

**Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar**

Centro de Linguística da Universidade de Lisboa, Lisbon,
Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

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Editor's note

The 32nd International Conference on Head-Driven Phrase Structure Grammar (2 September–3 September 2025) took place as a hybrid conference at the Center of Linguistics of the University Lisbon, Portugal and was organized by Jakob Maché.

The conference featured two invited talks and 14 papers selected by the program committee (Anne Abeillé, Sascha Bargmann, Emily M. Bender, Felix Bildhauer, Olivier Bonami, Francis Bond, Rui Chaves, Berthold Crysmann, Anthony Davis, Jonathan Ginzburg, Fabiola Henri, Anke Holler, Jong-Bok Kim, Jean-Pierre Koenig, Andy Lücking, Jakob Maché, Antonio Machicao y Priemer, Nurit Melnik, Luis Morgado da Costa, Stefan Müller, Tsuneko Nakazawa, Joanna Nykiel, Petya Osenova, Rainer Osswald, Gerald Penn, Frank Richter Manfred Sailer Sanghoun Song Frank Van Eynde, Elodie Winckel Shûichi Yatabe (chair), Eun-Jung Yoo, Olga Zamaraeva). There was a workshop on Minor Sentence Types – their form at its impact on grammar with one invited speaker and ten regular papers. This workshop had a separate program committee (Oleg Belyaev, Diti Bhadra, Cleo Condoravdi, Peter Culicover, Marcel den Dikken, Masha Esipova, Rita Finkbeiner, Jan Fließbach, Hans-Martin Gärtner, Bart Geurts, Jonathan Ginzburg, Eleni Gregoromichelaki, Bozhil Hriztov, Beste Kamali, Jongbok Kim, Espen Klævik-Pettersen, Manfred Krifka, Lukasz Jedrzejowski, Jess H.K. Law, Andy Lücking, Victor Manfredi, Alda Mari, Rui Marques, André Meinunger, Joanna Nykiel, Edgar Onea-Gaspar, Oliver Schallert, Heiko Seeliger, Vesela Simeonova, Tue Trinh, Andreas Trotzke, Giuseppe Varaschin, Nigel Vincent, Kilu von Prince, Martina Wiltschko).

We want to thank the program committees for putting this nice program together.

Thanks go to Jakob Maché, who was in charge of local arrangements.

As of 2024, the procedure to publish the proceedings has been changed. A conference submission consists of a five page abstract, which is reviewed by at least two reviewers. After the conference a full version of the paper is submitted to the program committee chair for a further round of reviewing. Papers that are accepted are then published in the proceedings.

To ensure easy access and fast publication we have chosen an electronic format. The proceedings are published by the University Library of Goethe-Universität, Frankfurt am Main.

The proceedings include all the papers of the conference and the workshop except the ones by Felix Bildhauer, Hyeonjoon Park, and Frank Van Eynde and by Nádia Alexandra Santos Canceiro, Itamar Francez. Some of these papers are or will be published in journals (Park 2025, Canceiro & Matos 2025).

References

- Canceiro, Nádia & Gabriela Matos. 2025. Are root *que*-sentences in Portuguese as insubordinate as in Spanish? *Isogloss, Open Journal of Romance Linguistics*. To appear.
- Park, Hyeonjoon. 2025. A constraint-based analysis of English NPN constructions. *Korean Journal of Cognitive Science* 50(3). 799–834. DOI: 10.18855/lisoko.2025.50.3.003.

Part I

Contributions to the Main Conference

Mixed clitics in Udi: The lexical verb as interface

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Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 5–25



Keywords: HPSG, morphosyntax, clitics, phrasal affixes

Crysmann, Berthold & Ana Luís. 2025. Mixed clitics in Udi: The lexical verb as interface. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 5–25. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.1.  CC-BY 4.0

Abstract

In this paper, we investigate the hybrid properties of subject agreement markers in the Udi language, which exhibit properties of both affixes and clitics. Through detailed analysis of their syntactic and morphological behaviour, including phenomena such as infixation, suffixation and edge inflection, we show that the realisation of these markers is not only sensitive to information structure (focus), as argued by Harris (1996, 2002), but also to the internal morphological structure of the verb. Building on previous work on Sorani Kurdish (Salehi & Koenig 2023), our HPSG analysis treats this hybrid status as an instance of delegated inflection, thereby enabling a modular account of the alternation between lexical and phrasal affixation.

1 Introduction

Clitics constitute a classical problem at the morphology-syntax interface, sharing properties with morphologically bound affixes, while enjoying some degree of syntactic mobility. Subject agreement markers¹ in Udi (Harris 2002) present a particularly challenging case of *mixed clitics* (Luís 2009, Spencer & Luis 2012): when realised as part of the verb, they provide strong evidence in favour of lexical affixes, including infixation (1). However, when realised externally, their attachment properties show the typical behaviour of post-lexical clitics (2), attaching to the edge of a focused constituent.²

- (1) äyel-en a-**t'u**-k'-e k'uč'an-ax
 child-ERG see₁-3SG.INV-see₂-AORII puppy-DAT
 'The child saw the puppy.' (Harris 2002: 28)
- (2) met'in-al burim sa yärvägä q'əzəl-**le** aq'sa
 this.ERG-AND apparently one bag.ABS gold.ABS-3SG take
 'She also apparently takes a BAG OF GOLD.' (Harris 2002: 44)

On closer inspection, complementary distribution between (1) and (2) is controlled by the verb: verb-internal placement constitutes the default (broad focus or

[†]We would like to thank the audience at HPSG 2025, in particular Bruno Estigarribia, Jakob Maché and Manfred Sailer, for comments and discussion, as well as the anonymous reviewers for the conference and the proceedings. The research reported here has partially benefited from a public grant overseen by the French National Research Agency (ANR), as part of the program "Investissements d'Avenir" (reference: ANR-10-LABX-0083), and from CELGA-ILTEC through public funding by the Fundação para a Ciência e a Tecnologia. It contributes to the IdEx Université Paris Cité (reference: ANR-18-IDEX-0001).

¹These markers are also referred to as "Personalzeichen" (Schulze 1982) or person markers (PM; Harris 2002). See Table 1 for full paradigms. For ease of reference, we use bold face for these markers.

²With respect to the characterisation of phrasal hosts, we essentially follow the empirical generalisation by Harris (1996, 2002), who suggests that focus is the notion that best characterises the phrasal hosts, including focused constituents, wh-phrases and negation. Harris (2002: Section 6.8) also provides a detailed discussion that attachment cannot be simply understood in prosodic terms, neither with phrasal nor with lexical hosts.

predicate focus); likewise, suffixal attachment to the verb is triggered by specific TAM properties (e.g. FutureII), preempting focus-driven placement. Furthermore, the verb class decides on the set of allomorphs: the inverse set (1) or the general set (2). This allomorphy applies to internal and external realisations alike.

Currently, no formal account addresses both sides of the coin: while the *endocclisis* approach of Harris (2002) essentially plays down the morphological side of the problem, the *mixed clitic* approach (Luís 2009, Spencer & Luis 2012) does not make explicit the interplay between morphology and syntax. Here, we provide this missing link, suggesting that the lexical verb assumes a pivotal role between internal and external realisation.

Analysing Sorani Kurdish mixed clitics, Salehi & Koenig (2023) combine a morphological approach to verb-internal realisation with edge inflection (Miller 1992, Halpern 1995) verb-externally. They argue that the verb may delegate, via a selectional requirement, realisation of part of its morphosyntactic properties to a prominent dependent, which is the least oblique NP complement in their case. Building on this, we shall analyse the Udi focus position left-adjacent to the verb as such a prominent dependent. To capture this positional restriction in HPSG, we assume that Udi focused dependents are initial elements of the complements list. For arguments, this means placement at the front of the list, whereas for modifiers, we adopt type shifting of an adjunct to first complement (Bouma et al. 2001). Thus, we can lexically control for the syntactic distribution of Udi subject agreement markers, account for their morphological properties and capture the complementary distribution between focus marking and verb-internal morphological realisation.

2 Data

Udi is a Northeast Caucasian (Lezgian) language. It is head-final, with a basic SOV order in main clauses, and allows null subjects. Word order is generally stable, though it may vary under the influence of focus. Udi displays ergative-absolutive alignment: the absolutive case marks the subject of intransitive verbs and the object of transitive verbs, while the ergative case marks the subject of transitive verbs. Grammatical relations are primarily encoded through a rich system of suffixal case marking; the language distinguishes ergative, absolutive, genitive, dative, and a large set of local and spatial cases, including locative, allative, and ablative (Schulze 1982, Harris 2002).

This section examines the syntactic and morphological properties of Udi clitics, critically reassessing the proposal that they should be analysed as endoclitics (Harris 2002), and focusing on their implications for the syntax-morphology interface.

2.1 Syntactic distribution

2.1.1 “Promiscuous” attachment

One of the defining features of Udi clitics is their ability to attach to morphological and syntactic hosts. They may be found suffixed to the verb (3a), but they may also

attach to the main predicate of a clause, even when the predicate is not a verb (3b) or they may attach to focused constituents (3c,d).

- (3) a. xorag box-al-**zu**
 food.ABS boil-FUT-1SG
 ‘I will cook some food.’
 b. beš mässäb š:el-**le**
 our religion.ABS good-3SG
 ‘Our religion is good.’
 c. äyel-en p’a eş-**ne** aq’-e
 child-ERG two apple.ABS-3SG take-AORII
 ‘The child took **two apples**.’
 d. irähät-en mya-**ne** bist’a cil-l-ux
 peasant-ERG here-3SG sow.PRES seed-OBL-DAT
 ‘The peasant sows seeds **here**.’ Harris (2002: 95)

2.1.2 Focused constituent

As proposed by Harris (1996, 2002), Udi clitics attach to the element in focus, which can be preverbal negation (4), wh-phrases (5) or narrow focus structures (6). The focused constituent is systematically found left-adjacent to the verb (Harris 1996, 2002). This distribution suggests a strong correlation between syntactic prominence and clitic placement.

- (4) zu k’inigax te-**z** bese
 I book.DAT not-1SG requested
 ‘I didn’t ask for a book.’ (Harris 1996: 212)
 (5) a. me išq’armux mano äizi-**q’un** karxesa?
 this man.PL.ABS which village.DAT-3PL.D live
 ‘Which village do these men live in?’ (Harris 1996: 210)
 b. xinärmux ma-**q’un** taisa?
 girl.PL.ABS where-3PL.D go
 ‘Where are these girls going?’ (Harris 1996: 210)
 (6) me xinären tägsa k’inigiyo-laxo-**ne** fikirbesa
 this girl.ERG only book.PL.DAT-about-3SG thinks
 ‘Does this girl only think about books?’ (Harris 1996: 208)

2.2 Lexical properties

Udi subject agreement markers also show properties typically associated with affixes, further blurring the line between morphology and syntax.

2.2.1 Infixation

With complex verb stems, Udi subject agreement markers appear as infixes between the lexical root and the light verb, glossed as DO, CAUS, LV, in (7) below. This placement is evidently highly sensitive to the morphological structure of the verb.

- (7) a. zavod-a aš-**ne**-b-sa
 factory-DAT work-3SG-DO-PRES
 ‘She works in a factory.’
- b. me pasčay-en eč-es-**ne**-st’a ... kul
 this king-ERG bring-INF-3SG-CAUS.PRES earth.ABS
 cip-es-*ne*-st’a pak-i
 spread-INF-3SG-CAUS.PRES garden-DAT
 ‘This king has earth brought ...; he has it spread in the garden.’
- c. zer-ev-**ne**-k’-sa
 decorate-CAUS-3SG-LV-PRES
 ‘She arranges [the house].’ (Harris 2002: 122)

With simple verbs, the subject agreement marker is typically infixed before the final consonant of the root, cf. (8). The root is regularly followed by affixes, which means that even here placement needs access to morphological structure.

- (8) pasčay-un yar-en gölö be-**ne**-y-sa met’a-laxo
 king-UN boy-ERG much look₁-3SG-look₂-PRES this.GEN-on
 ‘The prince looks at this for a long time.’ (Harris 2002: 125)

A class of verbs displays an interesting alternation between infixation into the root or suffixation to it. As shown below, we find infixation with the transitive variant (9a/10a), yet suffixation with the inchoative variant (9b/10b).

- (9) a. a-**t’u**-k’-sa
 see₁-3SG.INV-see₂-PRES
 ‘(s)he sees [it]’
- b. ak’-**ne**-sa
 see-3SG-PRES
 ‘[it] is visible’ (Harris 2000: 127)
- (10) a. bo-**ne**-x-sa
 boil₁-3SG.INV-boil₂-PRES
 ‘(s)he boils [it]’
- b. box-**ne**-sa
 box-3SG-PRES
 ‘[it] boils’ (Harris 2000: 127)

		General	Question	Inversion	Possession
SG	1	-zu,-z		-za	-bez,-bes
	2	-nu,-n,-ru,-lu		-va	-vi
	3	-ne, -re, -le	-a	-t'u	-t'a
PL	1	-yan		-ya	-beš
	2	-nan,-ran, -lan		-va, -van	-eř
	3	-q'un		-q'o	-q'o

Table 1: Udi subject agreement markers (Harris 2002: 28)

2.2.2 Trapping

In certain tenses (e.g., Future II, Subjunctive I and II, and Imperative)³, subject agreement markers must be realised as right-most suffixes on the verb, preempting both infixation(11) and attachment to a focused phrase (12):

- (11) ič turinlek'er-ax nut' tämiz-b-al-**le**
self's shoe-DAT NEG clean-DO-FUTII-3SG
'She won't clean her shoes.' (Harris 2002: 96)
- (12) gel-enk' ek'a yaq'a-b-al-**lu**
Gela-for what.ABSL road-DO-FUTII-2SG
'What will you send to Gela.' (Harris 2002: 118)

2.2.3 Allomorphy

The subject agreement markers exhibit systematic allomorphic variation, distinguishing between four sets of markers (cf. Table 1), including the question set in (13), the possession set in (14), and the inversion set in (15).

Question marking only affects a single form in the paradigm (3SG), and is arguably conditioned syntactically by sentence mood.

- (13) a. okt'omber-a evaxt'-**a** tay-sa?
Okt'omber-DAT when-3.SG go-PRES
'When does she go to Okt'omber?'
b. okt'omber-a evaxt'-**q'un** tay-sa?
Okt'omber-DAT when-3.PL go-PRES
'When do they go to Okt'omber?' (Harris 2002: 30)

³We follow the nomenclature of TAM used by Harris (2002) who in turn builds on the analysis in Schulze (1982), without, however, adopting his nomenclature. Note that Subjunctive I/II are distinct from the Subjunctive. The Subjunctive I/II both build on the future stem, with the Subjunctive I corresponding to the Optative in Schulze (1982). The (Particle) Subjunctive, by contrast, uses the marker -q'a (see Section 2.3.1) and builds on the preterite (=aorist) stem. It corresponds to the adhortative mood in Schulze (1982).

Choice of the possessive set, by contrast, is found in two environments, namely the possessive predicative construction (14a) and with specific verbs, such as *köfil* ‘like’, that select for the possessive marker. At least the latter case must be considered lexical in nature. I.e., even when attached to a non-verbal host, as in (14b), choice of the possessive variant of the marker depends on the verb.

- (14) a. vi günäh gölö-**vi**
 you.SG.GEN sin.ABS many-POSS2SG
 ‘You have many sins.’
 b. udin maḡ-**bes** köfil-esa
 Udi song-POSS1SG like-PRES
 ‘I like Udi songs.’ (Harris 2002: 29)

The third allomorphic alternation concerns the inverse set. According to Harris (1984), this set is found with a class of verbs that is characterised by its particular case assignment properties, i.e. alternate dative case subjects. However, as shown by the contrasts in (15), choice of the inverse set depends entirely on the verb’s class membership, i.e. case marking potential, not the actual subject case being assigned: i.e., irrespective of whether the subject is in the dative, as the subject pronoun *za* in (15a), or in the ergative, as the subject pronoun *zu* in (15b), the subject agreement marker on the verb is taken from the inverse set, surfacing as *-za* on the verb. Thus, this allomorphy must count as a lexical property as well, depending ultimately on the membership of the verb in a lexically defined class exhibiting exceptional case assignment potential.

- (15) a. za a-**za**-k’-sa šel läzätt’u pak.
 me.DAT see₁-1SG.INV-see₂-PRES good pretty garden.ABS
 ‘I see a good, pretty garden.’
 b. zu a-**za**-k’-sa šel läzätt’u pak.
 I.ERG see₁-1SG.INV-see₂-PRES good pretty garden.ABS
 ‘I see a good, pretty garden.’ (Harris 1984: 247)

Crucially, this allomorphy is observed whether the markers are attached to verbs, predicates or focused constituents, showing that the selection of allomorphic forms is driven by a combination of syntactic and morphological constraints.

2.3 Interaction with other clitics

2.3.1 Subjunctive *-q’a*

The TAM marker *-q’a* (the adhortative in Schulze 1982) combines with the aorist I suffix to express the subjunctive.⁴ Although it encodes verbal properties, Harris

⁴In the examples, intervening markers are set in italics, to distinguish them from the person markers, which are set in bold face throughout.

(2002) argues that *-q'a* is a postlexically attached clitic, mainly because of its promiscuous attachment to a variety of hosts: not only verbs, but also nouns, adverbs, adjectives and pronouns, as shown in (16). Since the subject agreement marker appears always immediately to the right of *-q'a*, Harris (2002) takes this distributional fact to support the clitic status of the subject agreement marker as well.

- (16) a. c'oro-b-en buɣ-buɣ če-r-i-*q'a-n*
 drain-DO-HORT vapor.ABS out-R-AOR-I-SUBJV-3SG
 'Let us drain it, that the vapor may go out.'
- b. murada-*q'a-q'un* ba-p-i
 goal-SUBJV-3PL fill-LV-AOR-I
 'May they attain their goal.'
- c. or-*q'a-n* bak-i?
 because-SUBJV-3SG become-AOR-I
 'How could that happen?'
- d. šono šelgär žal-*q'a-n-p-i* č'oč'o-*q'a-n* bak-i
 it.ABS well hot-SUBJV-3SG-SAY-AOR-I red-SUBJV-3SG become-AOR-I
 'It should be well heated, [it] should become red [i.e. brown].'
- e. šuxo-*q'a-va* q'i-b-i
 who.ABL-SUBJV-INV2SG fear-DO-AOR-I
 'Who should you be afraid of?' (Harris 2002: 103–104)

A closer look, however, shows that the behaviour of *-q'a* does not provide independent support for Criterion F. The crucial point is that the environments in which the subject agreement marker appears are exactly the environments in which *-q'a* appears (modulo the trapping cases, which are conditioned on a different TAM category). When the two markers co-occur, their distribution is fully parallel: if *-q'a* attaches to the verb (whether infixes or suffixes), the subject agreement marker also appears on the verb; if *-q'a* is hosted by a focused constituent, as in (16b) or (16e), the subject agreement marker likewise surfaces on that constituent.

The only safe conclusion regarding Criterion F that one can draw from the placement of *-q'a* between the PM and the host is that both markers probably enjoy the same status: if *-q'a* is a clitic, then the PM must be a clitic too. Conversely, if the PM is an affix, then *-q'a* must be an affix too. Given that the distribution of *-q'a* and the PM is so similar, we cannot tell from Criterion F alone what their status is. However, both the subject agreement marker and the adhortative marker *-q'a* express properties of the verb's paradigm, namely agreement and mood, respectively. The most natural conclusion therefore is that the subject agreement marker and *-q'a* have the same hybrid profile: they may be morphologically integrated into the verbal host, but they can also be attached to the edge of a phrasal host.

2.3.2 Discourse marker *-al*

The discourse marker *-al* ‘and/too’ attaches to an exceptionally wide range of hosts, combining with verbs, nouns, adverbs, adjectives, pronouns and even postpositions. While the exact function is sometimes difficult to pin down (Schulze 1982: 261), two main uses appear common, as indicated by the translation: use as a marker of sentential coordination (=‘and’; cf. (17a,b,d)) and the discourse marker (=‘too/also’; cf. (17c)).

Sentential coordinating in Udi is asyndetic (Schulze 1982). The marker *-al*, however, can be used to optionally mark such coordinations, as in (17a,b,d). When used in this function, the marker appears in second position, i.e. as a suffix/infix on the first constituent of the clause.

In (17c), by contrast, *-al* is a discourse marker on the subject, roughly equivalent with English ‘too’. In this function, it seems that *-al* attaches to the right edge of the phrase it modifies.

Regardless of these minor differences, the properties this marker expresses and the distribution of the marker suggest status of a phrasal affix.

- (17) a. pirog-ax čī-ne-č-er-i la-*al*-**le**-x-i
 pie-DAT out-3SG-CARRY-R-AOR_I put₁-AND-3SG-put₂-AOR
 ‘She took the pie out and put [it under her arm].’
 b. ... paščay-un yar-en-*al* zap-i lay-**ne**-sča
 ... king-GEN boy-ERG-AND pull-PTCPL up-3SG-CARRY.PRES
 ‘... and the king’s son, pulling, brings [them] up.’
 c. ek’a-te giorgi-n-en a-**t’u**-k’e muzeum-a,
 what-REL Giorgi-OBL-ERG see₁-INV3SG-see₂-AOR_{II} museum-DAT
 zu-*al* beš a-**za**-k’e
 I.ERG-AND before see₁-INV1SG-see₂-AOR_{II}
 ‘What Giorgi saw in the museum, I too had seen earlier.’
 d. šuk’ala-*al* te-t’u bak-o p-es te ...
 no one-AND NEG-INV3SG can-FUT say-INF that ...
 ‘No one can say that ...’ (Harris 2002: 102–103)

When *-al* and a subject agreement marker co-occur on the same host, the *-al* always intervenes between the host and the subject agreement marker, both when the host is a verb, as in (17), and when the subject agreement marker appears away from the verb, as in (18).

- (18) abaz-in-*al*-**le** aš-b-esa
 [coin]-INST-AND-3SG business-DO-PRES
 ‘And he works for an abaza [twenty kopeks].’ (Harris 2002: 103)

Harris (2002) therefore takes the bound discourse marker *-al* to be a postlexical clitic. Since the subject agreement markers surface peripheral to *-al*, they would

be postlexical clitics as well, according to Criterion F. However, that status appears incompatible with the broad evidence for the morphological status of the subject agreement markers we have seen above.

Fortunately, phrasal affixation offers a perspective on the syntactic distribution of the marker *-al* which is fully compatible with morphological attachment. Let us briefly consider the classical case of phrasal affixation, namely the English possessive: it (i) expresses a property of a possessive phrase, and (ii) is realised on the word at the right edge of that phrase, but (iii) is subject to haplology with morphological marking of plural and verb agreement.

We argue that the behaviour of the bound conjunction *-al* is highly similar to this classical case of phrasal affixation: *-al* (i) expresses a phrasal property on (ii) the right edge of the left phrase, but (iii) displays host-specific morphotactics, i.e., infixation with verbal hosts. We shall show, as part of our formal analysis below, how this perspective of *-al* as a phrasal affix integrates neatly with an account of the subject agreement markers as hybrid lexical and phrasal affixes.

3 Previous approaches

3.1 Harris (2002)

Harris (2002) advocates for an analysis of Udi subject agreement markers as endoclititics, proposing an Optimality-Theoretic (OT) account based on alignment constraints. This analysis treats subject agreement markers as syntactic clitics that align to specific morphological positions within the word. However, this approach faces several challenges. First, the assumption of endoclitisis is highly marked cross-linguistically, as it involves both infixation — a rare and dispreferred morphological process — and a violation of lexical integrity (Lapointe 1981). Second, the syntactic status of Udi subject agreement markers remains ambiguous, as they do not behave strictly like syntactic clitics nor entirely as affixes. Finally, Harris’ alignment-based analysis lacks modularity, as it necessitates full access to both syntactic and morphological structures, a requirement that complicates the theoretical separation between syntax and morphology. These issues raise concerns about whether an alignment-based approach adequately accounts for the distribution and behaviour of Udi subject agreement markers or whether an alternative morphological or hybrid account is needed.

3.2 Mixed clitics (Luís 2009, Spencer & Luis 2012)

Luís (2009), Spencer & Luis (2012) introduce the concept of *mixed clitics*, proposing that clitics can function as lexical affixes when morphologically integrated into the verb, and as phrasal affixes when attached to a separate constituent at the phrasal level. This dual behaviour aligns with the distribution of Udi subject agreement markers: (i) Udi subject agreement markers exhibit complementary distribution between verb-internal (infixal) and external (phrasal) realisation, indicating a complex syntax-morphology interaction; (ii) trapping effects in specific TAM contexts enforce fixed

positioning, overriding infixation or external attachment; and (iii) allomorphy applies to both lexical and phrasal variants, suggesting that their selection is controlled within the lexical entry of the verb rather than purely by syntax.

