*. 1–33. DOI: 10.1017/langcog.2020.6.

Park, Sang-Hee, Jean-Pierre Koenig & Rui Chaves. 2019. A semantic underspecification-based analysis of scope ambiguities in gapping. In M. Teresa Espinal, Elena Castroviejo, Manuel Leonetti, Louise McNally & Cristina Real-Puigdollers (eds.), *Proceedings of Sinn und Bedeutung 23*, 237–251. Barcelona: Universitat Autònoma de Barcelona.

Philippova, Tatiana. 2014. P-omission under sluicing, [P clitic] and the nature of P-stranding. In Martin Kohlberger, Kate Bellamy & Eleanor Dutton (eds.), *Proceedings of ConSOLE XXII*, 133–155. Universiteit Leiden.

Purver, Matthew. 2006. Clarie: Handling clarification requests in a dialogue system. *Research on Language and Computation* 4(2). 259–288. DOI: 10.1007/s11168-006-9006-y.

Rodrigues, Cillene, Andrew Nevins & Luis Vicente. 2009. Cleaving the interactions between sluicing and preposition stranding. In D. Torck & L. Wetzels (eds.), *Romance languages and linguistic theory 2006*, 175–198. Amsterdam: John Benjamins Publishing Co.

Ross, John Robert. 1967. *Constraints on variables in syntax*. Reproduced by the Indiana University Linguistics Club and later published as Ross (1986). Cambridge, MA: MIT. (Doctoral dissertation). http://files.eric.ed.gov/fulltext/ED016965.pdf (18 August, 2020).

Ross, John Robert. 1986. *Infinite syntax!* (Language and Being 5). Norwood, NJ: Ablex Publishing Corporation.

Sag, Ivan A. 1976. *Deletion and logical form* (Outstanding Dissertations in Linguistics). New York: Garland.

Sag, Ivan A. 2012. Sign-Based Construction Grammar: An informal synopsis. In Hans C. Boas & Ivan A. Sag (eds.), *Sign-Based Construction Grammar* (CSLI Lecture Notes 193), 69–202. Stanford, CA: CSLI Publications.

Sag, Ivan A., Rui Chaves, Anne Abeillé, Bruno Estigarribia, Frank Van Eynde, Dan Flickinger, Paul Kay, Laura A. Michaelis-Cummings, Stefan Müller, Geoffrey K. Pullum & Tom Wasow. 2020. Lessons from the English auxiliary system. *Journal of Linguistics* 56(1). 87–155. DOI: 10.1017/S002222671800052X.

Sag, Ivan A., Gerald Gazdar, Thomas Wasow & Steven Weisler. 1985. Coordination and how to distinguish categories. *Natural Language & Linguistic Theory* 3(2). 117–171. DOI: 10.1007/BF00133839.

Sag, Ivan A. & Joann Nykiel. 2011. Remarks on sluicing. In Stefan Müller (ed.), *Proceedings of the 18th International Conference on Head-Driven Phrase Structure Grammar, University of Washington*, 188–298. Stanford, CA: CSLI Publications. http://csli-publications.stanford.edu/HPSG/2011/sag-nykiel.pdf (15 September, 2020).

Sag, Ivan A., Thomas Wasow & Emily M. Bender. 2003. *Syntactic theory: A formal introduction*. 2nd edn. (CSLI Lecture Notes 152). Stanford, CA: CSLI Publications.

Schachter, Paul. 1977. Does she or doesn't she? *Linguistic Inquiry* 8(4). 763–767. DOI: 10.2307/4178025.

Schmeh, Katharina, Peter W. Culicover, Jutta Hartmann & Susanne Winkler. 2015. Discourse function ambiguity of fragments: A linguistic puzzle. In Susanne Winkler (ed.), *Ambiguity: Language and communication*, 199–216. Berlin: de Gruyter. DOI: 10.1515/9783110403589-010.

Shiraishi, Aoi, Anne Abeillé, Barbara Hemforth & Philip Miller. 2019. Verbal mismatch in right-node raising. *Glossa* 4. 114.1–26. DOI: 10.5334/gjgl.843.

Stjepanović, Sandra. 2008. P-stranding under sluicing in a Non-P-stranding language? *Linguistic Inquiry* 39(1). 179–190. DOI: 10.1162/ling.2008.39.1.179.

Stjepanović, Sandra. 2012. Two cases of violation repair under sluicing. In Jason Merchant & Andrew Simpson (eds.), *Sluicing: Cross-linguistic perspectives* (Oxford Studies in Theoretical Linguistics), 68–82. Oxford: Oxford University Press.

Szczegielniak, Adam. 2008. Islands in sluicing in Polish. In Natasha Abner & Jason Bishop (eds.), *Proceedings of the 27th West Coast Conference on Formal Linguistics*, 404–412. UCLA, Los Angeles, CA: Cascadilla Proceedings Project.

Vicente, Luis. 2015. Morphological case mismatches under sluicing. *Snippets* 29. 16–17. DOI: 10.7358/snip-2015-029-vice.

Webber, Bonnie. 1979. *A formal approach to discourse anaphora* (Outstanding Dissertations in Linguistics). New York: Garland. DOI: 10.4324/9781315403342.

Whitman, Neal. 2009. Right-node wrapping: Multimodal Categorial Grammar and the 'friends in low places' coordination. In Erhard Hinrichs & John Nerbonne (eds.), *Theory and evidence in semantics*, 235–256. Stanford, CA: CSLI Publications.

Yatabe, Shûichi. 2001. The syntax and semantics of Left-Node Raising in Japanese. In Dan Flickinger & Andreas Kathol (eds.), *The proceedings of the 7th*

International Conference on Head-Driven Phrase Structure Grammar: University of California, Berkeley, 22–23 July, 2000, 325–344. CSLI Publications. http://csli-publications.stanford.edu/HPSG/2001/ (18 August, 2020).

Yatabe, Shûichi. 2012. Comparison of the ellipsis-based theory of non-constituent coordination with its alternatives. In Stefan Müller (ed.), *Proceedings of the 19th International Conference on Head-Driven Phrase Structure Grammar, Chungnam National University Daejeon*, 453–473. Stanford, CA: CSLI Publications. http://csli-publications.stanford.edu/HPSG/2012/yatabe.pdf (18 August, 2020).

Yatabe, Shûichi & Wai Lok Tam. 2019. In defense of an HPSG-based theory of non-constituent coordination: A reply to Kubota and Levine. *Linguistics and Philosophy*. 1–77. DOI: 10.1007/s10988-019-09283-6.