3.3 Salehi & Koenig (2023)

In a recent paper, Salehi & Koenig (2023) discuss the attachment properties of mobile person markers in Sorani Kurdish, which display an alternation between lexical affixation to or even into the verb (19), and attachment/cliticisation to a complement of the verb (20).

- (19) a. *minał-ekan hermê-kan beş e-ke-n*
 kids-DEF.PL pear-DEF.PL share IPFV-do.PRS-3PL
 ‘The kids share the pears’
 b. *(ême) e-man-kêşan-n*
 we IPFV-1PL:A-pull.PST-3PL:P
 ‘We were pulling them.’ (Salehi & Koenig 2023)
- (20) *heřmê-ek-an-yan beş kird*
 pear-DEF-PL-3PL:A share do
 ‘They shared the pears.’ (Mohammadirad 2020)

Salehi & Koenig (2023) propose what is essentially a mixed clitic analysis, assuming a morphological treatment of verb-internal realisation (Bonami & Cysmann 2013). Phrasal attachment to the complement, by contrast, is captured using edge inflection (Miller & Halpern 1993, Cysmann 2010). In order to capture the complementary distribution between lexical and phrasal affixation and to relate the phrasal affix to the verb whose agreement properties it expresses, they assume that the morphosyntactic property of agreement is delegated by selecting, via COMPS, a phrasal complement with agreement information as a trigger feature. Following the edge inflection theory of phrasal affixation by Miller & Halpern (1993) (and its HPSG implementation in Cysmann 2010), a corresponding marking feature will be percolated down the right edge.

4 Analysis

In this section, we lay out an analysis that captures the hybrid status of the Udi subject agreement marker within HPSG, a constraint-based lexicalist framework. The empirical challenge extends beyond the subject agreement marker itself, given the interaction we observed between the subject agreement marker and *-q’a* and *-al*.

Both the subject agreement marker and the subjunctive marker *-q’a* encode genuinely verbal properties and are typically realised on the verb, where they show tight morphological integration. In focused contexts, both markers surface instead as phrasal affixes, which we understand in terms of edge inflection in the sense of Miller

& Halpern (1993): verbal features are delegated to a focused phrase to be realised at the left edge of a focused constituent.

The conjunction marker *-al*, by contrast, expresses a phrasal property rather than a property of the verbal paradigm. It is percolated to the left edge of the marked phrase and realised either as a suffix or as an infix on the leftmost element of that phrase, in a manner similar to classical cases such as Latin *-que*.

Against this background, the goal of the analysis is to formalise, within HPSG, how verbal inflectional properties (such as subject agreement and the subjunctive) can alternate between lexical affixation on the verb and edge realisation on a focused constituent, and how phrasal markers like *-al* likewise follow a pattern of edge realisation.

4.1 Phrasal affixation in HPSG

Within HPSG, the treatment of phrasal affixes, i.e., bound markers that morphologically integrate with a host word that in turn is determined syntactically, follows quite closely previous proposals within GPSG: as pioneered by Zwicky (1987) and later refined by Miller & Halpern (1993), phrasal affixes, such as the English possessive, are analysed as edge inflection, whereby a featural property of a phrase, e.g. the possessive pre-nominal NP, is inflected for possessive not on the head word, but rather on the rightmost word within that phrase.

(21) [a friend of mine]'s lemur

(22) [Anyone who cheats at roulette]'s hands will be hacked off.

Since the phrasal property is expressed as inflection of a terminal, i.e. lexical element, we expect interaction with other morphological processes: for the English possessive, this is illustrated by the haplology between possessive *'s* and the exponent *-s* on plural nouns or third singular verbs.

(23) the card players' hats

(24) Anyone who snores' mouth will be taped shut.

The GPSG approach, as formalised in Miller & Halpern (1993), uses pairs of features: a trigger feature, that is assigned to the phrase that bears the property, and a corresponding marking feature that serves to percolate the property down to a terminal element at the edge, where it will be expressed by morphology. The distinction between trigger and marking features was motivated by the observation that these features may have different linearisation properties: e.g., the *POSS* trigger feature is assigned to a left NP daughter of NP, while its corresponding *PM* marking feature is found on every daughter at the right edge of the possessive NP, i.e. exclusively on right daughters. Furthermore, the two types of features help distinguish between assignment of phrasal properties and the more technical aspect of edge percolation for means of expression.

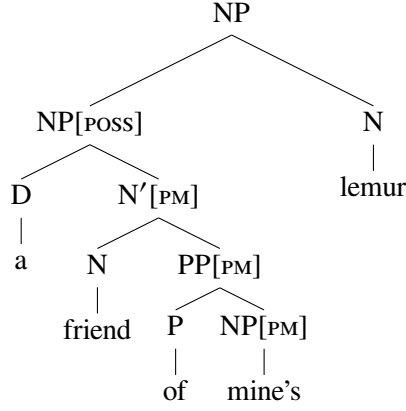


Figure 1: Phrasal affixation as edge inflection

In HPSG, edge feature percolation was first introduced by Tseng (2002) and later expanded in Kupść & Tseng (2005), permitting percolation of both trigger and marking features. In their analysis of Sorani Kurdish mixed clitics, Salehi & Koenig (2023) adopt the more restrictive version formulated in Cysmann (2010), a version which stays very close to the original formulation in Miller & Halpern (1993). Essentially, trigger feature (TRIGL and TRIGR) are asserted by phrase structure rule, differentiating between features that percolate along the left vs. the right edge, using the corresponding marking features (MRKL and MRKR). Percolation to a terminal element is done by the following constraints:

$$(25) \text{ phrase} \rightarrow \left[\begin{array}{l} \text{TRIG} \left[\begin{array}{l} \text{L} \left[\overline{tl} \right] \\ \text{R} \left[\overline{tr} \right] \end{array} \right] \\ \text{MRK} \left[\begin{array}{l} \text{L} \left[\overline{ml} \right] \\ \text{R} \left[\overline{mr} \right] \end{array} \right] \\ \text{DTRS} \left\langle \left[\text{MRK} \left[\begin{array}{l} \text{L} \left[\overline{tl} \oplus \overline{ml} \right] \\ \text{R} \left[\langle \rangle \right] \end{array} \right] \right], \dots \right\rangle \wedge \left\langle \dots, \left[\text{MRK} \left[\begin{array}{l} \text{L} \left[\langle \rangle \right] \\ \text{R} \left[\overline{tr} \oplus \overline{mr} \right] \end{array} \right] \right] \right\rangle \end{array} \right]$$

4.2 Focus position

In our analysis of Udi mixed clitics, we shall build on the recent proposal by Salehi & Koenig (2023) regarding mixed clitics in Sorani.

The main difference between phrasal attachment in Udi and Sorani lies with the properties that characterise the target or host for phrasal affixation. In Sorani, the host phrase corresponds to the least oblique non-subject complement. In Udi, by contrast, the host is defined in terms of its (grammaticalised) information-structural status, which happens to have very strict surface syntactic consequences, i.e. left-adjacency to the verb.

We therefore suggest to capture the strict ordering of the focused constituent by promoting it to the initial position on COMPS. For complements, this will be achieved by permutation of the COMPS list, as stated by the lexical rule in (26).

$$(26) \left[\begin{array}{cc} \text{HEAD} & \text{verb} \\ \text{COMPS} & \boxed{1} \oplus \langle \boxed{f} [\text{FOC} \quad +] \rangle \oplus \boxed{2} \end{array} \right] \mapsto \left[\begin{array}{cc} \text{COMPS} & \langle \boxed{f} \rangle \oplus \boxed{1} \oplus \boxed{2} \end{array} \right]$$

Since the verb-adjacent focus position is not reserved for complements alone, but equally available to modifiers, we suggest that focused modifiers undergo type shifting. To this end, we propose an adjunct-to-complements lexical rule (cf. Bouma et al. 2001), as given in (27) below.

$$(27) \left[\begin{array}{cc} \text{HEAD} & \boxed{h} \text{ verb} \\ \text{COMPS} & \boxed{c} \end{array} \right] \mapsto \left[\begin{array}{cc} \text{COMPS} & \left\langle \begin{array}{c} \text{FOC} \quad + \\ \text{MOD} \quad \left[\text{L|CAT|HEAD} \quad \boxed{h} \right] \end{array} \right\rangle \oplus \boxed{c} \end{array} \right]$$

Representing grammaticalised focus on COMPS not only captures its strict surface-syntactic position, but it also makes the focused constituent available as the target for external realisation (=delegated inflection) of Udi subject agreement.

$$(28) \left[\begin{array}{cc} \text{HEAD} & \text{verb} \\ \text{COMPS} & \langle [\text{FOC} \quad +], \dots \rangle \end{array} \right] \rightarrow \left[\begin{array}{cc} \text{INFL|DLS} & \boxed{a} \\ \text{COMPS} & \langle [\text{TRIG|R} \quad \{\boxed{a}, \dots\}], \dots \rangle \end{array} \right]$$

To effect delegation from inflectional morphology to a syntactic complement, we shall make use of the DLS feature proposed by Aguila-Multner & Crysmann (2025) to address inflectional periphrasis within Information-based Morphology (=IbM; Crysmann & Bonami 2016, Crysmann 2021): they translate the PFM theory of periphrasis by Bonami (2015) to IbM, proposing that individual rules specify, via DEL, the morphosyntactic properties they delegate. Delegated properties from all rules are assembled (=unioned) on the word's DLS feature, which serves as the primary morpho-syntactic interface. Furthermore, the global set of delegated properties is made visible to individual rules.

As detailed by the implicational constraint in (28), we lexically equate the set of delegated morphosyntactic properties of a word (DLS) with the trigger feature of the focus complement.

Conversely, if there is no grammaticalised focus complement, delegation of morphosyntactic properties will be illicit, as enforced by the implicational constraint in (29).

$$(29) \left[\begin{array}{cc} \text{HEAD} & \text{verb} \\ \text{COMPS} & \text{list}([\text{FOC} \quad -]) \end{array} \right] \rightarrow [\text{INFL|DLS} \quad \{\}]$$

In the following two subsections we shall detail how the current approach will capture the different placement properties.

4.3 Phrasal affix

To start with, we shall consider phrasal affixation on a focused constituent. As shown by the sample tree in Figure 2, the verb takes a focused complement. According to the lexical interface constraint in (28), the delegated morphosyntactic properties are imposed as a trigger feature on a COMPS valency.

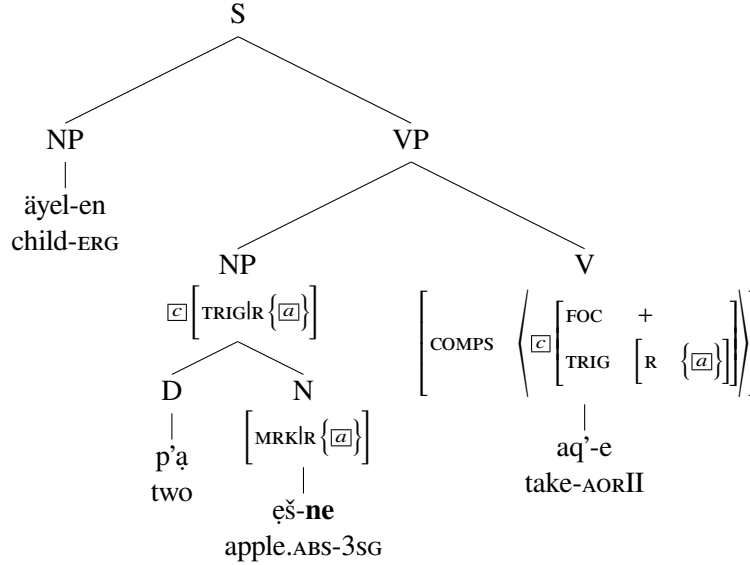


Figure 2: Phrasal affix (cf. example (3c))

The (right edge) trigger feature on the focused complement gives rise to a corresponding marker feature by which the phrasal inflectional property will percolate down along the right edge to a lexical element. This will capture both the phrasal distribution of the agreement marker and the broad set of host categories.

4.4 Lexical affix

Lexical affixation can arise in one of two situations: either in sentences with broad focus or in case of morphological trapping. We shall discuss both cases in turn.

Starting with broad focus or predicate focus, we see that the conditions for delegation to phrasal affixation (28) are just not met. Moreover, in the absence of a focused complement, (29) disallows delegation, thereby enforcing lexical realisation.

The other case to be considered is morphological trapping, which occurs with specific TAM categories. As observed above, such trapping is independent of the availability of a narrow focus phrasal host. What is more, the TAM categories that cause trapping also display exceptional morphotactics, preceding the agreement marker rather than following it.

We suggest that these particular TAM categories preempt the rule of delegation, by requiring that the word's global DLS feature be the empty set. Indeed the usefulness

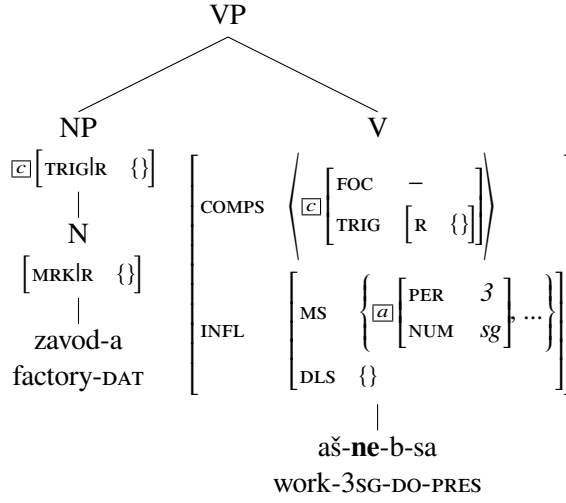


Figure 3: Lexical affix (broad focus; cf. example (7a))

of having individual rules impose global constraints has already been demonstrated for French (Aguila-Multner & Crysmann 2025). As a net result, the morphological feature responsible for delegation **DLS** will end up being the empty set in these cases, as shown in Figure 4. Thus, in the case of morphological trapping, the trigger feature will end up sharing an empty set of delegated properties.

4.5 Interaction

In the remainder of this paper, we shall briefly illustrate how the hybrid agreement marker interacts with other hybrid and phrasal affixes, namely the hybrid lexical/phrasal adhortative marker *-q'a*, as well as the marker *-al*, which we take to be a phrasal affix.

4.5.1 Subjunctive *-q'a*

The first marker we discuss is the subjunctive/adhortative marker. As detailed in Section 2.3.1 above, this marker, when present, always appears adjacent to the subject agreement marker.

Given the similarity of their distribution across verbal and non-verbal hosts, we shall treat adhortative *-q'a* as a hybrid lexical/phrasal affix as well. If realised on the verb, whose properties it expresses, realisation is morphotactically fully integrated, including infixation.

As shown in Figure 5, the subjunctive/adhortative marker “originates” as part of the verb’s inflectional paradigm, but its realisation may get delegated (via **DLS**) to a focused constituent, on a par with agreement marking.

Subject agreement and subjunctive marking are assigned to a right **TRIG** feature on the focused complement, percolating down to its right edge via the corresponding **MRK**

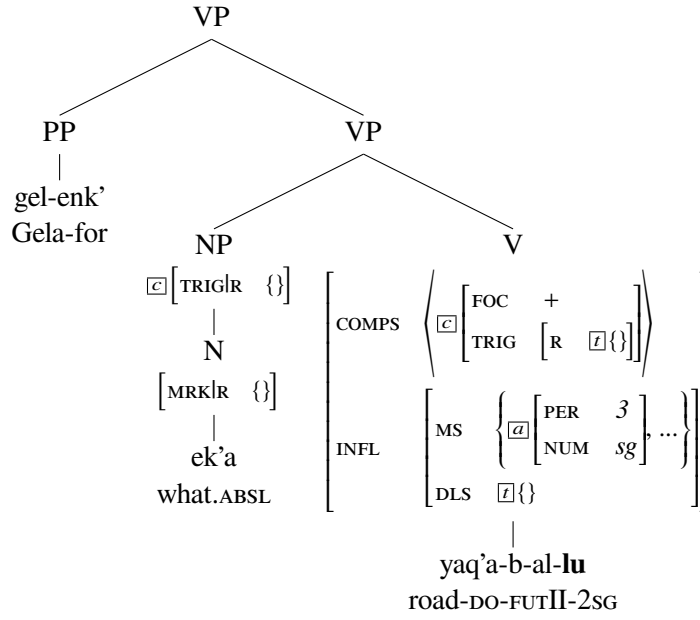


Figure 4: Lexical affix (narrow focus; cf. example (12))

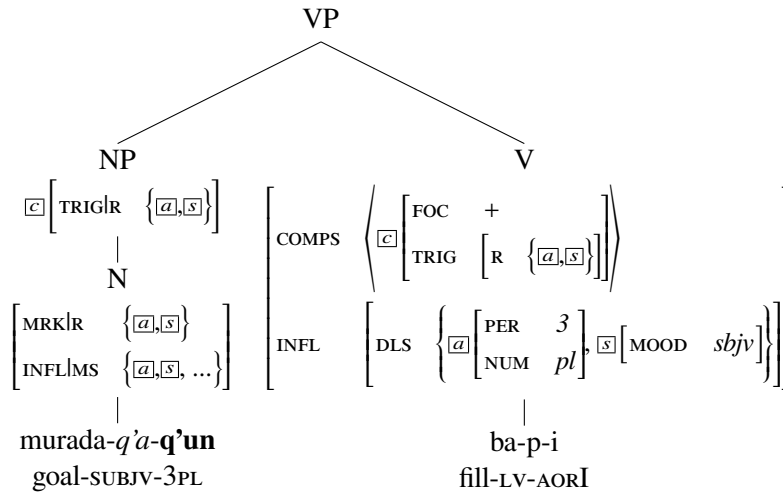


Figure 5: Subjunctive (narrow focus; cf. example (16b))

feature. On the verb, the value of the MRK feature is amalgamated with that word's morphosyntactic property set, making the MRK features available for morphological expression.

4.5.2 Marker *-al*

Turning now to the marker *-al*, recall from Section 2.3.2 that this marker has all the hallmarks of a phrasal affix: it expresses a property of a phrasal constituent, and its host word is selected by syntax as well. We assume that the marker attaches to the right of the first constituent, as in e.g. (17b). This can be achieved by requiring the left daughter of the conjunct to have a corresponding element (e.g. *c-cnj*) on the TRIGLR.⁵ Via MRKLR, it will percolate down along that constituent's right edge to the host word.

Once the host has been determined, exponence ensues in accordance with the morphotactic constraints of the host word's morphology, yielding the two following outcomes: (i) infixation and suffixation for verbs; (ii) suffixation for all other hosts.

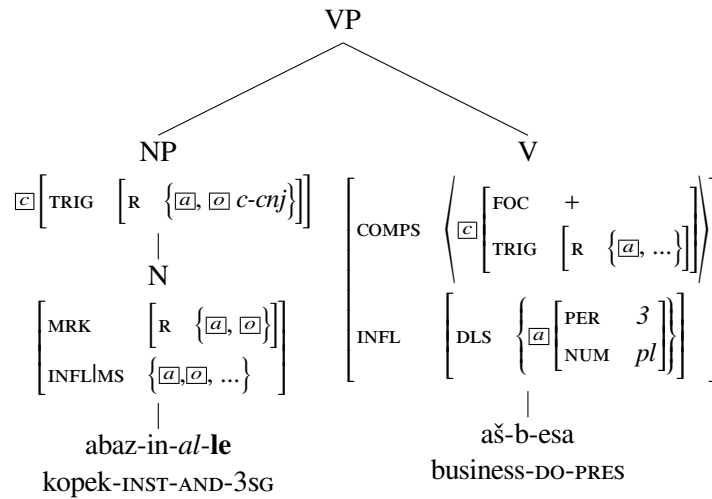


Figure 6: Coordinating conjunction and subject agreement marker (narrow focus; cf. ex. (18))

Given that the marker *-al* is a phrasal affix, but agreement is hybrid, three different situations can arise: if (i) the first constituent of the conjunct happens to be a focused constituent, as in (18), both agreement and coordination marking will end up on the right edge of the focused constituent. If (ii) the focused constituent is not the leftmost constituent, as in (17d), *-al* will attach to the first constituent (*šuk'ala* 'no one') and the agreement markers to the focused constituent (negation *te*). Finally, if (iii) the verb itself is conjunct-initial, as in (17a), both markers will be found on the verb. Since edge features are amalgamated with the host word's morphosyntactic property set, realisational morphology will have full control over exponence and morphotactics, including infixation.

⁵For attachment to the first word, one would specify a TRIGL feature on that daughter.

5 Conclusion

In this paper, we observe that Udi subject agreement markers show properties of both lexical affixes and phrasal affixes and can therefore be understood in terms of mixed clitics (Luís 2009, Spencer & Luis 2012). We argue that the “endocclisis” approaches by Harris (2002) and Anderson (2005), by contrast, downplay the affixal properties and fail to capture allomorphic variation. Most importantly, they require simultaneous access to syntactic and internal morphological structure, an assumption that greatly weakens Lexical Integrity (Lapointe 1981).

Building on a previous proposals for Sorani Kurdish (Salehi & Koenig 2023), we propose a formal approach to mixed clitics that establishes a narrow interface connecting lexical and phrasal affixation and thus maintains a modular view of morphology and syntax. Finally, using recent developments within IbM, the present approach connects mixed clitics to other cases of morphosyntactic delegation, such as periphrasis (Bonami 2015, Aguila-Multner & Crysmann 2025).

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A Sign-Based Construction Grammar analysis of “middle” *je-* in Paraguayan Guarani

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 26–45



Keywords: Passive, Reflexive, Tupi-Guarani, Tupian, Amazonian Languages, Voice, Morphology-Pragmatics Interface

Estigarribia, Bruno. 2025. A Sign-Based Construction Grammar analysis of “middle” *je-* in Paraguayan Guarani. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 26–45. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.2. 
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Abstract

Paraguayan Guaraní verbs prefixed with *je-* have “middle-like” passive, reflexive, impersonal, anticausative, and autocausative uses. I provide a Sign-Based Construction Grammar (SBCG) analysis showing that *je-* has a general and minimal argument-reducing function and that lexical semantics and context are jointly and systematically responsible for interpretive effects.

1 The Paraguayan Guaraní “passive/reflexive” prefix *je-*

Paraguayan Guaraní (PG) is the most widely spoken language in the Amazonian Tupi-Guaraní family (Tupian) and is the only autochthonous language of the American continent spoken by a non-indigenous majority. Interestingly, the study of Guaraní, and of Tupi-Guaraní languages more generally, has a long tradition, but none of it in the HPSG or SBCG frameworks.

PG is an agglutinative and postpositional language, with marginal polysynthesis, SVO basic order, an active/stative split for intransitive verbs, direct/inverse alignment for transitive verbs (subject to a person hierarchy), clusivity, and nasal harmony (Estigarribia 2020: 2, and *passim*). Its voice system includes three valence-reducing prefixes (passive/reflexive, reciprocal, antipassive) and three valence-increasing affixes with causative semantics (Estigarribia 2020: ch. 6). This paper concerns itself with the “passive/reflexive” prefix.¹ The examples in (1) (from Guaranía 2008: 44) are all ambiguous between a passive and a reflexive reading.²

- (1) a. Ange pyhare jero kyhápe ma'ëra ojejapi.
ange -pyhare jero kyhape ma'ëra o-je-japi
last.night at.the.dance some.guy 3-JE-shoot
'Last night at the dance some guy was shot.' (or 'shot himself')
- b. Oñekytĩ ohakã'onguévo yvyarakã.³
o-je-kytĩ ohakã'onguévo yvyarakã
3-JE-cut while.was.removing.top tree.head
'(S)he cut himself/herself while trimming the tree.' (or 'was cut')

[†]I would like to thank the audience at HPSG 2025 for their comments and discussion, in particular Stefan Müller for pointing out some technical inaccuracies in my talk and for discussion of the appropriate formalization of selectional restrictions, and also two anonymous reviewers for highlighting remaining inconsistencies.

¹Called “agent-demoting” voice in Estigarribia (2020: 208).

²When references are not given the examples are constructed by me. Glosses are simplified for readability and should not be taken as a complete morphological analysis. All verb stems are non-future by default: they are compatible with past or present. Paraguayan Guaraní has nasal harmony and when relevant, footnotes will indicate conditioned alternations. Non-standard abbreviation: JE = derivational “middle” prefix.

³*Ñe-* is the harmonizing form of the prefix *je-* that is used with nasal bases.

Characterizing *je-* as passive/reflexive assumes a basic transitive scenario with differentiated ACTOR and UNDERGOER (Davis 2001, Davis, Koenig & Wechsler 2025). In strictly reflexive scenarios, actor and undergoer are conceptualized as distinct, and the action or event as externalized; in strict passives, there is a semantically understood external actor different from the undergoer.⁴ Context often disambiguates between reflexive (2) and passive (3).

- (2) Aime porãiterei añembosako'i día a día.⁵ (reflexive)
aime porãiterei a-je-mbosako'i día a día
I.am extremely.well 1SG-JE-prepare every.day
'I am preparing myself very well every day.'
- (3) Marihuana oñemoambue so'o rehe.⁶ (passive)
marihuana o-je-moambue so'o rehe
marihuana 3-JE-change.sth meat against
'Marihuana is being exchanged for meat.'

Uses of *je-* that are neither strict reflexives nor strict passives are also known (Velázquez-Castillo 2008, Estigarribia 2020, 2025). First, *je-* can apply to intransitive bases, both with agentive subjects (4a) and with non-agentive subjects (4b), expressing the occurrence of an event without reference to participants. The single argument is always interpreted as an indefinite human (or perhaps animate), similarly to *impersonals* (or “impersonal passives”) in other languages (Blevins 2003, Müller 2003, Müller & Ørsnes 2013).

- (4) a. Al fin ojesapukái.⁷
al -fin o-je-sapukái
finally 3-JE-scream
'A goal was finally celebrated.' (lit. 'Finally there was screaming')
- b. Heta gueteri oñemanovéta ndopáirō la ñorairō.
heta gueteri o-je-mano-ve-ta ndopáirō la ñorairō
much even 3-JE-die-more-FUT if.not.end the fight
'Even more dying will occur if the fight does not end.'
(Velázquez-Castillo 2008: 383)

This impersonal reading is also available for CORE TRANSITIVES (those with two terms, subject and direct object), as shown in (5), and obligatory for GOVERNED TRANSITIVES (those with one term, the subject, and one oblique) (6).⁸

⁴Notably, PG has agentless passives only.

⁵<https://www.abc.com.py/especiales/remiandu/cabanas-aime-por-haimetema-100-227136.html>, 2026-01-30.

⁶<https://www.abc.com.py/especiales/remiandu/marihuana-onemoambue-soo-rehe-1404994.html>, 2026-01-30.

⁷<https://www.abc.com.py/especiales/remiandu/al-fin-ojesapukai-465515.html>, 2026-01-30.

⁸I use Manning (1996)'s terminology, where a *term* is a direct or “core” argument of a predicate, as opposed to an oblique argument.

- (5) ani haḡua ojehecha ichupe tembiapovai apohára ramo⁹
 ani haḡua o-je-hecha ichupe tembiapovai apohára ramo
 not for 3-JE-see him/her bad.work maker as
 ‘so that people would not see him as someone who does bad things’
- (6) Mbohapyha jey oñemaña Alderete rehe pirapire jepokóre.¹⁰
 mbohapyha jey o-je-maña Alderete rehe pirapire jepokóre
 third time 3-JE-look.at Alderete at money for.touching
 ‘They investigate Alderete for embezzlement for the third time.’

Additionally, in (7), we see that *je-* can give rise to AUTOCAUSATIVES (also ENDORE-FLEXIVES Haspelmath 1987: 26) where an actor changes body position or location (Geniušienė 1987).

- (7) oñemombo pe yva¹¹
 o-je-mombo pe yva
 3-JE-throw that fruit
 ‘they threw themselves upon the fruit’
- (8) ajepepy
 a-je-pepy
 1SG-JE-bend.sth
 ‘I bend (backwards), I straighten (myself)’
 (Guasch & Ortiz 1998: 583)

Finally, ANTICAUSATIVES are events often interpreted as spontaneously occurring with an undergoer subject and no actor (9).

- (9) a. Ovetã ojepe'a.
 ovetã o-je-pe'a
 window 3-JE-open.sth
 ‘The window opened.’ (Estigarribia 2020: 87)
- b. Pe yvy oñemonandiete.¹²
 pe yvy o-je-monandi-ete
 that ground 3-JE-empty.sth-very
 ‘The ground emptied completely.’

This constellation of uses/interpretations is characteristic of what has been termed a “middle” marker (Inglese 2022, 2023, Inglese & Sansò 2023).¹³ I will show that SBCG provides a natural framework to model this cluster of interpretations in Sections 3.2 and 3.3.

⁹https://gn.wikipedia.org/wiki/Hernán_Cortés, 2025-10-24.

¹⁰<https://www.abc.com.py/especiales/remiandu/mbohapyha-jey-onemana-alderete-rehe-pirapire-jepokore-1048617.html>, 2026-01-30.

¹¹Renée Ferrer, 1996, short story “Táva Jokupyty remiñongatu”.

¹²<https://heraldsofhope.org/blog/all-episodes/nandejara-nembojovake/>, 2026-01-30.

¹³There are also body-part incorporation uses that are not strictly reflexive but pseudo-reflexive, since there is no identity between agent and patient; I do not have the space to address those here.

2 Previous work on passives in HPSG

HPSG generally defines the passive as subject demotion instead of object promotion, with the “logical subject” (or first element of the ARG-ST list) realized as oblique or not at all (see Davis & Koenig 2025: 157). I will assume here without argument a non-canonical linking analysis where the ARG-ST list is changed by eliminating the subject term (see Davis, Koenig & Wechsler 2025). I will apply an analysis to the PG case that is similar to that in Müller & Ørsnes (2013) for Danish, German, and English passives: *je-* is a morphological marker (an affix as in Scandinavian -s passives, as opposed to an analytic construction), it suppresses the first term of the verb, and it has impersonal passive uses (like Scandinavian and German). The differences are that PG shows “middle-like” reflexive-passive syncretism (whereas Germanic languages have distinct morphosyntactic means for these two diatheses), there is no analytic passive (auxiliary+participle), and PG unaccusatives are not exempted (no need for a Germanic-style “designated argument”).

3 SBCG analysis of *je*-derivation

I have chosen to use the formalism of SBCG rather than the more common HPSG formalism (see Müller 2025: for discussion of the differences). In particular, instead of lexical rules (lexeme-to-lexeme), I will use here the derivational construction mechanism to account for variable polyadicity of lexemes proposed in Sag (2012: 119) (10).

$$(10) \quad \text{deriv-cxt:} \left[\begin{array}{c} \text{MTR} \quad \text{lexeme} \\ \text{DTRS} \quad \text{list}(\text{lex-sign}) \end{array} \right]$$

PG’s default impersonal inflection *o-* (e.g., *o-ky* ‘it rains’ or *o-sunu* ‘it thunders’) will be relevant in what follows (11).

$$(11) \quad \left[\begin{array}{c} \text{FORM} \quad X \\ \text{ARG-ST} \quad \text{list}(\text{obliques}) \end{array} \right] \Rightarrow \left[\text{FORM} \quad o\text{-}X \right]$$

My analysis of the lexical semantics of predicates is based on Davis (2001), and on Sag (2012: sec. 3.4) which suggests “flattened” semantic structures, except that I will use a Minimal Recursion Semantics representation, rather than a Frame Semantics approach. For example, the core transitive predicate *juka* ‘to kill’, will have the semantics in (12), where *kill-rel* is a subtype of *affect-ch-of-st-rel* (Davis 2001: 83), and *SIT* is a situational index corresponding to a Davidsonian event variable (Sag 2012: 89).

$$(12) \left[\begin{array}{cc} \text{FORM} & juka \\ \text{ARG-ST} & \langle \text{NP}_i, \text{NP}_j \rangle \\ \text{SEM} & \left[\begin{array}{c} \text{RELS} \left\langle \begin{array}{c} \text{kill-rel} \\ \text{LABEL } l \\ \text{SIT } s \\ \text{ACT } i \\ \text{UND } j \\ \text{SOA } l' \end{array} \right\rangle, \left[\begin{array}{c} \text{dead-rel} \\ \text{LABEL } l' \\ \text{P-BEARER } j \end{array} \right] \end{array} \right] \end{array} \right]$$

Prefixation of verb bases with only one term (monadic predicates or governed transitives) by *je-* always yields an impersonal interpretation, with any obliques “untouched”.¹⁴ *Je*-prefixation of core transitive bases yields impersonal, reflexive, passive, anticausative, and anticausative interpretations. In all cases *je-* only impacts the linking and argument realization of participants that are terms of the base predicate, but not those that are obliques. In impersonal cases, *je-* simply “de-links” the actor role from the subject, leaving all other links, if they exist, intact. Such de-linking is often called “subject demotion”. In passives and anticausatives from core transitive bases, *je-* “de-links” the actor from the subject and additionally links the undergoer role to the subject. This additional linking effect is often called “object promotion”. Finally, in reflexives and anticausatives from core transitive bases, there is linking of the undergoer to subject without de-linking of the actor. The common effect that *je*-prefixation has in all these cases is simply reducing by one the number of terms of the predicate, that is, eliminating one term from the ARG-ST list. I capture this with the constraint in (13).

$$(13) \text{ } je\text{-deriv-cxt:} \left[\begin{array}{c} \text{MTR} \left[\text{ARG-ST } \underline{1} \right] \\ \text{DTRS} \left\langle \left[\text{ARG-ST } \langle \text{NP} \rangle \oplus \underline{1} \text{list} \right] \right\rangle \end{array} \right]$$

Thus, *je-* does not itself encode particular interpretations for *je-* forms. In order to understand and model how such interpretations arise, let’s look first at what linking patterns are possible for valence-reduced *je*-prefixed predicates.

3.1 Linking affordances resulting from the *je*-derivation construction

For monadic and governed transitive bases, the term-reducing effect of *je-* leaves no terms (only possibly obliques) on ARG-ST, and since the actor can only be mapped to a term (to the subject, in fact), then we obtain an “impersonal subject” or “impersonal actor” interpretation.¹⁵

¹⁴Other interpretations, such as reflexive, require an independent reflexive postpositional pronoun without *je-*.

¹⁵I assume throughout that semantic roles are mapped to argument structure elements via the commonly accepted linking constraints in (14 on the following page) (Davis, Koenig & Wechsler 2025).

$$(14) \quad \begin{array}{l} \text{a.} \quad \left[\begin{array}{l} \text{CONTENT|KEY} \quad \left[\text{ACT} \quad \boxed{1} \right] \\ \text{ARG-ST} \quad \langle \text{NP}_{\boxed{1}}, \dots \rangle \end{array} \right] \\ \text{b.} \quad \left[\begin{array}{l} \text{CONTENT|KEY} \quad \left[\text{UND} \quad \boxed{2} \right] \\ \text{ARG-ST} \quad \langle \dots, \text{NP}_{\boxed{2}}, \dots \rangle \end{array} \right] \end{array}$$

This effect is modeled in (15).

$$(15) \quad \left[\begin{array}{l} \text{MTR} \quad \left[\begin{array}{l} \text{FORM} \quad o\text{-}je\text{-}X \\ \text{ARG-ST} \quad \langle \rangle \oplus \boxed{1} \\ \text{SEM} \quad \boxed{2} \end{array} \right] \\ \text{DTRS} \quad \left\langle \begin{array}{l} \text{FORM} \quad X \\ \text{ARG-ST} \quad \langle \text{NP}_i \rangle \oplus \boxed{1} \text{list}(\text{obliques}) \\ \text{SEM} \quad \boxed{2} \end{array} \right. \left[\begin{array}{l} \text{RELS} \quad \left\langle \begin{array}{l} \text{act-rel} \\ \text{LABEL} \quad l \\ \text{SIT} \quad s \\ \text{ACT} \quad i \\ (\text{UND } j) \\ (\text{SOA } l') \end{array} \right\rangle \right] \end{array} \right\rangle \end{array} \right]$$

For core transitives there are 4 logical possibilities under valence reduction: (i) Linking actor to subject, not linking undergoer; (ii) Linking undergoer to subject, not linking actor; (iii) Linking both undergoer and actor to subject; (iv) Neither actor nor undergoer are linked.

Option (i) is not available. It would yield a reading where the agent is expressed and referential, but the undergoer is unexpressed. This use for *je-* is “pre-empted” by the antipassive prefixes *poro-* and *mba'e-* that encode events with generic undergoers (Estigarribia 2020: 213–215). This is why *je-* only targets the first element of ARG-ST in (13 on the previous page).

Linking undergoer to subject and not linking the actor yields a reading where the undergoer is expressed, but the agent is unexpressed. This is compatible with passive and anticausative uses, which both share the underspecified SBCG representation in (16), in which I assume $i \neq j$.

$$(16) \quad \left[\begin{array}{l} \text{FORM} \quad je\text{-}X \\ \text{ARG-ST} \quad \langle \text{NP}_j \rangle \\ \text{SEM | RELS} \quad \left\langle \begin{array}{l} \text{act-und-rel} \\ \text{LABEL} \quad l \\ \text{SIT} \quad s \\ \text{ACT} \quad i \\ \text{UND } j \\ (\text{SOA } l') \end{array} \right\rangle \right] \end{array} \right]$$

Linking both undergoer and actor to subject yields a reading where both the agent and the undergoer are expressed and they are co-referential. This is compatible with reflexive and anticausative uses, which *prima facie* both share the underspecified SBCG representation in (17).

$$(17) \left[\begin{array}{cc} \text{FORM} & je-X \\ \text{ARG-ST} & \langle \text{NP}_i \rangle \\ \text{SEM} \mid \text{RELS} & \left\langle \begin{array}{c} \left[\begin{array}{c} \text{act-und-rel} \\ \text{LABEL } l \\ \text{SIT } s \\ \text{ACT } i \\ \text{UND } i \\ (\text{SOA } l') \end{array} \right] \end{array} \right\rangle \end{array} \right]$$

Finally, the configuration where neither role is linked to an argument is also possible: It is expressed by the prefix combinations *je-poro-* or *ñe-mba'e-* and yields a reading where both the agent and the undergoer are unexpressed and both are interpreted as generic/impersonal.

I propose that these linkage affordances are influenced by the lexical semantics of the base predicate and the resulting interpretations are determined fully only once the *je*-prefixed forms are used in context. Let's now examine how the different interpretations are arrived at and modeled.

3.2 How lexical semantics constrains possible interpretations

I will briefly note here the contribution of each base predicate's lexical semantics to the available interpretations. Take the core transitive predicate *ipuru* 'to use'. It selects for a first participant that controls the event (and is thus agent-like) and that uses a second participant to bring about the event (which is instrument-like). Instrument-like participants are most often inanimate things that an animate, volitional participant incorporates in an event to cause it. These two types of participants have a priori very low semantic compatibility, and therefore a reflexive or anticausative reading is predicted to be extremely difficult to obtain, if not downright impossible. Likewise, because an agent-like participant is semantically selected, anticausative "spontaneous event" interpretations are impossible. As predicted, *-jeipuru* only has documented passive uses in PG.

- (18) a. umi patron kuera ikatu oheja ojeipuru N95¹⁶
 umi patron kuera ikatu oheja o-je-ipuru N95
 those boss PL be.able they.let 3-JE-use N95
 'those managers can let N95 masks be used'

¹⁶<https://www.osha.gov/sites/default/files/publications/OSHA4457.pdf>, 2026-01-30.

- b. mba'éichapa ojeipuru umi maquina jevotaha¹⁷
 mba'éichapa o-je-ipuru umi máquina jevotaha
 how 3-JE-use those machine voting
 'how are voting machines used?'

It is an open question whether the facts of selectional restriction referred to here should be captured in the SEM(antic) structure or rather in the CONTEXT structure (Stefan Müller, p.c., 24 September 2025). For the purposes of this paper, following ideas in Androutsopoulos & Dale (2000), we can view such selectional facts as a subset of felicity conditions, often encoded in the value of CNTXT|BCKGRND.¹⁸ The lexical entry for *ipuru* would be as in (19), indicating that a felicitous (or maybe “literal” is a better notion here) use of this verb expects the first participant to be animate and with control over the event (actor), and the second participant to be employed by the first like an instrument (undergoer).

$$(19) \left[\begin{array}{ll} \text{FORM} & \textit{ipuru} \\ \text{ARG-ST} & \langle \text{NP}_i, \text{NP}_j \rangle \\ \text{SEM | RELS} & \left\langle \begin{array}{l} \textit{act-und-rel} \\ \text{LABEL } l \\ \text{SIT } s \\ \text{ACT } i \\ \text{UND } j \end{array} \right\rangle \\ \text{CNTXT | BCKGRND} & \left\langle \begin{array}{l} \textit{animate-fr} \\ \text{ENTITY } i \end{array}, \begin{array}{l} \textit{instrument-fr} \\ \text{ENTITY } j \end{array}, \begin{array}{l} \textit{control-fr} \\ \text{ENTITY1 } i \\ \text{ENTITY2 } j \end{array} \right\rangle \end{array} \right]$$

Remember that *je-* only has impersonal interpretations with one-term bases. Table 1 on the following page summarizes the possible interpretations of *je-* for the two-term predicates exemplified in this paper.¹⁹ Note first that *je-* derivation can always yield impersonal interpretations. Second, all bases with two terms yield passive interpretations. A few bases only allow these two. Next, excepting these bases, a base either allows a reflexive interpretation or it allows anticausative and anticausative interpretations. These affordances are mutually exclusive because they depend on whether the base codifies an event as requiring an externalized causer (reflexive), or not, and therefore compatible with the absence of an externalized causer (autocausatives and anticausatives). For both autocausatives and anticausatives, the event is codified as happening completely internally to the only involved participant, whereas reflexives codify some sort of externalization

¹⁷<https://www.facebook.com/reel/709167083824814>, 2026-01-30.

¹⁸I am assuming that values of this attribute are of type *semantic frame*; see Sag (2012: 88) and also Lücking, Ginzburg & Cooper (2025).

¹⁹I have no direct evidence for the entries in parentheses, but I present them as possible interpretations given my non-native knowledge of PG.

of the event. Therefore, the availability of reflexive, autocausative, or anticausative readings is determined lexically by each base.

Table 1: Interpretations available for each two-term base in this paper

Base	refl	auto	pass	anti	imp
<i>ipuru</i> ‘to use’			pass		imp
<i>hesa'ÿjo</i> ‘to clarify’			pass		imp
<i>japi</i> ‘to shoot’	refl		pass		imp
<i>hayhu</i> ‘to love’	refl		pass		imp
<i>mbosako'i</i> ‘to prepare’	refl		pass		imp
<i>hecha</i> ‘to see’	refl		pass		imp
<i>mbo'e</i> ‘to teach’	refl		pass		imp
<i>hunga</i> ‘to injure’	refl		pass		imp
<i>juka</i> ‘to kill’	refl		pass		imp
<i>kytĩ</i> ‘to cut’	refl		pass	(anti)	imp
<i>moambue</i> ‘to change’			pass	anti	imp
<i>pepy</i> ‘to bend’		auto	pass	anti	imp
<i>momombyry</i> ‘to move away’		auto	(pass)	(anti)	imp
<i>pe'a</i> ‘to open’		(auto)	pass	anti	imp
<i>monandi</i> ‘to empty’			pass	anti	imp

How to capture this in our analysis? In HPSG, reflexives and autocausatives are never differentiated in terms of their indexing of semantic roles: they both include a single index that is the value of ACTOR and UNDERGOER. Davis (2001: 105) proposes a *self-mot-rel* lexical semantic relation for verbs such as *run*, *jump*, and *shiver*, whose base form has an autocausative interpretation because it suggests a participant that moves volitionally (20).

$$(20) \left[\begin{array}{l} \textit{self-mot-rel} \\ \text{ACT} \quad \boxed{1} \\ \text{UND} \quad \boxed{1} \\ \text{GRND} \end{array} \right]$$

Is this approach applicable to autocausative interpretations that emerge as a result of a diathetic derivation? Take the case of *pepy* ‘to bend’. This is a dyadic, change-of-state, core transitive verb; crucially, it has a motion semantic component and a cause semantic component (*caus-mot-rel*) (21).

$$(21) \left[\begin{array}{c} \textit{caus-mot-rel} \\ \text{ACT} \\ \text{UND } \boxed{1} \\ \text{SOA} \left[\begin{array}{c} \textit{mot-rel} \\ \text{UND } \boxed{1} \\ \text{GRND} \left[\begin{array}{c} \textit{path} \\ \text{SOURCE} \\ \text{VIA} \\ \text{ENDPOINT} \end{array} \right] \end{array} \right] \end{array} \right]$$

The form *-jepepy* has an autocausative interpretation, ‘to bend backwards, to straighten up’, but is coindexing ACTOR and UNDERGOER as in (22) enough to differentiate this from a reflexive interpretation?

$$(22) \left[\begin{array}{c} \textit{caus-mot-rel} \\ \text{ACT } \boxed{1} \\ \text{UND } \boxed{1} \\ \text{SOA} \left[\begin{array}{c} \textit{mot-rel} \\ \text{UND } \boxed{1} \\ \text{GRND} \left[\begin{array}{c} \textit{path} \\ \text{SOURCE} \\ \text{VIA} \\ \text{ENDPOINT} \end{array} \right] \end{array} \right] \end{array} \right]$$

The difference actually resides in whether the causation is externalized (reflexive: UNDERGOER conceptualized as differentiated from the ACTOR) or not (autocausative: UNDERGOER and ACTOR not differentiated). I propose that core transitive predicates that yield an autocausative interpretation have a semantics of type *cause-rel* (Davis 2001: 86) as in (23). This kind of predicate encodes an event conceived as a causer bringing about a state of affairs that is the result of a motion subevent, rather than an event conceived as a causer acting on an undergoer to bring about a state of affairs involving the undergoer.

$$(23) \left[\begin{array}{c} \textit{cause-rel} \\ \text{ACT} \\ \text{SOA} \left[\begin{array}{c} \textit{mot-rel} \\ \text{UND} \\ \text{GRND} \left[\begin{array}{c} \textit{path} \\ \text{SOURCE} \\ \text{VIA} \\ \text{ENDPOINT} \end{array} \right] \end{array} \right] \end{array} \right]$$

Given this, a form like *apepy* ‘I bend it’, would have the representation in (24), where the indexing prefix *a-* indicates that the subject is 1sg and the object 3,

and where the semantics are that of the speaker bringing about a motion event involving a third person undergoer.

$$(24) \left[\begin{array}{ll} \text{FORM} & \textit{apepy} \\ \text{ARG-ST} & \langle \text{NP}_{1sg}, \text{NP}_3 \rangle \\ \text{SEM | RELS} & \left\langle \begin{array}{l} \textit{cause-rel} \\ \text{ACT } 1sg \\ \text{SOA } \left[\begin{array}{l} \textit{mot-rel} \\ \text{UND } 3 \\ \text{GRND } [\textit{path}] \end{array} \right] \end{array} \right\rangle \end{array} \right]$$

Now, in a context where it is clear that only one participant is involved (no unexpressed but understood agent different from the expressed participant, see Section 3.3), the stem *-jepepy* has the representation in (25). Embedding the UND in the SOA structure models the lack of externalization of the causal action in autocausatives.

$$(25) \left[\begin{array}{ll} \text{FORM} & \textit{-jepepy} \\ \text{ARG-ST} & \langle \text{NP}_i \rangle \\ \text{SEM | RELS} & \left\langle \begin{array}{l} \textit{cause-rel} \\ \text{ACT } i \\ \text{SOA } \left[\begin{array}{l} \textit{mot-rel} \\ \text{UND } i \\ \text{GRND } [\textit{path}] \end{array} \right] \end{array} \right\rangle \end{array} \right]$$

We can “flatten” these semantic structures in order to make them consistent with the choices made in SBCG following the choices advocated for in Minimal Recursion Semantics.

$$(26) \left[\begin{array}{ll} \textit{cause-rel} \\ \text{ACT } index \\ \text{SOA } \left[\begin{array}{l} \textit{mot-rel} \\ \text{UND } index \\ \text{GRND } [\textit{path}] \end{array} \right] \end{array} \right] \equiv \left[\begin{array}{ll} \textit{cause-rel} \\ \text{LABEL } l \\ \text{SIT } s \\ \text{ACT } index \\ \text{SOA } l' \end{array} \right], \left[\begin{array}{ll} \textit{mot-rel} \\ \text{LABEL } l' \\ \text{UND } index \\ \text{GRND } [\textit{path}] \end{array} \right]$$

Let’s look at the difference between *hunga* ‘to injure’, which can yield a reflexive interpretation under *je*-prefixation, and *pepy* ‘to bend’, which can yield an autocausative one.

$$\begin{aligned}
(27) \quad & \left[\begin{array}{l} \text{FORM} \quad -jehunga \\ \text{ARG-ST} \quad \langle \text{NP}_i \rangle \\ \text{SEM} \mid \text{RELS} \quad \left\langle \begin{array}{l} \text{cause-ch-of-st-rel} \\ \text{LABEL} \quad l \\ \text{SIT} \quad s \\ \text{ACT} \quad i \\ \text{UND} \quad i \\ \text{SOA} \quad l' \end{array} \right\rangle, \left[\begin{array}{l} \text{injured-rel} \\ \text{LABEL} \quad l' \\ \text{P-BEARER} \quad i \end{array} \right] \right\rangle \end{array} \right] \\
(28) \quad & \left[\begin{array}{l} \text{FORM} \quad -jepepy \\ \text{ARG-ST} \quad \langle \text{NP}_i \rangle \\ \text{SEM} \mid \text{RELS} \quad \left\langle \begin{array}{l} \text{cause-rel} \\ \text{LABEL} \quad l \\ \text{SIT} \quad s \\ \text{ACT} \quad i \\ \text{SOA} \quad l' \end{array}, \left[\begin{array}{l} \text{bend-rel} \\ \text{LABEL} \quad l' \\ \text{UND} \quad i \\ \text{GRND} \quad [\text{path}] \end{array} \right] \right\rangle \end{array} \right]
\end{aligned}$$

The different semantic structures for the base predicates explain why reflexive and anticausative interpretations are mutually exclusive.

3.3 Emergence of interpretations of the *je*-derivation construction in context

3.3.1 Reflexive-passive ambiguities

Out-of-context *je*- forms most often are ambiguous between a passive and a reflexive reading, as I mentioned in Section 1 on page 1. I exemplify again with the form *-ñehunga* in (29) and its corresponding description in (30).

- (29) *-ñehunga*
je-hunga
 JE-injure
 ‘to be injured’ or ‘to injure oneself’

$$(30) \quad \left[\begin{array}{l} \text{FORM} \quad -je-hunga \\ \text{ARG-ST} \quad \langle \text{NP}_i \rangle \\ \text{SEM} \mid \text{RELS} \quad \left\langle \begin{array}{l} \text{cause-ch-of-st-rel} \\ \text{LABEL} \quad l \\ \text{SIT} \quad s \\ \text{ACT} \quad \text{index} \\ \text{UND} \quad i \\ \text{SOA} \quad l' \end{array} \right\rangle, \left[\begin{array}{l} \text{injured-rel} \\ \text{LABEL} \quad l' \\ \text{P-BEARER} \quad i \end{array} \right] \right\rangle \end{array} \right]$$

In context, the form *-ñehunga* resolves to one of the two possible interpretations: reflexive in (31a) passive in (31b).

- (31) a. nderyeguasúrõ anínte reguata puku ani haḡua reñehunga²⁰
 nderyeguasúrõ anínte reguata puku ani haḡua re-je-hunga
 if.you.are.pregnant just.don't you.walk long not for 2SG-JE-injure
 'if you are pregnant do not take long walks so as not to injure yourself'
- b. mbohapy tapicha oñehunga vaipaite okúivo óga hoja ha'éva peteĩ es-
 tructura metálica²¹
 mbohapy tapicha o-je-hunga vaipaite okúivo óga
 three person 3-JE-injure very.badly when.it.detached house
 hoja ha'éva peteĩ estructura metálica
 sheet that.is one structure metallic
 'three people were injured very badly when a house sheet got detached
 (and fell) from a metal structure'

In (31a), the context before *reñehunga* establishes that the addressee is a woman *w*, that *w* is the continuous topic of the discourse, and introduces a possible world where:

- *w* is pregnant
- *w* takes a long walk
- the (undesirable) result of the long walk taken is...

This is the state of the context when *reñehunga* (2SG-JE-injure) is uttered. This explains why the most likely interpretation of *reñehunga* in that discourse is reflexive. In (32) I provide a simplified attempt to model this interpretation by availing myself of the CONTEXT (CNTXT) attribute, including CONTEXTUAL INDICES (C-INDS) that specify contextual elements relevant for indexicality and deixis, and a BACKGROUND (BCKGRND) attribute that is a list of propositions broadly understood to encode felicity conditions.²² Crucially, the passive interpretation is not impossible, it is only less natural ('if you are pregnant do not take long walks so as not to be injured by someone else').

²⁰<https://www.facebook.com/share/p/16sxNbfgqZ/>, 2026-01-30.

²¹<https://www.abc.com.py/especiales/remiandu/ara-vai-ama-ha-yvytu-hat-rire-1684775.html>, 2026-01-30.

²²As in example (19 on page 8), felicity conditions are modeled as semantic frames (*-fr*). The information that these predications that are part of the value of BACKGROUND are part of a possible world introduced by the conditional is not represented here. I am currently investigating the possibility to model this within TTR (*Type Theory with Records*; Lücking, Ginzburg & Cooper 2025).

$$(32) \left[\begin{array}{l} \text{phrase} \\ \text{FORM} \quad \text{Nderyeguasúrõ anínte reguata puku ani hağua re-je-hunga} \\ \\ \text{SEM} \mid \text{RELS} \quad \left\langle \begin{array}{l} \text{cause-ch-of-st-rel} \\ \text{LABEL} \quad l \\ \text{SIT} \quad s \\ \text{ACT} \quad w \\ \text{UND} \quad w \\ \text{SOA} \quad l' \end{array} \right\rangle, \left\langle \begin{array}{l} \text{injured-rel} \\ \text{LABEL} \quad l' \\ \text{P-BEARER} \quad w \end{array} \right\rangle \right. \\ \\ \text{CNTXT} \quad \left[\begin{array}{l} \text{context} \\ \text{C-INDS} \quad \left[\begin{array}{l} \text{SPKR} \quad a \\ \text{ADDR} \quad w \\ \text{TOPIC} \quad w \end{array} \right] \\ \text{BCKGRND} \quad \langle 1 \oplus 2 \oplus 3 \oplus 4 \rangle \end{array} \right] \end{array} \right]$$

where

$$\begin{array}{l} \boxed{1} \left[\begin{array}{l} \text{woman-fr} \\ \text{ENTITY} \quad w \end{array} \right] \\ \boxed{2} \left[\begin{array}{l} \text{pregnant-fr} \\ \text{ENTITY} \quad w \end{array} \right] \\ \boxed{3} \left[\begin{array}{l} \text{has-walked-long-fr} \\ \text{ENTITY} \quad w \end{array} \right] \\ \boxed{4} \left[\begin{array}{l} \text{result-fr} \\ \text{SOA} \quad \left[\begin{array}{l} \text{injured-fr} \\ \text{ENTITY} \quad w \end{array} \right] \end{array} \right] \end{array} \right].$$

In (31b on the previous page), on the other hand, the initial sequence *Mbohapy tapicha oñehunga (vaipaite)* is reflexive/passive ambiguous (33a). Resolution of the ambiguity in favor of the passive occurs only once the subordinate clause *okúivo óga hoja ha'éva peteĩ estructura metálica* ‘when a house sheet got detached (and fell) from a metal structure’ is uttered, because this clause clearly indicates a cause external to the participants. I attempt a very simplified first approach to how this resolution would work in (33b), again using the CONTEXT values. The subordinate clause *okúivo óga hoja ha'éva peteĩ estructura metálica* contains the temporal subordinator simultaneity suffix *-vo* ‘when, as’. The subordinator marks it as an adjunct to the main clause predicate, and the contribution to the semantics is that of simultaneity with the eventuality encoded by the main predicate. This simultaneity, together with world knowledge about events of falling, especially those including metallic objects, furthers the passive interpretation where it is the falling (or some aspect thereof) that is the cause of the injury event.

$$\begin{array}{c}
(33) \quad \text{a.} \quad \left[\begin{array}{l} \text{phrase} \\ \text{FORM} \quad \text{mbohapy tapicha o-je-hunga} \\ \\ \text{SEM} \mid \text{RELS} \quad \left\langle \begin{array}{l} \text{cause-ch-of-st-rel} \\ \text{LABEL } l \\ \text{SIT } s \\ \text{ACT } i \\ \text{UND } j \\ \text{SOA } l' \end{array} \right\rangle, \left[\begin{array}{l} \text{injured-rel} \\ \text{LABEL } l' \\ \text{P-BEARER } j \end{array} \right] \right\rangle \\ \\ \text{CNTXT} \mid \text{C-INDS} \quad \left[\begin{array}{l} \text{individual-fr} \\ \text{ENTITY } j \\ \text{INDEX } 3pl \\ \text{NAME } \textit{three people} \end{array} \right] \end{array} \right] \\
\\
\text{b.} \quad \left[\begin{array}{l} \text{phrase} \\ \text{FORM} \quad \text{mbohapy tapicha o-je-hunga okúivo...metálica} \\ \\ \text{SEM} \mid \text{RELS} \quad \left\langle \begin{array}{l} \text{cause-ch-of-st-rel} \\ \text{LABEL } l \\ \text{SIT } s \\ \text{ACT } \boxed{2} \\ \text{UND } j \\ \text{SOA } l' \end{array} \right\rangle, \left[\begin{array}{l} \text{injured-rel} \\ \text{LABEL } l' \\ \text{P-BEARER } j \end{array} \right] \right\rangle \\ \\ \text{CNTXT} \quad \left[\begin{array}{l} \text{C-INDS} \quad \left[\begin{array}{l} \text{individual-fr} \\ \text{ENTITY } j \\ \text{INDEX } 3pl \\ \text{NAME } \textit{three people} \end{array} \right] \\ \\ \text{BCKGRND} \quad \langle \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \rangle \end{array} \right] \end{array} \right]
\end{array}$$

where

$$\begin{array}{l}
\boxed{1} \left[\begin{array}{l} \text{detached-fr} \\ \text{ENTITY } i \end{array} \right] \\
\boxed{2} \left[\begin{array}{l} \text{result-fr} \\ \text{SOA} \left[\begin{array}{l} \text{fallen-fr} \\ \text{ENTITY } i \end{array} \right] \end{array} \right] \\
\boxed{3} \left[\begin{array}{l} \text{simultaneity-fr} \\ \text{SOA } l' \\ \text{SOA } \boxed{2} \end{array} \right].
\end{array}$$

Of course, this explanation is highly simplified and the technical details remain to be sorted out but the general idea is that *je-* itself is rather largely underspecified as to the resulting interpretations, which are a result of the interplay of lexical semantic information and contextual information.

3.3.2 Anticausative-passive ambiguities

The form *oñemonandi* ‘3-je-empty’ is ambiguous between the anticausative interpretation ‘it emptied (by itself)’ and the passive interpretation ‘it was emptied (by someone)’. In (34a), the anticausative is suggested by the fact that the events are purposefully presented as happening by themselves, whereas in (34b), the context of embezzlement furthers the passive interpretation that the bank was emptied by someone.

- (34) a. Ha ha'e he'i: Umi tavaguasu oñemonandi, ha opytapa peve avave'ÿre,
 ha umi óga kuimba'e'ÿre, ha pe yvy ha'eñoreipa²³
 ha ha'e he'i umi tavaguasu o-je-monandi ha opytapa peve
 and he said those city 3-JE-CAUS-empty and remain.all until
 avave'ÿre ha umi óga kuimba'e'ÿre ha pe yvy
 without.more.people and those house without.man and that ground
 ha'eñoreipa
 alone.in.vain.all
 ‘And he [God] said: until those cities empty and until they all remain
 without people and those houses without men and the land completely
 desolate’
- b. Oñemonandi pyahu piko Multibanco!²⁴
 o-je-monandi pyahu piko Multibanco
 3-JE-empty new Q Multibanco
 ‘Multibanco was recently emptied! (by embezzlers)’

I am not providing formal analyses of these cases: they seem to me squarely of a pragmatic nature and rather technically involved for the space I have in this paper. The treatment of such pragmatic effects requires a more careful analysis than what I can provide here, perhaps taking advantage of the *Dialogue Game Boards* framework proposed in Ginzburg (2012).

4 Conclusion

The analysis of middle markers is notoriously complex. I have shown how we can employ the theoretical apparatus of HPSG and its descendant framework SBCG to rein in the “explosion” of middle cluster interpretations.

²³<https://www.churchofjesuschrist.org/study/scriptures/bofm/2-ne/16?lang=grn>, 2026-01-30.

²⁴<https://www.abc.com.py/especiales/remiandu/onemonandi-pyahu-piko-multibanco-1080984.html>, 2026-01-30.

Underspecification is a key property of HPSG and it is crucial here. Instead of imbuing *je-* with a reflexive function, a passive voice function, and all the other attendant functions proper of a middle voice cluster, I model *je-* simply as an argument reducer, as is customary for passives in HPSG. Separating argument expression effects, linking affordances, and resolved interpretations allows us to have a principled analysis: *je-* reduces the number of terms (direct arguments) by 1, general linking constraints and the specific lexical semantics of each base predicate determine what linking patterns are possible for monadic and dyadic predicates with only one expressed argument (subject), and contextual information resolves any remaining ambiguities in interpretation.

So the take-home is that there isn't a "reflexive" *je-*, a "passive" *je-*, an "impersonal" *je-*, etc. Rather, *je-* does one and only one thing: reducing a predicate's number of direct arguments by one. The rest is done by the grammar of linking and by the rules of context-dependent interpretation. This prevents an "explosion" of types of *je-* where we would have a reflexive *je-*, an impersonal *je-*, a passive *je-*, an anticausative *je-*, and an autocausative *je-*.²⁵ Finally, I believe this analysis also sets the stage for a clearer, more principled account of the development of these clusters of functions, which in PG all arise from an original Tupi-Guarani reflexive-only prefix (Estigarribia 2025).

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²⁵This situation is commonly found in the analysis of Spanish which is considered to have about a dozen types of *se*: middle *se*, agentive *se*, transitive *se*, antipassive *se*, etc (see Fábregas 2021).

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A direct interpretation approach to English multiple sluicing constructions

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 46–68



Keywords: HPSG, Direct Interpretation, Question Under Discussion, Multiple Sluicing Constructions

Kim, Jimin & Eun-jung. Yoo. 2025. A direct interpretation approach to English multiple sluicing constructions. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 46–68. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.3. 
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Abstract

This paper[†] investigates multiple sluicing constructions, wherein two *wh*-phrases alone form a complete multiple *wh*-interrogative clause. Analyses of multiple sluicing generally fall into two broad categories: deletion-based approaches (Abels & Dayal 2023, Lasnik 2014, Merchant 2001, Nishigauchi 1998) proposing an underlying syntactic structure that is elided and a direct interpretation approach (Park 2009) which posits that fragment phrases are generated “as is,” with their interpretation supplied by the discourse.

By examining key syntactic phenomena, particularly island insensitivity, exceptions to clause-mateness, and sluicing without overt antecedents, this study argues that the direct interpretation approach more effectively captures the empirical data than deletion-based alternatives. Building on Ginzburg and Sag’s (2000) HPSG approach to single sluicing, we analyze multiple sluicing by employing the concept of Question Under Discussion (QUD) with two quantifiers. Through this approach, we demonstrate how the meaning of multiple sluicing can be derived from the discourse context, even in the absence of explicit linguistic antecedents. Furthermore, we show how it can effectively account for the three key syntactic phenomena mentioned above, to which deletion-based approaches struggle to provide a uniform account.

1 Introduction

A single sluicing construction is an elliptical phenomenon where a single *wh*-phrase serves as a unary *wh*-interrogative clause, as shown in (1). Here, the *wh*-phrase *what* functions to convey the meaning of *what Ben wanted to ask*.

- (1) Ben wanted to ask something. I wonder *what*. (Merchant 2001: 41)

Similarly, a multiple sluicing construction is an elliptical phenomenon where two *wh*-phrases constitute a multiple *wh*-interrogative clause, as in (2).¹ Here, the multiple sluice *who whom* is interpreted as equivalent to *who kicked whom*.

- (2) I saw that one girl kicked a boy, but I don’t know *who whom*. (Bolinger 1978: 109)

[†]We thank the anonymous reviewers and the audience of the HPSG conference for their helpful comments and suggestions. All the remaining errors are ours.

¹Admittedly, multiple sluicing is a marked construction in English and its acceptability is subject to cross-linguistic variation. Adopting the view of Cortés Rodríguez (2026), we assume that its marginality in English can be attributed to the lack of cues such as case markers and non-omittable prepositions that would facilitate the processing of the multiple *wh*-dependencies. This may also explain why the acceptability of multiple sluicing increases substantially when the second *wh*-phrase is a PP in English, as will be shown in Section 2 and Section 4.

There are broadly two possible approaches to a sluicing construction, a deletion-based approach and a direct interpretation approach. A deletion-based approach (Abels & Dayal 2023, Lasnik 2014, Merchant 2001, Nishigauchi 1998) assumes that the two *wh*-phrases are moved to the clause-initial or final position, and the remaining TP is then deleted. The problem is that English does not permit multiple *wh*-fronting. Therefore, different mechanisms such as extraposition or exceptional covert *wh*-phrase movement had to be introduced to allow the second *wh*-phrase to survive the TP ellipsis.

On the other hand, a direct interpretation approach (e.g., Park 2009) assumes that a multiple sluicing construction is generated directly from two *wh*-phrases without a deleted or unpronounced syntactic structure. In this approach, the key issue is how the form-meaning mismatch can be resolved without positing an elided syntactic structure. In Park (2009), a multiple sluicing construction is assumed to draw its predicate meaning from its linguistic antecedent in the discourse record. However, it has limitations in accounting for cases without a linguistic antecedent or cases where the semantic structure of a multiple sluice and that of its linguistic antecedent do not match.

In this paper, we advocate a direct interpretation approach that exploits the notion of Question Under Discussion (QUD). By comparing it with a couple of representative deletion-based approaches, we show how it is more favorable in dealing with some key data of multiple sluicing constructions: exceptions to the so-called “clause-mate condition,” cases without linguistic antecedents, and examples involving island insensitivity. Then, drawing on Ginzburg & Sag (2000)’s HPSG approach to single sluicing, we provide an HPSG analysis of multiple sluicing. Specifically, we show how the Question Under Discussion triggered in the discourse context can provide the backbone to the meaning of multiple sluicing constructions without solely resorting to the parallelism with the linguistic antecedents.

2 Key Properties of Multiple Sluicing Constructions

In this section, we discuss the key properties of multiple sluicing constructions. To begin with, as mentioned above, a multiple sluicing construction is a clausal ellipsis where two *wh*-phrases serve as a multiple *wh*-interrogative clause. That is, the multiple sluicing construction in (3) is semantically equivalent to (4).

- (3) A: Some student is reported to have quarreled with a famous professor.
B: *Which student with which professor?* (Ginzburg & Sag 2000: 301)
- (4) Which student is reported to have quarreled with which famous professor?

Like regular *wh*-clauses, it can not only serve as a stand-alone construction as shown in (3) above, but also as an embedded clause as in (5) below.

- (5) Some student is reported to have quarreled with a famous professor, but I don't know *which student with which professor*.

The fact that multiple sluicing constructions are not impossible even in a single *wh*-fronting language such as English can be perplexing to those advocating the idea that a sluice results from a *wh*-movement followed by a TP deletion, which is exemplified in (6) below. This is because, in this line of analysis, they would have to assume a multiple *wh*-fronting as in (7) in the case of multiple sluicing constructions, which is of course illicit in English.

- (6) John likes someone, but I don't know *who_i* [TP ~~John likes t_i~~.]
 (7) ?Someone talked about something, but I can't remember *who_i about what_j* [TP t_i ~~talked t_j~~]

Therefore, different suggestions have been made to deal with this issue, such as repair via ellipsis (Merchant 2001, Abels & Dayal 2023) or rightward focus movement (Nishigauchi 1998, Lasnik 2014). More discussion on this will be elaborated in Section 3.

Second, the linear order of the two *wh*-remnants must match that of their correlates. The shuffling of the two *wh*-remnants is disallowed, as shown in the contrast in (8).

- (8) a. Everyone brought something (different) to the potluck, but I couldn't tell you *who what*. (Merchant 2001: 112)
 b. *Everyone brought something (different) to the potluck, but I couldn't tell you *what who*.

Third, multiple sluicing constructions are insensitive to island constraints. Island constraints refer to some syntactic constraints on movement, which is generally assumed by transformational approaches (Ross 1967). Certain syntactic structures such as complex NPs, adjuncts, or *wh*-clauses prohibit extraction of a constituent inside them. Ross (1969) was the first to point out that single sluices exhibit island insensitivity. For instance, in (9) below, *who* is extracted out of a complex NP island under the assumption that sluicing results from a TP deletion following the *wh*-movement. The fact that (9) is grammatical indicates that single sluices are not subject to the island constraint.

- (9) I believe the claim that he bit someone, but they don't know *who_i* [TP I believe [CNP-island ~~the claim that he bit t_i~~]]. (Ross 1969: 277)

Similarly, multiple sluices are not subject to island constraints as well. In (10) below, the two *wh*-remnants originate from a *wh*-island. Again, when

assuming that the multiple sluicing construction results from extraction of the two *wh*-phrases out of the *wh*-clause, the derivation of (10) must involve an island violation. The fact that (10) is allowed means that multiple sluicing constructions are also island-insensitive.

- (10) Ben got mad when every student talked to some teacher, but he just couldn't remember *which student to which teacher*. (Cortés Rodríguez 2024: 53)

Fourth, as can be seen in the contrast between (11a) and (11b), it seems that the two *wh*-remnants of multiple sluicing may not be separated by a tensed clause boundary. As such, quite a few previous works on this construction posited a syntactic restriction that the two *wh*-remnants must be clause-mates within a finite clause (Nishigauchi 1998, Lasnik 2014, Abels & Dayal 2023).

- (11) a. A student met with some professor, but I don't know *which student with which professor*. (Barros & Frank 2023: 651)
 b. *Some student said that Sally met with some professor, but I don't know *which student with which professor*. (*ibid.*)

However, there are several data that debunk the existence of such condition. For example, Barros & Frank (2023) report several occasions where multiple sluicing across a tensed clause boundary is grammatical. For instance, if the first correlate is co-referential with the pronoun occupying the embedded subject position as in (12) or if the embedded subject is an expletive as in (13), multiple sluicing across a tensed clause-boundary is possible.

- (12) Everybody_k claimed that *they_k* had talked to some professor, but I can't remember *who to which professor*.
 (13) Some student claimed that *there* was a problem with some professor, but I can't recall *which student with which professor*.

Fifth, while the category of the correlates must match that of the associated remnants, only the first *wh*-remnant allows P-stranding. P-stranding refers to the fronting of a prepositional object while leaving the preposition in its original place. Therefore, in (14), the preposition of the first *wh*-remnant can be optionally omitted. On the other hand, the preposition of the second *wh*-remnant cannot be omitted.

- (14) Peter talked about something to somebody, but I can't remember (about) what *(to) whom. (Rodrigues et al. 2009: 180)

Sixth, in some cases, a multiple sluicing construction does not have an antecedent clause, as shown in examples below. Rather, the sentence providing the clue to its meaning follows it. This data is particularly noteworthy because

a deletion-based approach crucially depends on the existence of a salient antecedent clause preceding the multiple sluice, as will be shown in Section 3.

- (15) I don't know *who with who*, but I'm sure everybody will get hooked up with someone. (Merchant 2006: 286)
- (16) I don't know *who with who*, but I'm sure everybody will dance with somebody. (Romero 1997: 197)

Finally, the type of the embedding verbs in the antecedent clause seems to affect the grammaticality of multiple sluicing constructions according to Lasnik (2014). In (17) below, when the embedding verb is *deny* or *doubt*, the acceptability of the following multiple sluicing construction drops significantly.

- (17) A: Fred *denied/doubted* that a certain boy talked to a certain girl.
 B: ???I wish I could remember *which boy to what girl*. (Lasnik 2014: 13)

So far, some of the key properties of this construction have been presented, which will be crucial in the discussion of which approach fits the broader data better. In the following section, we show how two representative deletion-based approaches and the existing direct interpretation approaches are insufficient to accommodate the full range of properties of this construction shown above.

3 Previous Analyses

3.1 Lasnik (2014)

Lasnik (2014) accounts for multiple sluicing constructions in a way analogous to gapping. That is, while the first *wh*-phrase undergoes a regular *wh*-movement, the second *wh*-phrase is extraposed, landing in a position higher than TP. Then, TP ellipsis occurs, yielding the surface form. For instance, (18a) below is derived from (18b).

- (18) a. ?One of the students spoke to one of the professors, but I don't know *which to which*. (Lasnik 2014: 4)
 b. ..., but I don't know [which]_i [TP ~~t_i spoke t_j~~] [to which]_j

One implicit assumption here is that the E-site² is syntactically identical to the antecedent clause. An issue challenging this approach concerns the Right Roof Constraint (RRC) (Ross 1967). The RRC is a condition on rightward movement, which prohibits the long-distance extraposition across a clause boundary. This posits a problem in cases like (19) below.

²The term E-site refers to the syntactic structure that is the target of ellipsis.

- (19) Fred thinks a certain boy talked to a certain girl. I wish I could remember *which boy to what girl*. (Barros 2014: 12)

To derive the multiple sluice in (19), Lasnik would have to assume a derivation in (20), where the second *wh*-phrase, *to what girl*, has to be extraposed all the way across a finite CP boundary to the matrix CP, which is in violation of the RRC.

- (20) [CP₁ [which boy]_i [TP ~~Fred thinks~~ [CP₂ ~~t_i talked t_j~~] [to what girl]_j]

To resolve such an issue, Lasnik proposes an alternative derivation for (19), where the E-site contains the truncated mono-clausal structure:

- (21) ... [CP [which boy]_i [TP ~~t_i talked t_j~~] [to what girl]_j]

This derivation is licensed under the assumption that the speaker can accommodate the propositional content *P* from *Fred thinks P*, thereby allowing the embedded content *P* to serve as the antecedent for the elided TP. In (21), the extraposed phrase does not cross the finite clause boundary, since it is generated in the matrix clause. Thus, it survives the TP ellipsis, while not violating the RRC. Since Lasnik posits that the structure is always mono-clausal, the fact that the two *wh*-phrases seem to be clause-mates can be naturally accounted for.

However, there are certain data that it cannot explain. To begin with, extraposition is generally assumed to target places under a TP, as noted by Lasnik himself. This is illustrated by the ungrammaticality of (22).³ Yet, Lasnik is assuming a different pattern of extraposition for a *wh*-phrase, which may not be independently motivated.

- (22) ?*I know who Mary talked to yesterday about phonology, but I don't know *who about semantics*. (Lasnik 2014: 14)

Another issue is that multiple sluicing across a tensed clause boundary is not appropriately accounted for. As stated earlier, Lasnik basically posits a solid syntactic constraint that the E-site must contain a mono-clausal structure which is syntactically isomorphic to the linguistic antecedent. Therefore, it cannot accommodate cases of multiple sluicing across a clause-boundary in (13), repeated below in (23).

- (23) Some student claimed that *there* was a problem with some professor, but I can't recall *which student with which professor*.

³If an extraposed phrase can move to somewhere above the TP, *about semantics* should be able to survive the TP ellipsis as follows:

- (i). [who]_i [TP ~~Mary talked to t_i t_j~~] [about semantics]_j

Furthermore, he cannot address certain cases of island-insensitivity, marking another limitation.

- (24) A: Sally will be surprised if one of the students in her class wins a prize in some contest.
 B: *Which student in which contest?*

In (24), the correlates of the two *wh*-fragments, *one of the students in her class* and *in some contest*, are inside an adjunct island. Since extraction out of an adjunct island is prohibited (Ross 1967), Lasnik would have to assume that the E-site contains a truncated mono-clausal structure that does not contain an island:

- (25) [which student]_i [TP ~~t_i wins a prize t_j~~] [in which contest]_j

However, unlike the case of (19), the derivation in (25) cannot be licensed because a conditional clause does not support accommodation. Overall, it is evident that Lasnik (2014) cannot capture the wide array of data shown in multiple sluicing constructions.

3.2 Abels & Dayal (2023)

Abels & Dayal (2023) propose another deletion-based account of multiple sluicing, deriving it from multiple *wh*-fronting. They argue that while the first *wh*-phrase undergoes overt movement, the second moves covertly, after which TP ellipsis applies. Adopting a single-cycle model with a copy or multi-dominance view of movement, they suggest that the overt realization of the covertly moved *wh*-phrase results from pronunciation of the higher copy when the lower copy is deleted (Gärtner 2002).

They argue that since covert movement is clause-bounded and subject to superiority, both *wh*-phrases can appear in the correct order within the same CP only if the E-site contains a single finite clause. That is, while departing from different assumptions, their view aligns with Lasnik (2014) in positing a mono-clausal structural constraint in the E-site.

What distinguishes it from Lasnik (2014) is the choice of an identity condition: whereas Lasnik assumes a syntactic requirement, Abels and Dayal, adopting Merchant (2001)'s E-givenness,⁴ allow the E-site to differ syntactically from its antecedent as long as semantic identity is maintained.

⁴Merchant's E-givenness Condition, presented below, is a semantic identity condition on ellipsis, requiring a mutual entailment between the focus closures of the antecedent and the elided constituent.

- (i) A constituent E can be deleted iff E is e-GIVEN.
- (ii) An expression counts as e-GIVEN iff E has a salient antecedent A and, modulo $\exists$ -type shifting:
 - (a) A entails the Focus closure of E ($F\text{-clo}(E)$), and E entails $F\text{-clo}(A)$.
 - (b) $F\text{-clo}(\alpha)$ replaces F-marked parts of α with $\exists$ -bound variables.

Given this, it can address how multiple sluicing can “evade” island constraints. In the German example in (26), the two correlates, *which present* and *to which child*, belong to a relative clause, extraction out of which is prohibited.

- (26) Ich kenne einen Lehrer, der jedem Kind ein Geschenk gegeben hat
 I know a teacher who every.DAT child a.ACC present given has
 aber ich weiß nicht genau welchem Kind welches Geschenk.
 but I know not exactly which.DAT child which.ACC present
‘I know a teacher who gave a present to each child, but I don’t know exactly which present to which child.’
 (Abels & Dayal 2023: 433)

Abels & Dayal (2023) account for this data by positing a mono-clausal structure which is semantically equivalent but not syntactically isomorphic to the linguistic antecedent, as shown in (27). This way, the E-site does not contain a relative clause, thus evading the island violations.

- (27) ... I don’t know exactly [which present]_i [to which child]_j [TP he gave ~~t_i~~ t_j]

However, such an account cannot resolve all cases of island insensitivity. For instance, in (24), repeated below, the two correlates belong to a conditional clause.

- (28) A: Sally will be surprised if one of the students in her class wins a prize in some contest.
 B: Which student in which contest?

In this case, an analysis in line with (27), given in (29) below, is not tenable here. In (28), since the antecedent clause is a conditional clause, it cannot entail the focus closure of the E-site in (30), violating Merchant’s E-givenness condition (see footnote 4).

- (29) [which student]_i [in which contest]_j [TP ~~t_i wins a prize~~ t_j]
 (30) F-clo of (29): $\exists x \exists y$ [x wins a prize in y]

Abels & Dayal (2023) also face challenges as to explaining the exception cases to the clause-mate condition. Recall that Abels and Dayal require the E-site to be mono-clausal, so examples of multiple sluicing that cross a finite-clause boundary (e.g. (13)) appear problematic.⁵

⁵Cortés Rodríguez (2022) claims that Abels & Dayal (2023) can also cover multiple sluices across a tensed clause boundary by invoking the “short source” approach as below:

(i) ..., but I can’t recall [which student]_i [with which professor]_j [TP ~~t_i had problem~~ t_j].

Finally, there are cases where multiple sluicing does not follow a linguistic antecedent. For instance, in (15), repeated below in (31), the sentence providing the clue to the interpretation of the multiple sluice does not precede it, but follows it.

- (31) I don't know who with who, but I'm sure everybody will get hooked up with someone.

These cases cannot be accounted for in this analysis, because Merchant (2001)'s E-givenness condition basically requires a salient antecedent. If there is no appropriate linguistic antecedent, there is no way to account for such cases.

Overall, deletion-based approaches assume that the relevant syntactic structure in the ellipsis site is derived from the syntax/ semantics of an overt antecedent. Consequently, such approaches cannot be applied when no suitable antecedent exists. Moreover, since the movement that precedes deletion, whether it is an extraposition or a covert *wh*-phrase movement, is subject to clause-boundedness constraints, the E-site must be mono-clausal. It thus follows that deletion-based accounts are unable to capture cases of multiple sluicing across a finite clause-boundary. Furthermore, certain cases regarding island-insensitivity cannot be explained in both approaches. In Lasnik (2014), the syntactic identity condition disallows evasion of island constraints. Abels & Dayal (2023), on the other hand, circumvent this issue by positing a non-isomorphic E-site structure but still fails to account for cases where the mutual entailment between the antecedent and the multiple sluicing construction cannot be satisfied.

3.3 Park (2009)

Park (2009), adopting Bertomeu & Kordoni (2005), provides an HPSG analysis of multiple sluicing based on the discourse record.⁶ In Bertomeu & Kordoni (2005), it is assumed that fragments are not a uniform phenomenon but are licensed by different construction types. One such type is *sem-struct-res-frag-cl*, which crucially relies on the access to the structural semantic information from an antecedent utterance. The semantic structural information of recent utterances is stored in the discourse record, which is a memory buffer that keeps track of representations of recent utterances in sequence. In *sem-struct-res-frag-cl*, fragment resolution is achieved by identifying the relation of the *soa* of the recent utterance with that of the constructional

However, in this case, the structure prior to ellipsis would be *which student had a problem with which professor*. It only licenses the specific meaning where some student had a trouble with some professor. Another possible interpretation where some student is a mere reporter of some professor having a problem is rejected under such an analysis.

⁶Due to space constraints, we only provide a simplified description of Park (2009). For a detailed discussion, refer to Kim (2025).

content, allowing the fragment to reconstruct a propositional meaning without a verbal predicate.

By introducing *multi-wh-frag-cl* as a type representing multiple sluicing constructions and making it a subtype of *sem-struct-res-frag-cl*, Park (2009) applies this approach directly to multiple sluicing, with an addition of a few construction-specific constraints. The crucial point in the constraints is that the key semantic relation of the recent utterance is matched with that of the multiple sluicing construction⁷

However, this approach also faces certain limitations. First, it crucially relies on the presence of an antecedent in the discourse, making it difficult to account for exophoric multiple sluicing, where no linguistic antecedent is available. Second, because the approach derives the constructional meaning by mapping the relation of a single verbal predicate in the antecedent to multiple fragments, it encounters challenges in cases where multiple sluicing occurs across the clause boundary. It is because neither of the antecedent predicates can have the two *wh*-fragments as their arguments. Finally, since it relies purely on semantics in resolving multiple sluicing constructions, it cannot account for the syntactic features of the construction. For instance, while only the first fragment allows for the omission of preposition, this sort of syntactic pattern cannot be captured in this approach.

4 A QUD-based HPSG Analysis

In this section, we propose a more discourse-driven approach in which the interpretation of an elliptical phenomenon is guided not mainly by the structural parallelism with the antecedent, but by the retrieval of contextually salient question meanings from the discourse i.e., Question Under Discussion (QUD). QUD, discussed in Ginzburg (1994) and Roberts (1996), is a salient question meaning sequentially activated in the discourse context, which functions to constrain the felicitous flow of discourse among interlocutors. Employing such a pragmatic concept enables a more flexible account that is not necessarily constrained by the presence of a linguistic antecedent.

One possible approach is to extend AnderBois (2014)’s QUD-based analysis of single sluicing constructions to multiple sluicing constructions. However, since it is couched in a type of a deletion-based approach, it assumes that the QUD is directly calculated from the quantificational items in the linguistic antecedent. Thus, it shares many of the limitations of deletion-based analyses discussed in Section 3.⁸

⁷To be more specific, this identity is enforced by matching the RELN value of the *soa* relation in the construction’s C-CONT|RELS with the RELN value of the *soa* in the RELS stored in the antecedent’s DISC-REC (discourse record).

⁸See Kim (2025) for the discussion on potential challenges to an attempt to extend this particular analysis to multiple sluicing constructions.

Instead, we adopt and extend Ginzburg & Sag’s (2000) single sluicing analysis (G&S henceforth) to multiple sluicing constructions. G&S offers a QUD-based account of sluicing within HPSG, employing a direct interpretation approach. Basically, it assumes that a *wh*-fragment in a single sluicing construction is generated *as is*, without transformational operations such as movement and deletion. That single fragment projects into a verbal mother and the sentential meaning of the mother is derived from the most immediate QUD (i.e., maximal QUD) in the discourse context.

To see how it works, here is a simple example:

- (32) A: Some student died.
B: Who?

In G&S, which is built up upon the framework of KoS (Ginzburg 1996, Traum et al. 1999), both querying and assertion involve a question becoming the maximal QUD: when a question *q* is explicitly posed, that question *q* will become the maximal QUD. When an assertion *p* is uttered, a polar question $\lambda\{ \}p$ will become the maximal QUD. In (32) above, the MAX-QUD will be $\lambda\{ \}prop(s, \langle\langle Some; \lambda b. \langle\langle Student; b \rangle\rangle, \lambda c. \langle\langle Die; c \rangle\rangle \rangle\rangle)$, a polar interrogative question semantically equivalent to ‘Did some student die?’ This QUD will provide the backbone of the meaning to the following sluicing construction, a detailed account of which will be provided below.

What is important to note is that G&S adopts a speaker-oriented view of the utterance and allows a QUD trigger even without an explicit utterance.⁹ That is, if the speaker thinks a certain question can and should be discussed immediately in the current discourse context, that question can become the maximal QUD. Related examples presented in G&S are as follows:

- (33) [Milling around on first day of conference, participants ignorant of location of talks go up to harried organiser:] Hey, could you tell us which room so we can go in and wait for things to start? (Ginzburg & Sag 2000: 298)
- (34) [In an elevator] What floor? (*ibid.*)

The advantage of choosing G&S is manifold. First, it presents a more genuinely discourse-oriented QUD approach, one that does not mandate the existence of a linguistic antecedent. Thus, it admits the possibility

⁹For example, Ginzburg (2012) argues that what counts as a relevant utterance in a discourse is constrained by activity relevance, which is modeled in terms of *conversational genres*. Even in the absence of an overt linguistic antecedent, a conversational genre may support the accommodation of a relevant question. If the speaker believes that an utterance addresses such an accommodated QUD, an exophoric non-sentential utterance can be licensed. Although the current analysis does not make reference to the notion of conversational genres, it crucially adopts the underlying insight that a QUD may be accommodated based on the speaker’s assessment of the discourse context.

that a QUD can be triggered without an antecedent, given an appropriate discourse context. Furthermore, since it denies transformational operations, island insensitivity and the possibility of multiple sluicing across a finite clause boundary are more easily accounted for. However, several modifications to this system are necessary to extend this to multiple sluicing cases, since the original approach only dealt with single sluicing cases. In the following subsection (§4.1), we propose an HPSG analysis to multiple sluicing constructions, building on G&S. Then in the next subsection (§4.2), it will be shown how this account can capture the key properties of the construction discussed in Section 2.

4.1 Representing Multiple Sluicing Constructions

Since G&S only deals with the cases of single sluicing constructions, some modifications should be made to its type hierarchy and type constraints. The modified type hierarchy is presented in Figure 1. First, unlike G&S, which regards the type *hd-frag-ph* representing Non-Sentential Utterances (NSUs) as a headed phrase, we revise it into a non-headed phrase, renaming it as *frag-ph*. This is motivated by the fact that NSUs do not show a typical property of a headed structure in that the mother (‘S’) and the head daughter (‘NP’) do not share categorical identity or semantic headedness. Moreover, when they comprise more than one fragment daughter, they do not constitute a head-mother relationship with any of their daughters. In addition, we change *slu-int-cl*, which originally represented single sluices, into a cover type subsuming *mult-slu-int-cl* (for multiple sluices) and *sg-slu-int-cl* (for single sluices).

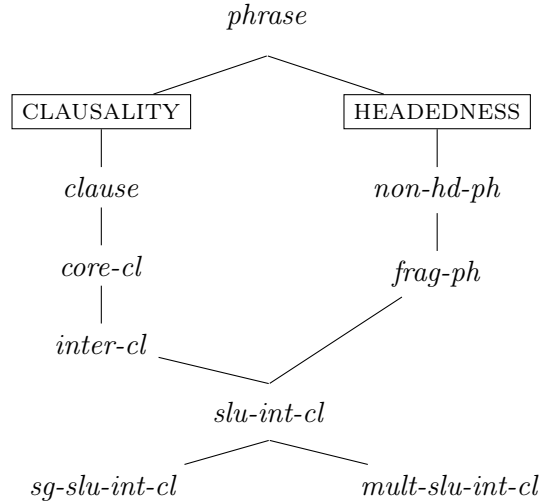


Figure 1: Type Hierarchy Associated with Multiple Sluicing Constructions

In addition, the constraint imposed on *frag-ph* is revised as in (35) below. Unlike the original constraint where the SAL-UTT (salient-utterance) takes a singleton set, it now takes an ordered list of multiple items, only the first one of which is mandatory. The SAL-UTT represents the (sub)utterance that are in focus in the maximal QUD. They correspond to the correlates in case there are linguistic antecedents. Note that their CAT (category) and INDEX values are matched with that of the fragments in order. This matching ensures that they share syntactic category and have same referents as the corresponding fragment daughters. The only exception is the first fragment. In the case of first fragment, it merely shares a VAL value with SPR and COMPS saturated, which means that they should be a maximal projection. This is to accommodate the fact that only the first fragment of multiple sluicing constructions allows the omission of preposition when the relevant correlate is a PP (Romero 1997, Merchant 2006, Cortés Rodríguez 2026).¹⁰

$$(35) \quad \left[\begin{array}{c} frag-ph \\ \left[\begin{array}{c} CAT \\ \left[\begin{array}{c} HEAD \left[\begin{array}{c} v \\ VFORM \textit{fin} \end{array} \right] \\ VAL \left[\begin{array}{c} SUBJ \langle \rangle \\ SPR \langle \rangle \end{array} \right] \end{array} \right] \\ \left[\begin{array}{c} SAL-UTT \left\langle \left[\begin{array}{c} CAT \\ \left[\begin{array}{c} HEAD \textit{nominal} \\ VAL \left[\begin{array}{c} SPR \langle \rangle \\ COMPS \langle \rangle \end{array} \right] \end{array} \right] \right] \left[\begin{array}{c} INDEX \boxed{n} \end{array} \right] \end{array} \right\rangle \left(\left[\begin{array}{c} CAT \boxed{n} \left[\begin{array}{c} HEAD \textit{nominal} \end{array} \right] \right] \left[\begin{array}{c} INDEX \boxed{n} \end{array} \right] \end{array} \right) \dots \left(\left[\begin{array}{c} CAT \boxed{n+1} \left[\begin{array}{c} HEAD \textit{nominal} \end{array} \right] \right] \left[\begin{array}{c} INDEX \boxed{n+1} \end{array} \right] \end{array} \right) \end{array} \right] \end{array} \right] \end{array} \right] \rightarrow \\ \left[\begin{array}{c} CAT \\ \left[\begin{array}{c} HEAD \textit{nominal} \\ VAL \left[\begin{array}{c} SPR \langle \rangle \\ COMPS \langle \rangle \end{array} \right] \end{array} \right] \left[\begin{array}{c} INDEX \boxed{n} \end{array} \right] \end{array} \right] \left(\left[\begin{array}{c} CAT \boxed{n} \left[\begin{array}{c} HEAD \textit{nominal} \end{array} \right] \right] \left[\begin{array}{c} INDEX \boxed{n} \end{array} \right] \end{array} \right) \dots \left(\left[\begin{array}{c} CAT \boxed{n+1} \left[\begin{array}{c} HEAD \textit{nominal} \end{array} \right] \right] \left[\begin{array}{c} INDEX \boxed{n+1} \end{array} \right] \end{array} \right) \end{array} \right]$$

Moving onto the dimension of CLAUSALITY, *inter-cl* represents all *wh*-interrogative clauses which require *wh*-retrieval. By the Interrogative Retrieval Constraint (IRC) imposed on this type, *wh*-phrases in an interrogative clause can find its appropriate scope. In G&S, the *wh*-retrieval in the IRC was mediated through a head-mother relationship, since all subtypes of *slu-int-cl* were a headed phrase. However, in our approach, since *slu-int-cl* is a non-headed construction, we add a new mode of *wh*-retrieval in the IRC, where non-head *wh*-fragment daughters mandatorily find its scope in its mother. In the modified IRC in (36) below, it specifies that the parameters in the STORE of fragment daughters must be retrieved in the mother's PARAMS set. As in G&S, the STORE represents scopal elements which have yet to find their scope. Every *wh*-phrase mandatorily introduces one parameter (in its STORE), which is a restriction-bearing index corresponding to the entity that gets abstracted away.

¹⁰This way of treating preposition omission in fragments is partly based on Nykiel & Kim (2022).

(36) *inter-cl*:
 (i) In *hd-ph*

$$\left[\begin{array}{l} \text{STORE } \boxed{\Sigma_1} \\ \text{CONT } \left[\text{PARAMS } \boxed{\Sigma_2} \right] \end{array} \right] \rightarrow \mathbf{H} \left[\text{STORE } \boxed{\Sigma_1} \uplus \boxed{\Sigma_2} \right]$$

(ii) In *non-hd-ph*

$$\left[\text{CONT } \left[\text{PARAMS } \boxed{\Sigma_1} \uplus \dots \uplus \boxed{\Sigma_n} \right] \right] \rightarrow \left[\text{STORE } \boxed{\Sigma_1} \right] \dots \left[\text{STORE } \boxed{\Sigma_n} \right]$$

Next, to capture the common properties of sluicing constructions in general, we impose the constraint on *slu-int-cl* in (37). As in G&S, the mother has the feature MAX-QUD, which represents the maximal QUD in the current context. The maximal QUD of *slu-int-cl* has a propositional argument containing up to two wide-scoping quantificational items.¹¹ It represents a correlate or a quantifier associated with the *wh*-fragment(s) of sluicing constructions. In case the given sluicing construction has two fragment daughters, there will be at least two quantifiers, each corresponding to a different fragment daughter. Then, the CONT value of the mother, which represents the meaning of the construction itself, is also a question, with the same SIT (situational index) and NUCL (key semantic relation) as the MAX-QUD. This indicates that the meaning of a sluicing construction references the same situation and semantic relation as the maximal QUD. Note also that the fragment daughter(s) mandatorily has a non-empty set of parameters, suggesting that they must be a *wh*-phrase.

$$(37) \left[\begin{array}{l} \text{slu-int-cl} \\ \text{CONT } \left[\begin{array}{l} \text{question} \\ \text{PROP } \left[\begin{array}{l} \text{proposition} \\ \text{SIT } \boxed{1} \\ \text{SOA } \left[\text{QUANTS } \boxed{A} \right] \\ \text{NUCL } \boxed{2} \end{array} \right] \end{array} \right] \\ \text{STORE } \{\} \\ \text{MAX-QUD } \left[\begin{array}{l} \text{question} \\ \text{PARAMS } \{\} \\ \text{PROP } \left[\begin{array}{l} \text{proposition} \\ \text{SIT } \boxed{1} \\ \text{SOA } \left[\text{QUANTS } \langle p\text{quant-rel} \rangle \oplus \left(\langle p\text{quant-rel} \rangle \right) \oplus \boxed{A} \right] \\ \text{NUCL } \boxed{2} \end{array} \right] \end{array} \right] \end{array} \right] \rightarrow \left[\text{STORE } \text{neset}(\text{param}) \right] \left(\left[\text{STORE } \text{neset}(\text{param}) \right] \right)$$

¹¹Non-sentential utterances such as gapping may allow more than two fragment daughters, which is permitted by the *frag-ph* in (35). On the other hand, since sluicing does not appear to allow more than two daughters in English, we limited the number of the fragment daughters to two in (37).

Finally, the constraint imposed on the terminal type *mult-slu-int-cl*, which represents multiple sluices, is presented in (38). It ensures that the maximal QUD must have two wide scoping positive quantifiers, whose scope interaction will give rise to a pair of entities queried by the multiple sluice. Also, it makes sure that the number of the fragment daughters must be two. (39) below illustrates all the constraints on *mult-slu-int-cl* inherited from its supertypes mentioned so far.

$$\begin{aligned}
(38) \quad & \left[\begin{array}{c} \text{mult-slu-int-cl} \\ \text{CONT} \quad \left[\text{PROP} \left[\text{SOA} \left[\text{QUANTS} \boxed{A} \right] \right] \right] \\ \text{MAX-QUD} \quad \left[\text{PARAMS} \{ \} \right. \\ \quad \left. \text{PROP} \left[\text{SOA} \left[\text{QUANTS} \left\langle [pquant-rel] \right\rangle_{\oplus} \left\langle [pquant-rel] \right\rangle_{\oplus} \boxed{A} \right] \right] \right] \end{array} \right] \rightarrow \left[\dots \right] \left[\dots \right] \\
(39) \quad & \left[\begin{array}{c} \text{mult-slu-int-cl} \\ \text{CAT} \quad \left[\text{HEAD} \left[\begin{array}{c} v \\ \text{VFORM } fin \end{array} \right] \right] \\ \text{CONT} \quad \left[\begin{array}{c} \text{question} \\ \text{PARAMS} \left[\Sigma_1 \text{ neset} \uplus \Sigma_2 \text{ neset} \right] \\ \text{PROP} \left[\begin{array}{c} \text{proposition} \\ \text{SIT} \quad \boxed{0} \\ \text{SOA} \quad \left[\text{QUANTS} \boxed{A} \right] \right] \end{array} \right] \end{array} \right] \\ \text{STORE} \quad \{ \} \\ \text{MAX-QUD} \quad \left[\begin{array}{c} \text{question} \\ \text{PARAMS} \{ \} \\ \text{PROP} \left[\begin{array}{c} \text{proposition} \\ \text{SIT} \quad \boxed{0} \\ \text{SOA} \quad \left[\text{QUANTS} \left\langle [pquant-rel] \text{ INDEX } \boxed{2} \right\rangle_{\oplus} \left\langle [pquant-rel] \text{ INDEX } \boxed{4} \right\rangle_{\oplus} \boxed{A} \right] \right] \end{array} \right] \end{array} \right] \\ \text{SAL-UTT} \quad \left\langle \begin{array}{c} \text{CAT} \quad \left[\text{HEAD } nominal \right] \\ \text{VAL} \quad \boxed{1} \left[\begin{array}{c} \text{SPR } <> \\ \text{COMPS } <> \end{array} \right] \end{array} \right\rangle, \left[\begin{array}{c} \text{CAT } \boxed{3} \left[\text{HEAD } nominal \right] \\ \text{INDEX } \boxed{4} \end{array} \right] \end{array} \right] \rightarrow \left[\begin{array}{c} \text{CAT} \quad \left[\text{HEAD } nominal \right] \\ \text{VAL} \quad \boxed{1} \left[\begin{array}{c} \text{SPR } <> \\ \text{COMPS } <> \end{array} \right] \end{array} \right] \left[\begin{array}{c} \text{CAT} \quad \boxed{3} \\ \text{INDEX} \quad \boxed{4} \\ \text{STORE } \Sigma_2 \end{array} \right] \\ \text{INDEX } \boxed{2} \\ \text{STORE } \Sigma_1 \end{array} \right]
\end{aligned}$$

To summarize the essence of what has been presented so far, a multiple sluicing construction has a maximal QUD of a polar question, whose propositional argument has two wide-scoping positive quantifiers. The CONT of the mother is largely drawn from this maximal QUD, suggesting that the construction meaning is referencing the situation and the semantic relation of the propositional argument of the maximal QUD. Importantly, the difference

between the maximal QUD and the mother’s CONT is that while the former has an empty PARAMS set, thus being a polar question, the mother’s CONT has two items in its PARAMS set. This is a consequence of the modified IRC, where all the parameters in the STORE set of the fragment daughters must be retrieved in the mother. Since the parameters contributed by the fragment daughters are retrieved in the mother node, it ends up having the meaning of querying the identity of the pair of entities associated with them.

4.2 A Comprehensive Picture

In this section, we demonstrate how the proposed analysis in §4.1 can address diverse examples of multiple sluicing constructions. First, Figure 2 below shows the analysis of the basic case of multiple sluicing in (18), repeated below in (40).

- (40) ?One of the students spoke to one of the professors, but I don’t know *which to which*.

In this case, the maximal QUD has a propositional argument semantically equivalent to *one of the students spoke to one of the professors*. This fact is reflected in the MAX-QUD value of Figure 2. Here, the MAX-QUD has two *some-rel* quantifiers, each corresponding to *one of the students* and *one of the professors*. Note also that it has a NUCL value of *speak-to-rel*, where [2] (INDEX of the student) speaks to [4] (Index of the professor). Then, the mother’s content is a question with the same SIT and NUCL values as the MAX-QUD, indicating that the mother’s meaning is derived from the situation and the semantic relation of the maximal QUD. Also, since the fragment daughters each contain one parameter in its STORE, which is each associated with *some student* and *some professor*, those parameters will end up finding its scope in the mother’s QUANTS. As a result, the mother will have a meaning of querying the identity of student-professor pairs where the former spoke to the latter.

Now, we move onto the key phenomena mentioned in Section 2. To begin with, we discussed in Section 2 how multiple sluicing can take place across the finite clause-boundary. Although it is seemingly subject to a clause-boundedness constraint where two *wh*-phrases must belong to a single finite clause, we have seen quite a few exceptions where this constraint does not hold and drew a conclusion that it is not a solid syntactic constraint. In our analysis, the CONT value of the multiple sluicing example in (13), which is repeated in (41), can be presented as in (42).

- (41) Some student claimed that there was a problem with some professor, but I can’t recall *which student with which professor*.

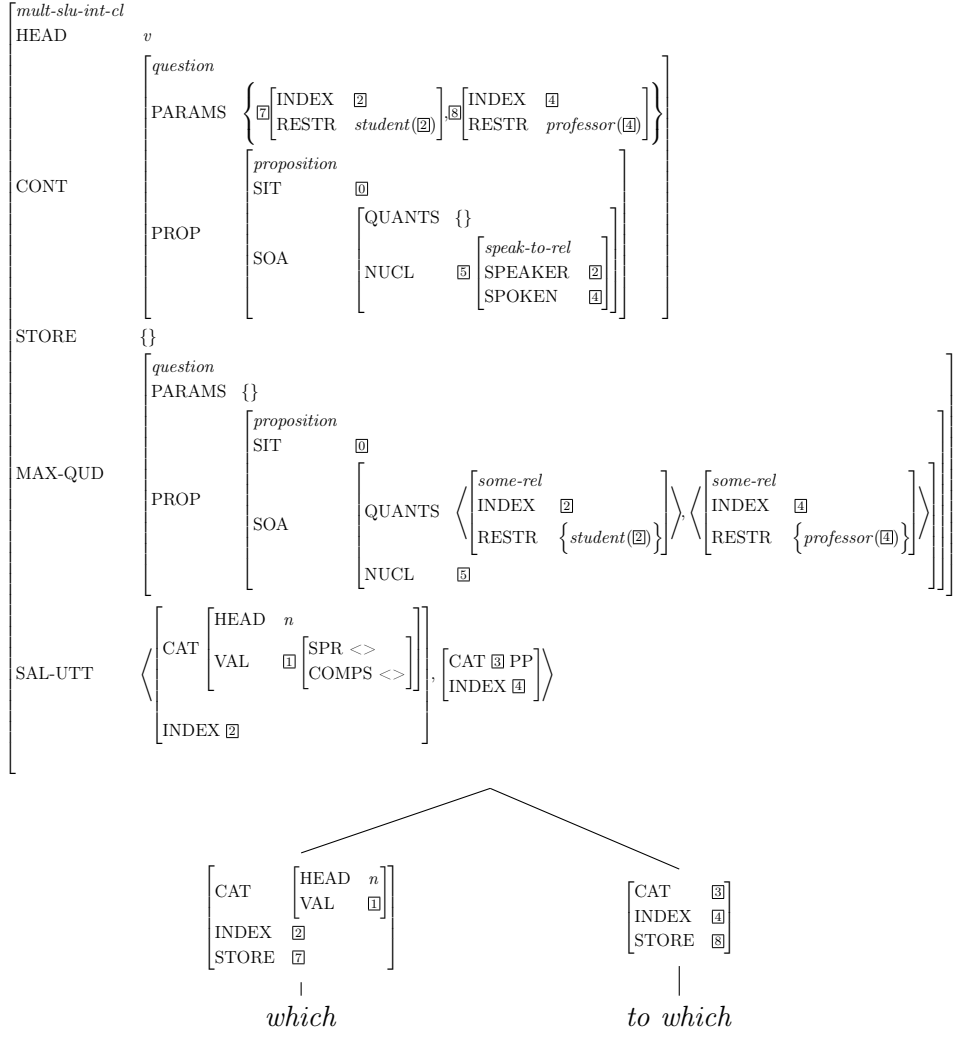
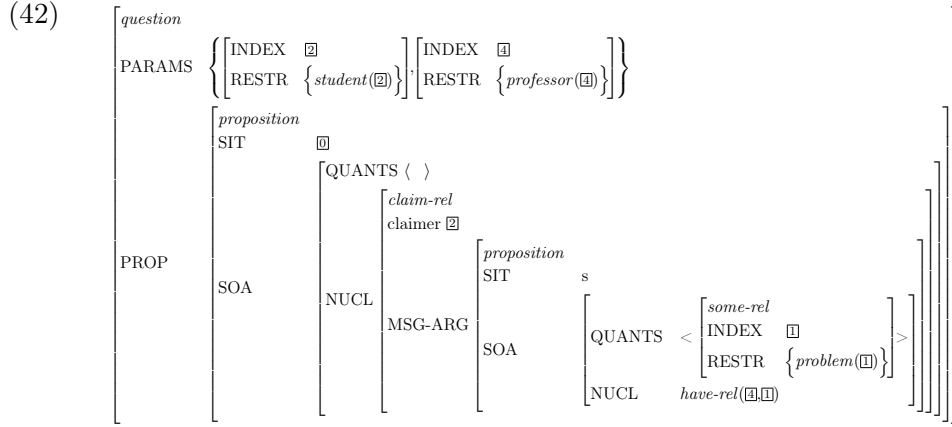


Figure 2: Analysis of *which to which* in (40)



In (42), the NUCL value of the type *claim-rel* is structure-shared with that in the MAX-QUD, as required by the type constraint on *slu-int-cl* in (37). Since we do not impose any structural constraint on the NUCL value of MAX-QUD or CONT, we can posit a nested semantic relation like this. Crucially, we do not rely on the syntactic structure of a linguistic antecedent, but focus on whether a given QUD is pragmatically plausible given the context. Therefore, it can be more flexible to cover the cases of multiple sluicing across a clause-boundary.

Second, the cases exhibiting island insensitivity is dealt with. In (10), repeated below in (43), the correlates of the two *wh*-phrases belong to a *wh*-island, extraction out of which would be prohibited according to a deletion-based approach.

- (43) Ben got mad when every student talked to some teacher, but he just couldn't remember which student to which teacher.

However, in the current analysis, this fact can be accounted for, since we assume that *wh*-phrases are simply generated as fragments without extraction or ellipsis.

This approach also provides a solution to another case of island insensitivity which was problematic to deletion-based approaches. In (24), repeated below in (44), the correlates of the *wh*-phrases belong to a conditional clause.

- (44) A: Sally will be surprised if one of the students in her class wins a prize in some contest.
B: Which student in which contest?

As discussed in Section 3, such example is hard to be dealt with by either Lasnik (2014) or Abels & Dayal (2023), since a conditional clause cannot be accommodated and items in a conditional clause cannot be existentially presupposed. On the other hand, in our approach, we do not adopt a short-source approach and thus do not have to worry about any of those. The

possibility of generating a multiple sluicing construction crucially relies on whether a relevant QUD can be triggered based on the discourse context. That is, whether a relevant QUD based on the proposition of the entire sentence is pragmatically plausible is important in determining the possibility of multiple sluicing. In the case at hand, the relevant QUD that ought to be generated here would be ‘what is the x-y pair where Sally will be surprised if a student x wins a prize in a contest y?’ ($\lambda\langle x,y \rangle. \lambda w. (student(x) \wedge contest(y) \wedge (win(x,y,w) \rightarrow surprise(w, Sally)))$). Since the QUD is sufficiently plausible in this case, the multiple sluicing construction can be generated out of this without difficulty.

Finally, the cases where multiple sluicing is ungrammatical under certain embedding verbs can be explained in the same vein. Example (17), repeated in (45) below, shows that the type of the embedding verbs in the antecedent clause affects the availability of multiple sluicing.

- (45) A: Fred denied/doubted that a certain boy talked to a certain girl.
 B: ???I wish I could remember which boy to what girl.

To generate the multiple sluicing construction here, a relevant QUD ‘what is the boy-girl pair such that Fred denied that the former talked to the latter’ must be maximal in the current discourse context. However, compared to examples where the embedding verb is a bridge verb like *say* or *think*, such a QUD with the embedding verb *deny* or *doubt* is harder to conceive, because such a question is pragmatically less plausible. Since the QUD is less accessible, the formation of the multiple sluicing construction whose meaning is mainly dependent on it, is also much less plausible, making the construction significantly degraded.

5 Conclusion

This paper shows that an HPSG analysis with a direct interpretation approach has merits over deletion-based analyses in accounting for multiple sluicing constructions. Overall, deletion-based approaches are inherently constrained by their core assumptions. Since these analyses posit that the elliptical clause contains a fully specified syntactic structure, which is subsequently deleted under identity with an overt antecedent, they necessarily depend on the existence of a suitable linguistic antecedent. Furthermore, since deletion is assumed to follow a movement operation, whether it is an extraposition or a covert *wh*-movement, these accounts are subject to certain movement constraints such as clause-boundedness constraints and island constraints. As a result, deletion-based analyses are forced to adopt a “short source” approach, by which the ellipsis site must remain mono-clausal. This makes it difficult for such accounts to accommodate cases of multiple sluicing that cross finite clause boundaries or islands.

On the other hand, our direct interpretation approach offers a more flexible account to accommodate broader data. We assume that the construction involves no operations such as movement and deletion. Rather, fragment daughters project into a sentential mother by virtue of the constraints imposed on this construction. Furthermore, the mother’s meaning is mainly derived from QUDs activated in the discourse context. Importantly, QUDs do not rely on the existence of linguistic antecedents. They can be triggered by overt linguistic antecedents but they can also be triggered implicitly by the discourse context. Given all this, our analysis accounts for empirical data that pose difficulties for deletion-based accounts, such as sluices without linguistic antecedents, island-insensitive cases, and multiple sluicing across a clause-boundary.

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Genitive vs. *von*-PP arguments in German NPs: Grammatical and use conditions

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 69–92



Keywords: NP, genitive, von PP, functional preposition, argument structure, alternation, parasitic head, social meaning, register, use-conditions

Machicao y Priemer, Antonio, Pauline Reiß & Giuseppe Varaschin. 2025. Genitive vs. *von*-PP arguments in German NPs: Grammatical and use conditions. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar*, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal, 69–92. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.4.

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Abstract

In German, NP arguments of nominal heads can be marked either with genitive case or with the preposition *von*. Although these types of marking are truth-conditionally equivalent, they have distinct contextual distributions, with genitive-marked arguments being associated with speakers who present themselves socially as more educated than *von*-marked arguments. This paper has a threefold objective. First, we offer a lexicalist account of the *von* vs. genitive alternation for NP arguments in German, deriving the pool of possible variants. Second, we formulate an extension of the HPSG architecture that allows us to predict the differences in usage preferences in a way that captures a graded notion of register and contextual appropriateness – in the spirit of Varaschin, Machicao y Priemer & Lu (2024). Our extension crucially involves the statement of use-conditional constraints, which associate independently licensed linguistic objects to gradable social meanings. Finally, we propose a corpus methodology to empirically validate hypotheses about social meaning assignments via use-conditional constraints and the principle of social meaning composition, focusing on the interaction between the *von* vs. genitive alternation and *-ung* (‘-ment’) nominalisations.

1 Introduction

In German, NP arguments of nominal heads can be marked either with genitive case (GEN) or with a PP headed by the preposition *von* (*von*-PP), which assigns dative case to the embedded NP (Machicao y Priemer 2017, Machicao y Priemer & Müller 2021, Kopf & Bildhauer 2024), cf. (1).

- (1) die Behandlung { des Patienten / von dem Patienten }
the treatment the.GEN patient.GEN of the.DAT patient.DAT
‘the treatment of the patient’

While the GEN NP and the *von*-PP are truth-conditionally equivalent, they differ w.r.t. the contexts in which they usually appear. For instance, in more educated or more formal contexts, the GEN realisation is preferred over the realisation with a *von*-PP. In contrast, in neutral or colloquial contexts the *von*-PP is preferred. Similarly, the contexts in which *ung*-nominalisations¹ occur tend to be associated with a higher degree of education and formality (cf. nominal vs. verbal style). In this paper, we focus on verbs nominalised with the *-ung* suffix, as these are cases in which the argument structure of the verbal base is inherited by the derived nominal stem. Moreover, using *-ung* nouns as a proxy for education/formality enables us to examine which form (i.e. GEN vs. *von*) shows a stronger correlation with *-ung* in the data.

¹The nominalisation suffix *-ung* in German is comparable with the suffix *-ment* in English. For further details on this kind of nominalisation, cf. Ehrich & Rapp (2000), Dölling (2015), Machicao y Priemer (2017).

The goals of this paper can be summarised as follows: (i) We propose an account of the grammatical conditions for the *von* vs. GEN alternation, which also captures the argument-marking behaviour of the preposition, which we define as a *parasitic head* (Levine 2010). (ii) We show how the HPSG architecture can be used to model not only the grammatical properties of the construction, but its use conditions, thereby predicting the contexts in which the construction occurs. (iii) We outline a method for empirically validating the theoretical implications of our analysis by means of corpus data.

2 Describing the variation

Within the German verbal domain, NP arguments of verbal heads marked with structural case are realised with nominative (NOM) and accusative (ACC) case, cf. (2a). When the verbal base is nominalised (e.g. with the suffix *-ung*) its argument structure is inherited by the derived nominal (Bierwisch 1989, Grimshaw 1990, Machicao y Priemer 2017, Machicao y Priemer & Müller 2021), cf. (2a) vs. (2b). According to the Case Principle (Przepiórkowski 1999: 65), GEN functions as the realisation of structural case within the nominal domain.

- (2) a. *Tim* behandelt *den* *Patienten*.
Tim.NOM treats the.ACC patient.ACC
‘Tim treats the patient.’
b. *Tims* Behandlung *des* *Patienten*
Tim.GEN treatment the.GEN patient.GEN
‘Tim’s treatment of the patient’

When realised postnominally,² the inherited arguments with structural case (i.e. GEN) can also be realised with a PP headed by the preposition *von* ‘of’ (cf. Machicao y Priemer 2017, Kopf & Bildhauer 2024), cf. (3a) & (3b) vs. (2b). In this case, *von* selects an NP realised with dative (DAT).

- (3) a. die Behandlung *vo-m* *Patienten*
the treatment of-the.DAT patient.DAT
‘the treatment of the patient’
b. die Behandlung *von Tim*
the treatment of Tim.DAT
‘the treatment of Tim’

As a result of this alternation – and assuming that selection is strictly local (cf. selectional localism, Pollard & Sag 1987, 1994, Sag 2007, 2012)

²In this paper, we concentrate on the alternation of GEN vs. *von* PP in postnominal position. For an account of the prenominal vs. postnominal realisation of arguments, cf. Machicao y Priemer & Müller (2021).

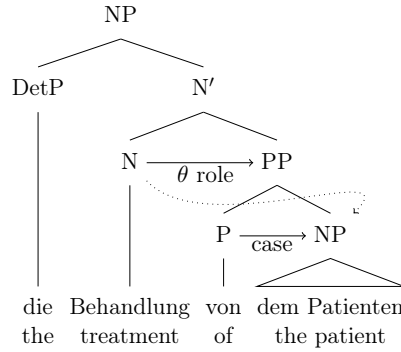


Figure 1: θ -role and case assignment

– the NP *dem Patienten* receives DAT from the preposition *von*. However, since the θ -role is determined and assigned by the head noun *Behandlung*, only the PP (and not the NP itself) can receive this θ -role, cf. Fig. 1. Note that the interpretation of the NP (or *von*-PP) arguments of the head noun parallels that of the corresponding arguments in the verbal domain, cf. (2a). Within the nominal domain an additional *possessor* interpretation is also available, which we likewise treat as an argument of the head noun (based on distributional evidence, cf. Machicao y Priemer & Müller 2021). Classifying these elements as arguments of the head noun – rather than as modifiers (contra Kopf & Bildhauer 2024) or arguments of an external head (contra Kratzer 1996) is crucial for an accurate account of the phenomenon. That is, one puzzle we encounter in dealing with this structure is how θ -role and case can be assigned by two different heads.

Furthermore, as pointed out in Kopf & Bildhauer (2024), not all *von*-PPs undergo the alternation. For instance, some nouns – e.g. *Abhängigkeit* ‘dependence’ – select a *von*-PP, cf. (4a). In this case, the *von*-PP is selected also by the adjectival base *abhängig* ‘dependent’, cf. (4b), and is inherited by the nominalised head.³

- (4) a. die *Abhängigkeit* { von seinen Eltern / *seiner Eltern }
the dependence on his parents his.GEN parents.GEN
INTENDED: ‘the dependence *on* his parents’
- b. Der Student ist [AP von seinen Eltern *abhängig*].
the student is on his parents dependent
‘The student depends on his parents.’

Another case in which the alternation does not take place is when the *von*-PP is a true modifier of the noun (e.g. temporal or local), cf. (5). In this

³This is similar to the selection of an *of*-PP by the verb *think*, which cannot alternate either, cf. *I think of Tim* vs. *Tim’s thinking*.

case, the preposition assigns case as well as a θ -role to the NP it combines with – in comparison to the *von* used in the alternation.

- (5) der Blick { vo-m Turm / *des Turms }
 the view from-the.DAT tower the.GEN tower.GEN
 INTENDED: ‘the view from the tower’

For an adequate description of the alternation, it is necessary to take into account that not all types of argument NPs can be realised with GEN case. The cases allowing both realisations (i.e. GEN as well as *von*-PP) include proper names, cf. (6a) & (7a),⁴ NPs with a definite determiner, cf. (6b) & (7b), and NPs with an indefinite determiner, cf. (6c) & (7c).

- | | |
|--|--|
| <p>(6) die Untersuchung ...
 the examination</p> <p>a. Tims
 Tim.GEN</p> <p>b. des Lehrers
 the.GEN teacher.GEN</p> <p>c. eines Lehrers
 a.GEN teacher.GEN</p> | <p>(7) die Untersuchung ...
 the examination</p> <p>a. von Tim
 of Tim.DAT</p> <p>b. vo-m Lehrer
 of-the.DAT teacher.DAT</p> <p>c. von einem Lehrer
 of a.DAT teacher.DAT</p> |
|--|--|

That is, a full NP can alternate, cf. (6) & (7), whereas an N' cannot serve as an argument either of the head noun (8a) or of the preposition (8b). This follows from an independent reason: German singular bare nouns are not fully saturated phrases, hence they cannot occur in argument positions.

- (8) a. *die Untersuchung *Lehrers*
 the examination teacher.SG.GEN
- b. *die Untersuchung *von Lehrer*
 the examination of teacher.SG.DAT

On the other hand, singular bare mass nouns (e.g. *Honig* ‘honey’) and plural count nouns (e.g. *Lehrer* ‘teachers’) are considered full NPs as well, as they can normally occupy argument positions without a determiner. However, they can appear only as arguments of the preposition *von*, cf. (10), and not as GEN marked arguments of the noun, cf. (9). Even more puzzling is the fact that singular bare mass nouns and plural count nouns without a determiner can appear as GEN marked arguments of the noun when they are modified, cf. (11a) & (11b) vs. (9).⁵ This is unexpected, since the modifier does not

⁴As a reviewer mentioned, it is not the case that proper names with GEN are allowed postnominally in all German dialects, i.e. (6a). See footnote 10 for further details.

⁵For the sake of completeness, it should be mentioned that *von* can combine with modified as well as with unmodified singular bare mass and plural count nouns.

turn a noun into a full NP. This can be seen with singular bare count nouns, which do not become fully saturated (i.e. NPs) by the addition of a modifier, cf. (8a) vs. (12)⁶ vs. (11b). Furthermore, given locality constraints, the selecting nominal head should not be able to determine whether its argument is modified or not.

- (9) die Untersuchung {*Honigs / *Lehrer}
the examination honey.SG.GEN teacher.PL.GEN
- (10) die Untersuchung {von Honig / von Lehrern}
the examination of honey.SG.DAT of teacher.PL.DAT
- (11) die Untersuchung ...
the examination
- a. *süßen* Honigs
sweet.SG.GEN honey.SG.GEN
- b. *korrupter* Lehrer
corrupt.PL.GEN teacher.PL.GEN
- (12) *die Untersuchung *korrupten* *Lehrers*
the examination corrupt.SG.GEN teacher.SG.GEN

That is, we have to account for the fact that the N-head and *von* combine with full NPs rather than with N', cf. (6)–(7) vs. (8). However, they differ w.r.t. their selectional restrictions: *von* can select “simple” or “complex” NPs, cf. (10), whereas the N-head selects only complex GEN NPs, cf. (11).

3 Grammatical constraints for alternation

Having identified the issues related to the alternation, we can now specify the grammatical constraints for our proposal. First, we require a lexical rule (LR) that derives *-ung* nouns and permits the inheritance of arguments from the verbal to the nominal stem. We adopt the LR from Machicao y Priemer & Müller (2021), cf. (13), which states that the arguments with structural case and the PP arguments of the verb are inherited by the derived *-ung* noun, cf. (2a) & (2b).⁷

⁶(12) is also not grammatical with the preposition *von*: **die Untersuchung von korruptem Lehrer* ‘the examination of corrupt teacher’.

⁷Following Przepiórkowski (1999), we divide the ARG-ST list into parametrised lists to inherit only the lists of arguments with structural case (i.e. GEN in the nominal domain) and of PP arguments, but not of arguments with lexical case.

(13) LR for *-ung*-nominalisation (cf. Machicao y Priemer & Müller 2021)

$$\left[\begin{array}{l} \text{stem} \\ \text{PHON } \boxed{1} \\ \text{SYNSEM|LOC|CAT } \left[\begin{array}{ll} \text{HEAD} & \text{verb} \\ \text{ARG-ST} & (\boxed{2} \text{list}_{str}) \oplus \text{list}_{lex} \oplus (\boxed{3} \text{list}_{pp}) \end{array} \right] \end{array} \right] \mapsto \left[\begin{array}{l} \text{ung-n-stem} \\ \text{PHON } \boxed{1} \oplus \langle \text{ung} \rangle \\ \text{SYNSEM|LOC|CAT } \left[\begin{array}{ll} \text{HEAD} & \text{noun} \\ \text{ARG-ST} & \boxed{2} \oplus \boxed{3} \end{array} \right] \end{array} \right]$$

For the mapping of elements from the ARG-ST list to the valence lists (e.g. COMPS), we assume argument structure mapping constraints (*as-mapping*) (cf. Manning & Sag 1998, Davis & Koenig 2000, Van Eynde 2015, Machicao y Priemer & Fritz-Huechante 2018, Machicao y Priemer & Müller 2021). To capture the fact that only “complex” NPs can be realised with GEN, (11) vs. (9), we make use of the LEX(ICALICALITY) feature (cf. Pollard & Sag 1987: 72–73).⁸ This feature distinguishes (roughly) between lexical and phrasal signs: LEX+ objects correspond to “words”, while LEX− objects result from the phrasal combination of two objects. Accordingly, “complex” NPs are characterised as output of a phrasal constraint, e.g. *head-adjunct-phrase* in (11). We implement this feature specification in the *as-mapping* constraint, such that only full NPs with the specification LEX− can be realised as complements of N.⁹ With this constraint in place – which is independently needed for all nouns – we can rule out N′ complements that are either LEX+ (8a) or LEX− (12), as well as full NPs that are LEX+, e.g. (9).¹⁰

(14) Constraint on ARG-ST to COMPS mapping

$$\left[\begin{array}{ll} \text{n-as-mapping} \\ \text{HEAD} & \text{noun} \\ \text{ARG-ST} & \langle \dots, \boxed{1} \text{ NP[LEX-]}, \dots \rangle \end{array} \right] \Rightarrow \left[\text{COMPS } \langle \dots, \boxed{1}, \dots \rangle \right]$$

As noted w.r.t. Fig. 1, the preposition *von* assigns DAT (more specifically *lexical dative*) to the NP, while it is the N-head that assigns the θ -role, resulting in a locality issue. Similar constructions are attested in other languages as well (for Dutch prepositions, see Van Eynde 2004; for *of* in English, see Van Eynde & Kim 2022; for *de* in Spanish, see Machicao y Priemer 2017; and for the *ass* camouflage construction, see Levine 2010). Following Levine

⁸See Arnold & Sadler (1992) and Deng et al. (2025) for further implementations of this feature in English and Mandarin Chinese.

⁹Recall that by virtue of the nominalisation LR in (13), only NPs with structural case are represented in the ARG-ST list of nouns.

¹⁰As mentioned above, the LEX+ vs. LEX− distinction corresponds “roughly” to the lexical–phrasal contrast. For instance, proper names such as *Tim* in (7a) can be classified as LEX−. This classification is also reflected in their behaviour w.r.t. modification and definiteness, and – depending on the analysis – they may even be derived via a phrasal constraint. Following our analysis, German dialects that do not allow proper names in GEN in postnominal position (cf. footnote 4), classify them as LEX+.

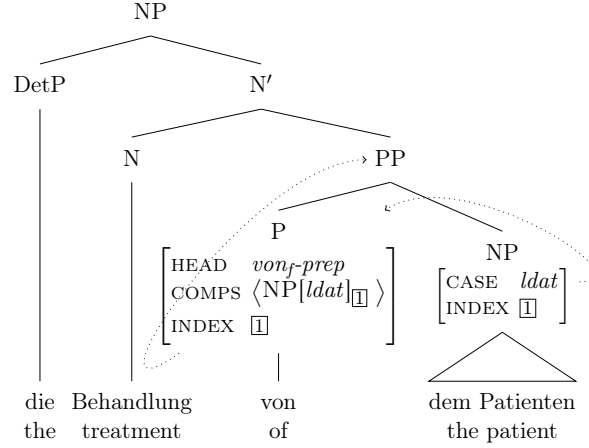


Figure 2: Parasitic head

(2010), we analyse this preposition as a *parasitic head*.¹¹ Specifically, we posit a distinct subtype of the PFORM value for the (functional) preposition *von* (PFORM *von_f*) – different from the one used in modification, cf. (5), which assigns a temporal or locative θ -role. This functional *von* (i.e. *von_f*) acts as a case assigner, selecting a NP with lexical dative (*dem Patienten* in Fig. 2) and taking the INDEX value of its complement (*dem Patienten*) as its own. Thus, the preposition can project its INDEX value to the maximal projection, which in turn receives a θ -role from the N-head (*Behandlung* in Fig. 2). Consequently, the complement PP of the N-head can bear either the agent or patient role, as illustrated in (3). The lexical entry for the preposition is provided in (15).¹²

(15) Lexical entry for functional *von*

PHON	$\langle von \rangle$
HEAD	$\begin{bmatrix} preposition \\ PFORM\ von_f \end{bmatrix}$
COMPS	$\langle NP[ldat]_{\overline{1}} \rangle$
INDEX	$\overline{1}$

The final component of the grammatical analysis concerns the LR for the alternation. Although arguments realised with the preposition *von* are “more

¹¹A different approach worth considering is the functor analysis of prepositions (cf. Van Eynde 2004, Van Eynde & Kim 2022). However, adopting this approach would require more substantial changes to the overall system, since *von*-PPs would be analysed as (*von*-marked) NPs. As these issues are orthogonal to the concerns addressed here, we leave the exploration of this approach to future research.

¹²Consider that *von_f* is not only needed in this construction. It fulfils the requirements to reintroduce the external argument in passive constructions in German, where the preposition assigns case but no θ -role. For similar cases in Dutch, see Van Eynde (2004).

widespread” than those marked with GEN (cf. Sec. 4 & 5), the LR governing the alternation must take as its input an N-head that selects an NP with structural case. Recall that not all *von*-PPs participate in the alternation, cf. (5) & (4). Even in cases where *von_f* is used – this could be assumed for *Abhängigkeit* ‘dependence’ in (4) – the alternation is not possible. The crucial factor, then, is that a NP with structural case can be realised as a *von_f*-PP, whereas the reverse does not necessarily hold. Therefore, we propose the LR in (16), which states that a NP with structural case can be realised as a PP with the PFORM *von_f*.

(16) LR for GEN to *von_f*-PP alternation

$$\left[\begin{array}{c} n\text{-stem} \\ \text{CAT}|\text{ARG-ST} \end{array} \langle \dots, \text{NP}[\text{str}]_{\boxed{\text{I}}}, \dots \rangle \right] \mapsto \left[\text{CAT}|\text{ARG-ST} \langle \dots, \text{PP}[\text{PFORM } \textit{von}_f]_{\boxed{\text{I}}}, \dots \rangle \right]$$

With these constraints in place, we can correctly predict distribution of the alternation in the cases illustrated in Sec. 2. All constraints used are in any case needed for independent reasons, i.e. in other constructions. We just needed to strengthen the restrictions on these constraints, for instance, restricting the *as-mapping* constraint for nouns w.r.t. the LEX value. Furthermore, we provide a more adequate description of the functional counterpart of the preposition *von*, which is not only needed for this construction, but can be used for other phenomena as well, e.g. passive. In the next section, we show how the grammatical and use conditions interact to predict in which contexts the alternation occurs.

4 Grammar and use conditions

In the previous section, we proposed a set of constraints that capture the range of realisations of NP arguments in German. However, as the brief remarks about the situational distribution of each variants suggest, speakers know more than the purely structural licensing conditions for NP arguments: they also know when (and by whom) each type of argument is preferably used. The question we address in this section is the following: how do we relate these two types of knowledge – knowledge of grammatical constraints and knowledge of usage preferences – in a way that allows our theory not only to predict the pool of possible variants, but also to say something about their relative frequencies in different linguistic and situational contexts?

Building on prior work (Asadpour et al. 2022; Machicao y Priemer, Müller, Schäfer & Bildhauer 2022, Varaschin, Machicao y Priemer & Lu 2024), we answer this question by formulating a theory of register in HPSG. The cornerstones of this theory are what we call *use-conditional constraints* (UCCs), which take the general form in (17):

(17) *description of linguistic structure* $\mathcal{S} \Rightarrow$ *description of $\mathcal{S}$ ’s context*

Formally, UCCs are just ordinary implicational constraints. On the left hand side, a UCC identifies a range of independently licensed structures by means of a partial description, which can be a type or a more complex feature description. The right hand side is a partial specification of the features of the context that are required to make the structure acceptable. In the case of HPSG, the context is represented as a feature of signs themselves, under the attribute `CONTEXT` (Green 1994). So UCCs, like other constraints, simply state necessary conditions on the well-formedness of signs.

By using the HPSG formalism to state UCCs, we are hypothesizing that use-conditional knowledge is part of linguistic competence (Wilcock 1999, Paolillo 2000, Bender 2001, 2007, Asadpour et al. 2022; Varaschin, Machicao y Priemer & Lu 2024; i.a.). It is useful, however, to distinguish between those aspects of linguistic competence that pertain to the well-formedness of CAT, CONT and their correspondence (i.e. the domain of narrow syntax and semantics) from those that pertain to contextual appropriateness. There is suggestive evidence that the former are acquired sooner and processed more rapidly than use-conditional information (Münster & Knoeferle 2018, Soto & Almeida 2021, Plesca et al. 2024; i.a.). This is ensured by keeping UCCs separate from the core grammatical constraints.¹³ The set of UCCs is what Culy (1996) calls the “user’s manual” of a language.

In the case of register variants, UCCs constrain contexts via the assignment of *social meanings* to linguistic structures (Burnett 2019, Beltrama 2020, Salmon 2022). We use this term in a broad sense to refer to any non-truth-conditional semantic content that ascribes some socially-relevant property to a context coordinate, for instance, the speaker (s_c) or the addressee (a_c). We are assuming, therefore, a multidimensional semantics in the tradition of Kaplan (1999), Potts (2005), McCready (2010) and Gutzmann (2015), whereby a sentence like (18a) would have two layers of meaning: a *truth-conditional* (TC) and *social meaning* (SM), as in (18b–c).

- (18) a. Die Behandlung des Patienten war gut.
 the treatment the.GEN patient.GEN was good
 b. TC: $\{w : \text{the treatment of the patient was good in } w\}$
 c. SM: $\{c : s_c \text{ is presenting as educated in } c\}$

As (18) makes clear the TCs of an utterance u (TC_u) characterize a set

¹³For the sole purpose of defining the models of a grammar, it would often not matter whether we encode constraints on `CONTEXT` via dedicated UCCs or introduce them as parts of other (independently required) constraints. For instance, suppose we want to say a form derived via a lexical rule carries a use-condition. We could either state the constraint on the `CONTEXT` as part of the statement of the lexical rule or define a separate UCC identifying the outputs of the lexical rule in the antecedent. We opt for the latter strategy to capture the idea that UCCs and core grammatical constraints have a different cognitive status. Note, however, that some UCCs – namely, those that identify antecedents that are not mentioned in other parts of the grammar – are not reducible to other constraints.

of worlds. An utterance u is *true* in a specific world w iff $w \in TC_u$. In turn, the SMs of an utterance u (SM_u) characterize a set of contexts by ascribing a property to one of its participants. An utterance u is *usable* in a particular context c iff $c \in SM_u$. We refine this notion in gradient terms below.

SMs can be distinguished from most instances of TC meanings on the basis of the following properties (see Varaschin, Machicao y Priemer & Lu 2024 for more discussion):

- (19) a. **Independence:** SMs are immune to the effect of TC operators (e.g. negation, modals, conditionals, interrogatives).
- b. **Unplugability:** SMs project over presuppositional plugs like propositional attitude predicates, they cannot be evaluated w.r.t. to any parameter other than the local context.
- c. **Indexicality:** SMs predicate something of the present utterance situation or its participants (Potts 2007).
- d. **Gradability:** SMs hold of entities to different degrees.

The first two properties are the most important ones, as they reflect the way SMs interact with TC content. To illustrate (19a), note that (20) conveys the GEN-induced SM we stated in (18c), in spite of the fact that the very proposition to which GEN contributes its TC content is negated. (21) illustrates the related property in (19b): there is no reading in which the sentence conveys the SM that Lena (i.e. the attitude holder) is the one presenting as being educated. This SM projects to the speaker even under a reading where the existential presupposition associated with the definite *die Behandlung des Patienten* is not assumed to be satisfied in the world where the matrix clause is evaluated, but only in Lena’s belief worlds. That is, even if we assume that no patient was treated in the actual world, the SM that comes from GEN still projects. (22) illustrates the only context where SMs can be semantically embedded: direct quotation.

- (20) Die Behandlung des Patienten war *nicht* gut.
the treatment the.GEN patient.GEN was not good
- (21) Lena *glaubt*, dass die Behandlung des Patienten gut war.
Lena thinks that the treatment the.GEN patient.GEN good was
- (22) Lena sagte: “die Behandlung des Patienten war gut.”
Lena said the treatment the.GEN patient.GEN was good

We propose to model properties (19a)–(19b) by placing SMs as the values of the C(ONVENTIONAL)I(MPLICATION) attribute inside CONTEXT. In virtue of general linking constraints, TC operators (e.g. negation) and propositional attitudes only take their scopal arguments from elements under CONT. There is no TC operator that is a function over SM types. We model property (19c) by stating social-meaning relations in such a way that they always take a

C(ONTEXTUAL)-IND(ICE)S value as one of their arguments. The property in (19d) is modeled by requiring SM relations to take a DEG(REE) argument (i.e. an interval from 0 to 1), as in Potts & Kawahara (2004) and McCready (2019). As in standard degree semantics, each point d in this interval stands for an equivalence class (see, e.g., Kennedy 2001). In this case, ds are equivalence classes of contexts where the entity argument of the SM has the SM to a d -extent. This means that the wider the d range is the more contexts the SM is compatible with.

That said, we assume the following UCCs, cf. (23)–(25), for the phenomena at hand.¹⁴

(23) **UCC** for NPs with arguments with structural case (i.e. GEN):

$$\left[\begin{array}{c} \text{HEAD} \quad \textit{noun} \\ \text{ARG-ST} \quad \langle \dots, \text{NP}[\textit{str}], \dots \rangle \end{array} \right] \Rightarrow \left[\text{CTXT} \left[\begin{array}{c} \text{C-INDS|SPEAKER} \quad \boxed{1} \\ \text{CI} \left\langle \dots, \left[\begin{array}{c} \textit{educated} \\ \text{ARG1} \quad \boxed{1} \\ \text{DEG} \quad [.5, 1] \end{array} \right], \dots \right\rangle \end{array} \right] \right]$$

(24) **UCC** for NPs with *von*-PP arguments:

$$\left[\begin{array}{c} \text{HEAD} \quad \textit{noun} \\ \text{ARG-ST} \quad \langle \dots, \text{PP}[\text{PFORM} \textit{von}], \dots \rangle \end{array} \right] \Rightarrow \left[\text{CTXT} \left[\begin{array}{c} \text{C-INDS|SPEAKER} \quad \boxed{1} \\ \text{CI} \left\langle \dots, \left[\begin{array}{c} \textit{educated} \\ \text{ARG1} \quad \boxed{1} \\ \text{DEG} \quad (0, .7] \end{array} \right], \dots \right\rangle \end{array} \right] \right]$$

(25) **UCC** for *-ung* nouns:

$$\textit{ung-n-word} \Rightarrow \left[\text{CTXT} \left[\begin{array}{c} \text{C-INDS|SPEAKER} \quad \boxed{1} \\ \text{CI} \left\langle \dots, \left[\begin{array}{c} \textit{educated} \\ \text{ARG1} \quad \boxed{1} \\ \text{DEG} \quad [.6, 1] \end{array} \right], \dots \right\rangle \end{array} \right] \right]$$

Each of these SMs assigns to a class of structures a SM that picks out different sets of contexts where the speaker is presenting as being *educated* to a specific degree. (23), for instance, assigns to *nouns* that have an argument marked with structural case (i.e. GEN) a social meaning that represents a set of contexts where the speaker is presenting as being educated to mid-to-high extent. This captures the intuition that GEN sound more formal or educated in German. (25) assigns a similar SM (understood as a range of admissible contexts) to words that result from *ung*-derivations.

Of course this proposal is, as it stands, highly simplified. Forms subject to register variation are also typically not associated with a specific SM

¹⁴As in McCready (2019), the particular DEG intervals are estimated based on observations from the literature and on native speakers' intuitions about the situational distribution of the corresponding expressions. The kind of quantitative corpus-based methodology we discuss in Sec. 5 could be used to arrive at or motivate such intervals in a more data-driven fashion. But what is most important here is not the exact numerical values, but their relative differences and how they interact when different variants are used together.

(e.g. *educated*), but with an indexical field of inferentially related SMs (cf. Eckert 2008). This can be modelled by associating these structures with an underspecified type that includes *educated* as a subtype, so that SMs enforced by UCCs are only resolved to maximal types like *educated* in concrete communicative situations. For simplicity, we do not implement underspecification here, but a concrete worked-out proposal is developed in Varaschin, Machicao y Priemer & Lu (2024).

The UCCs account for the SMs that the grammar assigns to individual pieces of structures. To calculate the SM of a full utterance, we need a principle of composition. A statement of the principle proposed by Varaschin, Machicao y Priemer & Lu (2024) is shown in (26). We say that two predication P_1 and P_2 are repeated predication *iff* they are of the same type and have the same ARG values, but possibly different DEG(REE) values.

(26) **Local CI Composition Principle**

For each phrase,

- a. If the CI values of its daughters *do not have repeated predication*s, then the CI value of the phrase is the concatenation of the CI values of its daughters.
- b. If the CI values of its daughters *have repeated predication*s $SM_1, \dots SM_n$ then the CI value of the phrase is the concatenation of the CI values of its daughters: (i) minus $\langle SM_1 \rangle, \dots \langle SM_n \rangle$; (ii) plus a list of predication of the same type and with the same ARG values as $SM_1, \dots SM_n$, but with a DEG value consisting in the intersection between the DEG values of $SM_1, \dots SM_n$.

In cases where repeated SMs do not intersect, the mother phrase will have a SM with an empty DEGREE value, which represents that the set of contexts where it is admissible is the empty set. This is arguably what happens with honorific mismatches (Kaur & Yamada 2022, i.a.). Crucially, however, having an empty DEGREE value does not mean that the structure is ungrammatical (i.e. not a model of the grammar), only that it is unusable, given that no utterance context will be an element of the empty set.

If the DEGREE values of repeated predication do intersect, they get progressively narrowed as one moves upwards in the tree. The core claim is that SM composition within a clause is monotonic: constraints on the context accumulate (i.e. each SM-bearing daughter *adds* restrictions) either via concatenation or via intersection of repeated SM predication. As we said, narrower DEGREE intervals represent a narrower set of admissible contexts.

In the case of German NPs, the core empirical prediction this approach makes, when combine with the UCCs in (23)–(25) is the following: *-ung* nouns and *von*_FPP argument combinations should be more contextually restricted than combinations between *-ung* and GEN. Figs. 3–4 illustrate the effects of SM composition in each of these cases. What is interesting here is that, due

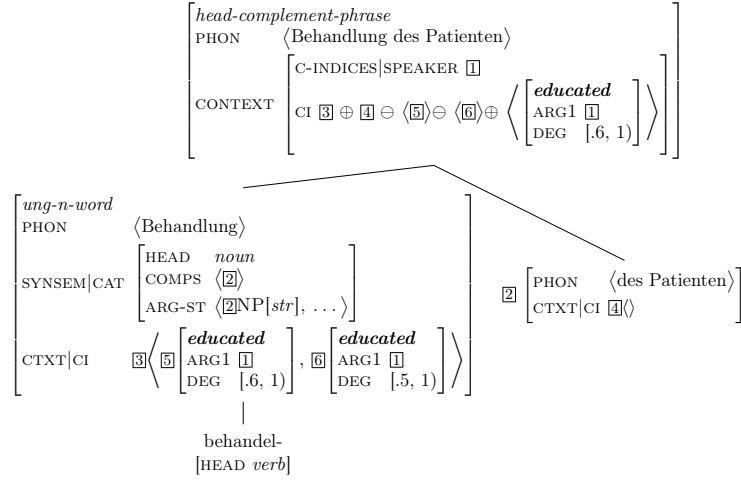


Figure 3: SM composition with *-ung* and GEN arguments

to the structures targeted by the UCCs, repeated SM predications have to be present at the lexical level. The composition principle in (26) applies when such words undergo phrasal combination.

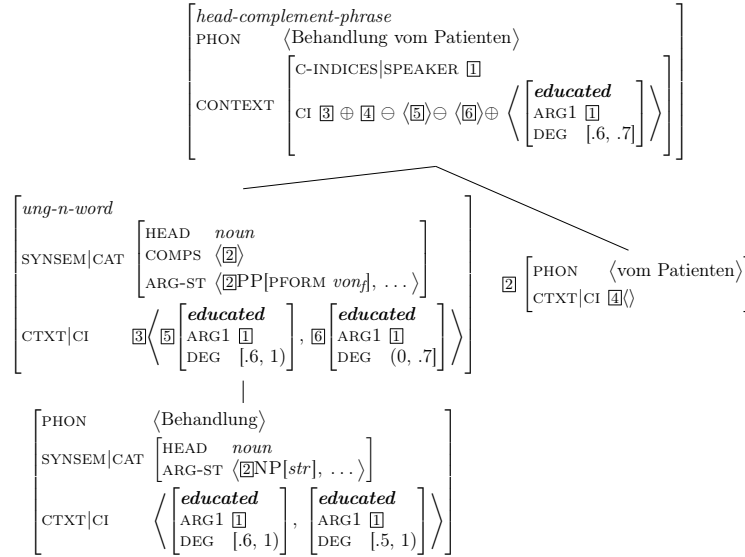


Figure 4: SM composition with *-ung* and *von_f*-PP arguments

If felicitous, the output of Local CI Composition (26) updates the global context – i.e. the context that pertains to the broader discourse beyond the sign (Paolillo 2000). Contextual update is subject to the following constraint:

(27) **Felicity constraint** (cf. McCready 2019: 31)

For every utterance u expressing a SM α , if the **prior global context** of u is specified as having a SM α' , where α and α' are repeated predication, then the DEGREE values of α and α' have to intersect.

The bigger the overlap between the SMs in the prior global context and those in u 's CONTEXT|CI value, the more appropriate u is with respect to the context. On this view, we can think of a register as a cluster of linguistic constraints whose associated models are required (by virtue of UCCs) to carry SMs that are appropriate in the same global contexts. Therefore, whether or not a form *belongs* to a register R is a matter of degree, i.e. it depends on how much its SMs overlap with the contextual parameters associated with R .

5 Empirical Validation

In this section, we argue that the proposed set of grammatical constraints and the proposed UCCs with respective DEG-values need to be empirically validated. Furthermore, we argue that all claims about register-sensitive grammatical structures need to be supported by empirical data. In order to investigate the register sensitivity of GEN and *von*-PPs, we analyse corpus data from the PreCOXX25-LDA corpus (Schäfer, Bildhauer, Reiß, Pankratz & Müller 2025). Our goal is to test whether our theoretical predictions are empirically supported and, if necessary, make adjustments to our theoretical modelling. In this section, we will outline our methodological approach, which should be seen as a proposal on how to motivate numerical values in UCCs and SMs.¹⁵

The PreCOXX25-LDA corpus is a large-scale corpus containing 21,775,285 tokens across 2,475 documents. All documents show a wide variety of language representation, ranging from internet forums to sports reports and legal texts. We chose the corpus for its large number of tokens and linguistic heterogeneity. The corpus was built by Schäfer, Bildhauer, Reiß, Pankratz & Müller (2025) with a probabilistic approach based on Latent Dirichlet Allocation (LDA) (Blei 2012). LDA is a statistic model originally used for topic modelling, which posits that documents are mixtures of topics and topics are mixtures of words. As a result, documents are being assigned weights representing the probability that each document is associated with a specific topic. In the process of constructing the corpus, it was used to discover latent register dimensions to describe the probabilities of documents to belong to different potential registers (or *registers*), allowing the documents to be described as a *mixture* of potential registers. In the experiment, 25 so-called registers

¹⁵A complete and commented version of the code is available via Github https://github.com/paureiss/GEN_vs_VON_HPSG_2025.git.

were extracted. Each of these can be interpreted as a cluster of documents sharing similar linguistic features.

Since the analysis of register in language requires the analysis of situational and functional parameters, the clustering of texts into registers was completed by manual annotation. For the analysis, a subset of documents was extracted from the corpus and manually annotated by four human experts. The documents were classified according to situational and functional parameters: *Education*, *Interactivity*, *Proximity* and *Narrativity*, achieving a substantial to almost perfect inter-rater agreement across categories. Due to the combination of LDA-based analysis and human annotation, the corpus provides a robust empirical basis for analysing register-sensitive grammatical structures and enables the nuanced analysis of register mixtures in texts.

In our analysis, we focus on the *Education* parameter due to its established association with nominal style and genitive constructions (cf. Biber 1988). In the manual annotation, *Education* was annotated using binary labels, following “whether a document requires an elevated educational background (EEB) on the side of the reader” (Schäfer, Bildhauer, Reiß, Pankratz & Müller 2025: 16) and achieved an overall substantial inter-rater agreement (Fleiss’s $\kappa = .67$).

For our analysis, we begin by ranking the registers by their *Education* annotation scores (drawn from the manual annotation), normalised on a continuum using *min-max* scaling. Registers with a larger proportion of documents annotated as *high education* receive a higher *Education* score whereas registers with a larger proportion of documents annotated as *low education* receive a lower score. These serve as proxies for the education parameter. We then compute whether the number of extracted GENS and *vonf*-PPs correlate with the assigned *Education*-scores. This methodology enables the comparison with the hypothesized DEG-values in the corresponding constructions.

For the analysis, we conducted a pre-study in order to pre-validate the hypothesis that genitives and *vonf*-PPs correlate in terms of their register usage. The pre-study was conducted without further annotation in order to ascertain the hypothesis’s plausibility and to obtain a preliminary insight.

To visualize the relationships between *gens*, *vonf*-PPs and the *Education*-scores, we created a heat-map (cf. Fig. 5) to identify patterns, correlations, and anomalies within the dataset. The colour gradient ranging from blue (-1.0) to red ($+1.0$) represents the strength of correlation, blue indicating a negative and red indicating a positive correlation. The heat-map reveals indications of weak to moderate correlations in the expected direction. GENS and *vonf*-PPs show a perfect negative correlation of -1 as the existence of one excludes the other. *ung*-nouns generally show a moderate positive correlation with the *Education* parameter (0.49). While genitives show a weak positive correlation (0.28) with *Education*, *vonf*-PPs show a weak negative correlation (-0.28) with it – as expected. This results enables us to infer that genitives

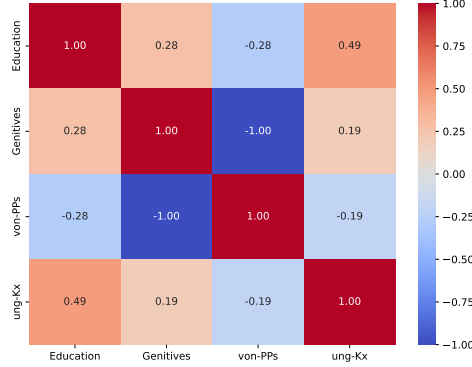


Figure 5: Correlation heatmap of all target variables, based on Spearman’s rank correlation coefficient (Kx = Construction)

and *-ung*-nouns trend positively with higher educational registers.

While the heat-map provides valuable insights, it is only a simplification of the studied structures. Still, these findings support the broader hypothesis of register-sensitive distribution patterns, as expected by our theoretical modelling. Therefore, we can deduce that the combinations of *von*-phrases with *-ung*-nouns should have small DEG values for their educated SM, rendering them more contextually restricted.

Nonetheless, validation via manual annotation is essential. As stated in Sec. 2, the extent to which a speaker has the freedom to choose between the two constructions depends on the context. As a second step, we therefore conducted a manual annotation experiment to empirically validate the degree of optionality between GENs and *von*-PPs in our dataset. The study aimed to determine whether speakers truly have the freedom to choose between the GEN and *von*-PP in different contexts or if certain contexts favour one construction over the other. In order to maintain and verify the quality of annotations, the annotation was performed by two expert annotators. The quality of the annotation is calculated via inter-rater agreement (IRA) using Fleiss’s κ .

In total, we conducted two annotation rounds, with the endeavour to fine-tune the annotation guidelines and to ensure sufficient inter-annotator agreement. The first round consisted of $n = 250$ items of two exemplary registers (register 10 and register 24), resulting in $n = 500$ in total. The registers were chosen based on their general high number of *ung*-derived nouns and their contrasting *Education*-scores. Subsequent to the revision of discrepancies in the annotation guidelines, a second round was conducted to check the operationalisation of the annotation and comprehensibility and clarity of the annotation guidelines. The second round consisted of $n = 250$

items from the same registers as well as an additional pre-register (10, 14 and 24), resulting in $n = 750$ in total. The final IRA of Fleiss’s $\kappa = .701$ indicates substantial agreement between the annotators, suggesting that the annotation guidelines were clear and consistently applied.

The annotation guidelines are based on the discussed literature in Sec. 2. First, we excluded all elements comprising proper names as attributes as they differ with regard to their syntactic properties and are, therefore, not suitable for comparison. In a second step, we filtered the data based on optionality by excluding all items where speakers do not have choice over the construction. Further, we excluded all items that are fixed constructions or idioms as in (28a). Additionally, all *von*-PPs were excluded if *von* had a temporal or local interpretation as in (28b) instead of being interpreted as an argument of the head noun. If the *von*-PP did not contain a determiner as in (28c) they were excluded as well, as GEN nouns are obligatorily marked with a determiner. This implies that no equivalent construction exists with GEN. Lastly, all items were excluded if *von* was part of the argument structure of the verbal base as in (28d).

- (28) a. Tag der Arbeit
day the.GEN work.GEN
‘Labour Day’
b. der Blick vo-m Turm
the view from-the.DAT tower.DAT
‘the view from the tower’
c. Beförderung von Hunden
transport of dogs.PL.DAT
‘transport of dogs’
d. Ausschluss vo-m Wahlrecht
exclusion from-the.DAT voting.right.SG.DAT
‘exclusion from voting rights’

The stepwise testing allowed us to establish the annotation guidelines and confirm their consistency, thus providing a solid foundation for a methodologically robust analysis.

Considering the two previously outlined annotation rounds it is evident, that establishing clear and consistent guidelines is essential prior to conducting a larger-scale empirical study. Despite the fact that the dataset is not sufficiently large and does not allow for a sophisticated statistical analysis, both annotation rounds still serve as a pre-study to pre-validate our hypothesis and to fine-tune the guidelines for the annotation. Only three registers were annotated to gain preliminary insights into the data. Preliminary findings suggest that GEN and *-ung* nouns trend positively with higher education registers and that *von*-PPs show a slight negative correlation. While a larger

statistical study is still pending, our methodology sets a strong foundation for validating the theoretical predictions regarding the encoding of register-sensitive grammatical structures, particularly in relation to education-based register variations. Once a larger study has been conducted, the data can be used to model the respective DEGREE values in the corresponding UCCs.

The presented methodological approach represents one of several possible methods for empirical validation. It has potential applications for testing formal hypotheses about register and social meaning. Still, we wish to stress that numerical values in UCCs and SMs should ultimately not be arbitrary but empirically verified. This can be done on the basis of a quantitative corpus methodology, or average ratings derived from matched-guise experiments (cf. e.g. Lüdeling et al. 2024; Varaschin, Machicao y Priemer & Lu 2024).

In this section, we presented a method combining probabilistic modelling (LDA) and human annotation for validating register-sensitive grammatical encoding. Future empirical work should expand the annotation to establish robust empirical intervals. While the analysis provides evidence supporting our hypothesis, further research is needed to refine the DEG values for our theoretical model.

6 Concluding remarks

In this paper, we proposed (i) structural constraints that predict when GEN and *von*-PP arguments of NPs in German *can* be used: (ii) use-conditional constraints (UCCs) that model when the two forms *would* be used, and (iii) a new method to empirically validate the predictions made by the model that results from (i)–(ii). The latter relied on the automatic classification of texts into potential registers (i.e. *pregisters*) by means of the Latent Dirichlet Allocation (LDA) model and on their subsequent manual annotation for situational parameters (Schäfer, Bildhauer, Reiß, Pankratz & Müller 2025).

A crucial step in our methodological proposal was to take the LDA-induced preregisters ordered by their annotation-derived *education* scores as proxies for the *education* SM parameter itself. This assumes that how much a structure appears on a preregister assigned to a particular degree of education reflects how appropriate it is in a context where the speaker presents as having that particular degree of education.¹⁶ This appropriateness can then be compared to the hypothesized DEGREE values we assign to the corresponding *educated* SM in UCCs like (23)–(25). If the empirically induced *education* intervals don’t match the hypothesized values, the latter can be revised accordingly.

¹⁶This is a simplification (since many SM parameters are active in any situation), but it serves as a heuristically useful approximation for empirically validating hypothesized SMs. In this respect, this technique is similar to the use of written vs. spoken corpora as proxies for *formality*, as proposed in Sauerland (2022). The difference is that our association between corpora and situational parameters is independently established by annotators.

A further step is to develop some technique for automatically extracting SM DEGREE values from the distribution of different variants across different registers annotated for that SM. There are potentially different ways this could be done. One could, for instance, derive such values from the relative proportion of different variants across registers ranked by their scores for a particular SM (e.g. *education*), normalized to [0,1]. The degree interval could be defined as the range where the variant appears with frequency above some threshold (e.g. above the median frequency, or above a percentage of its maximum frequency). A simpler alternative, following the logic of Sauerland (2022), is to calculate the frequency of a variant in the register ranked highest with respect to a particular SM annotation, divide it by the frequency of the same variant in the register ranked lowest with respect to the same SM annotation and normalise the resulting number to correspond to a value between [0,1]. This provides a single point estimate reflecting a variant’s degree of association with contexts associated with a SM. To convert this to an interval, one could establish bounds using confidence intervals derived from the empirical variance, or by setting the point estimate as the interval’s midpoint with width determined by the variant’s dispersion across registers.

On the theoretical side, our proposal says that genitive arguments are more frequent in ‘more educated’ contexts because they are grammatically required (by UCCs) to have SMs that largely overlap with these contexts. The higher prevalence of genitives in registers with high education scores was confirmed by our preliminary data analysis. According to the SM composition principle in (26), *-ung* derived Ns and *von*-PPs are predicted to have a restricted distribution because their hypothesized SMs define sets of admissible contexts with a narrow intersection. The preliminary data analysis we carried out favors this intersective approach to local SM composition. This goes against proposals like McCready’s (2019), who argues that DEGREE values of SMs of the same type are composed by calculating a numerical average.

7 Acknowledgements

We thank the audience at the 32nd HPSG Conference (Centro de Linguística da Universidade de Lisboa), three anonymous reviewers, and Sigi Bahr, Felix Bildhauer, Elin McCready, Andrés Saab, Manfred Sailer, and Frank Van Eynde for invaluable comments and conversations. All remaining errors are ours. This research was funded by the Deutsche Forschungsgemeinschaft (DFG) – SFB 1412, 416591334, Project A04.

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Having an iota of talent: A gradable HPSG analysis of the syntactic distribution and semantics of the minimizer *an iota*

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 93–112



Keywords: HPSG, LRS, Negative polarity, NPI, scalarity, minimizer

Martinez García, Edgar David. 2025. Having an iota of talent: A gradable HPSG analysis of the syntactic distribution and semantics of the minimizer *an iota*. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar*, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal, 93–112. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.5.



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Abstract

The exhaustificational account predicts that the polarity distribution of minimizers is due to the effect that exhaustificational/focal operators have on their semantics: they cause minimizers and their alternatives to be organized in likelihood scales while requiring the former to be in the lowest position. This approach excludes positive sentences as licensing environments for minimizers, but a defining characteristic of partitive minimizers, such as *an iota*, is that they can occur in these kinds of sentences. The aim of this paper is to give a scalar account of the polarity distribution of the minimizer *an iota* that determines its polarity as being the product of satisfying an absolute minimum standard provided by a relevant gradable predicate: in positive contexts, the minimizer meets the standard, while it does not in negative contexts. The proposal is implemented for the phrase *an iota of talent*, utilizing the combinatoric tools of LRS and the feature geometry of HPSG. This treatment motivates a lexicalist alternative to proposals engaging with polarity phenomena based on exhaustificational operators.

1 Introduction

Minimizers, phrases such as *a drop*, *a red cent*, or *lift a finger*, have commonly been treated as strong negative polarity items (NPIs), licensed only by negative operators and negative quantifiers (van der Wouden 1997, Zwarts 1998). The purpose of the exhaustificational approach is to capture such distribution by positing that minimizers need to be compared to a set of relevant alternatives along a scale of likelihood. However, this account ignores the distribution of partitive minimizers like *an iota* in plain positive contexts, an environment in which they are predicted to be infelicitous.

I propose an alternative scalar account that leaves the definition of the dimension of measurement to a relevant gradable predicate, and compares the minimizer to absolute minimum standards of satisfaction, also defined by the predicate. I argue that partitive minimizers in positive contexts meet the standard, while those in negative contexts do not. To illustrate this, I offer a detailed analysis of the phrase *an iota of talent* using the combinatoric tools of Lexical Resource Semantics (LRS) (Richter & Sailer 2004).

This paper is structured as follows: Section 2 will provide a detailed account of the exhaustificational approach to the polarity of minimizers as well as the empirical issues associated with it. Section 3 deals in detail with the issues associated to the exhaustificational approach. Section 4 develops

[†]I want to thank the audience at the HPSG 2025 conference as well as the reviewers of this article for their comments. I have an immense debt of gratitude to Manfred Sailer for his help in the completion of this, my first attempt at doing serious linguistic research within the framework of HPSG. Manfred dedicated hours to patiently listening to my ideas and helping me craft the LRS analysis I have implemented here, for which I am indeed very grateful.

the scalar analysis to be implemented in this article and the role of absolute minimum standards. Section 5 illustrates the HPSG/LRS implementation through the analysis of *an iota of talent*. Section 6 concludes the present article.

2 The Exhaustificational Account

The exhaustificational account of the distribution of minimizers assumes that they are associated with a focal operator that sets them in the lowest position of a likelihood scale along which a set of alternatives is also ordered (see Eckardt & Csipak (2013) and Eckardt (2005)). Such an analysis borrows heavily from the research on the semantics and pragmatics of the focal operator *even* (Crnič 2011, Karttunen & Peters 1979, Lahiri 1998, Rooth 1985) and it intends to capture the infelicitous use of minimizers in positive contexts (1a), their degraded acceptability under the scope of quantifiers such as *few* (1b), and their felicitous use in the scope of negative operators (1c) and negative quantifiers (1d).

- (1) a. I saw a living soul.
- b. Few people saw a living soul.
- c. I didn't see a living soul.
- d. Nobody saw a living soul.

In other words, the exhaustificational account aims to capture the NPI-hood of minimizers, while also attempting to account for their more restricted distribution, at least when compared with other NPIs like *ever*, which is welcome in plain downward-entailing (D.E.) (2a), anti-additive (2b), and anti-morphic (2c) contexts (see van der Wouden (1997) and Zwarts (1998)). As exemplified above, the minimizer *a living soul* is expected to be felicitous only in the latter two. The differences in the distribution of *ever* and *a living soul* have motivated the classification of ever-like expressions as *weak NPIs*, while a-living-soul-like expressions have been labelled *strong NPIs*.

- (2) a. Few people have ever been to Peru.
- b. Nobody has ever been to Peru.
- c. I haven't ever been to Peru.

Let us illustrate the mechanisms set in motion by exhaustification with the analysis of the expression *a living soul*, adapted from Eckardt (2005). Let us first assume that *a living soul* triggers the following alternatives:

- (3) **ALT**(a living soul) = {a priest, a carpenter, a baker,...}

The alternatives to the minimizer denote more specific entities than the one denoted by the minimizer itself. That is, *a living soul* stands for the most generic person one is keen to find in any given situation: the denotation of *a living soul* itself is the union set of the set of its alternatives (Krifka 1995).

Given the general nature of the minimizer, the likelihood of it taking part in any given event is high compared to its alternatives. For example, one is more likely to see an anonymous passerby than to see a particular, easily identifiable person, like a baker or a priest. This scalar relation can be informally illustrated with the following formula:

$$(4) \quad \textbf{Likelihood}(P(\text{living soul})) > \textbf{Likelihood}(P(\text{ALT}(\text{living soul})))$$

However, the presence of a focal operator would position the minimizer at the lowest point on a likelihood scale relative to the alternatives. This means that the expected scalar relationship should be completely opposite to the one shown in (4) and resemble (5).

$$(5) \quad \textbf{Likelihood}(P(\text{ALT}(\text{living soul}))) > \textbf{Likelihood}(P(\text{living soul}))$$

A minimizer in a positive sentence like (1a) generates alternatives towards which it keeps a scalar relation as in (4), while the expected likelihood value of the minimizer and its alternatives should be (5). The clashing scalar implicatures render *a living soul*, and minimizers in general, infelicitous in positive contexts.

In turn, negative contexts preserve the scalar implicature imposed by the emphatic operator. Intuitively, in any given event involving people, one is highly unlikely **not** to see at least some generic individual compared to the alternatives; for example, **not** seeing a priest is more likely. These intuitions concerning a sentence like (1c) can be captured by the informal representation below:

$$(6) \quad \textbf{Likelihood}(\neg P(\text{ALT}(\text{living soul}))) > \textbf{Likelihood}(\neg P(\text{living soul}))$$

The expected likelihood relations between the minimizer and its alternatives, shown in (5), and the ones generated by (1c) as in (6) are structurally similar, pointing to the felicity of *a living soul* in negative contexts.

To sum up, minimizers generate alternatives, and they are by default the most likely element to take part in an event with respect to such alternatives; however, they are only licensed in environments in which the exact opposite holds: the minimizer ought to be highly unlikely to (not) take part with respect to the alternatives.

Formal attempts to capture these insights postulate special exhaustificational operators activated at the utterance level (Krifka 1995), or as part of the semantic content of lexical items, an approach implemented in HPSG treatments of NPI licensing in Romanian (Rizea & Sailer 2019, 2020). Likewise, minimalist accounts assume the presence of an optionally overt focal

operator *even* as part of the abstract syntactic structure of minimizer phrases (Tubau 2016).

Disregarding whether one’s theoretical stance favors a pragmatic, lexical-semantic, or syntactic treatment of exhaustification, this hypothesis fails to account for the complete distribution of English minimizers given its inability to predict their occurrence in contexts such as *do*-support environments (Sailer 2021, 2022, Sedivy 1990), and simple positive sentences (Martínez García 2022, 2023). In the following section, we will discuss these problems in turn.

3 Problems

The exhaustificational hypothesis intends to capture the more restricted distribution of minimizers with respect to other NPIs, but it ultimately fails in two ways: it predicts the occurrence of minimizers across the entire spectrum of D.E. licensing contexts, with a distribution parallel to weak NPIs, while not being able to account for their attestation in non-D.E. environments such as *do*-support sentences (Sailer 2021, 2022, Sedivy 1990). On the other hand, the formulation of this hypothesis has its basis in the received knowledge that minimizers do not happen in plain positive sentences, a premise that has been called into question by more recent research in the polarity systems of the languages of the Iberian peninsula (Pinto 2015, San-Segundo Cachero 2019), and English (Martínez García 2022, 2023). Let us explore each problem in turn.

3.1 Minimizers in other D.E. Environments (Eckardt & Csipak 2013)

Eckardt & Csipak (2013) note that exhaustificational accounts would predict strong NPIs, such as minimizers, to be licensed in all downward-entailing contexts, violating the distributional constraints these expressions are expected to set on environments that license them. To illustrate this, assume properties P and P_1 such that $P_1 \subset P$ so that whenever these properties appear in a downward entailing context S , it follows that $S(P) \rightarrow S(P_1)$. Now, in reasoning of the form $p \rightarrow q$, if p is true, q will also be true. In other words, q is necessarily as likely as p , and probably more. Since minimizers are theorized to denote the union set of all their alternatives, any environment for which $S(P) \rightarrow S(P_1)$ follows will allow minimizers as well: given that $\text{ALT}(\text{min}) \subset \text{min}$ then $S(\text{min}) \rightarrow S(\text{ALT}(\text{min}))$ is predicted to hold. That is, downward-entailing contexts preserve likelihood relations among propositions, and thus they are bound to license inferences from the least likely proposition to more likely ones.

In other words, enriching minimizers with an exhaustification operator will not prevent minimizers from being licensed by plain D.E. operators, such

as *few* or *rarely*, predicting their acceptability in sentences in which they should be barred, such as the following (Eckardt & Csipak 2013: 277):

- (7) a. ? Few students even lifted a finger.
- b. ? Otto rarely lifted a finger.

However, the attestation of minimizers in such contexts has been well-documented, motivating calls to classify them as *weak* NPIs, given their broad distribution (Giannakidou 2011). This is illustrated by the following attested examples from the enTenTen21 Corpus (2022). Emphasis is mine:

- (8) a. (...) whilst residents of both Brightlingsea and Shoreham were prepared to go to huge lengths to stop the live-export trade, **few lifted a finger** to stop scab coal being brought in through these same ports to break the miners strike.
- b. Corbyn is still sitting on the same fence he did three years ago. He **hardly lifted a finger** to help.

In short, exhaustificational accounts license NPIs in the same contexts as D.E. accounts of NPIs licensing, but such overgeneralization does not seem to be a problem for at least some minimizers since their distribution has been attested to be wider than initially assumed.

3.2 Attestation in non-D.E. environments

Consider these data from the enTenTen21 corpus (emphasis mine):

- (9) a. I most definitely **do give a damn** if female characters have a better representation in games
- b. She really **does give a damn** about the walfare [sic] of the city!!

These examples defy licensing theories of NPI that restrict the occurrence of minimizers to the scope of D.E. operators. Likewise, they are not accounted for by other dominant theories of polarity sensitive items such as Giannakidou's non-veridicality theory (1998). Let us explore Giannakidou's proposal in some detail.

Concisely, a non-veridical operator cannot guarantee the truth of the proposition on which it is applied (Giannakidou 2014). Thus, for any proposition p such that it is scoped over by a non-veridical operator Op .

$$(10) \quad Op(p) \rightarrow p \vee \neg p$$

Additionally, if the following holds:

$$(11) \quad Op(p) \rightarrow \neg p$$

Op is said to be anti-veridical (Giannakidou 1998, 2014).

The relevance of non-veridicality to the discussion of NPI licensing lies in its capturing properties of operators that allow NPIs in their scope, but that cannot be classified within the hierarchy of negative environments proposed by Zwarts (1998) and van der Wouden (1997). In general terms, Giannakidou proposes that NPIs are licensed by non-veridical or anti-veridical environments. Classical negation is an example of the latter, while modals and subjunctives are examples of the former. For instance, consider the attested occurrence of the minimizer *give a damn* licensed by the modal *willing to* (from enTenTen21):

- (12) the reason they're so willing to appreciate the efforts of any celebrity wrestler *willing to* **give a damn** is that the business has been victim to countless celebrities who clearly had no interest in sports entertainment

Willing to is not D.E., but it is non-veridical as illustrated by the tests below:

- (13) a. I am willing to eat vegetables $\nrightarrow$ I am willing to eat broccoli
b. I am willing to eat vegetables $\nrightarrow$ I eat vegetables

In other words, *willing to* does not allow set to subset inferential reasoning as D.E. operators do (13a), and neither does it preserve the truth of its subjacent proposition (13b): From *I am willing to eat vegetables*, it is not possible to deduce that *I eat vegetables*.

Applying a similar test to (9b) shows that *do*-support is not D.E., but that it preserves the truth of the proposition (i.e., it is veridical).

- (14) a. I do eat vegetables $\nrightarrow$ I do eat broccoli
b. I do eat vegetables $\rightarrow$ I eat vegetables

Likewise, *do*-support environments do not license weak NPIs such as *ever* (Sedivy 1990: 98):

- (15) *Bert did ever kiss Marilyn Monroe.

In short, *do*-support sentences do not fit in current licensing theories of NPIs: they are not D.E. or non-veridical, and they license *strong* NPIs but block weak ones. This is surprising, considering that the set of licensing operators that allow strong NPIs is regularly assumed to be a subset of the set of operators licensing *weak* NPIs. This last assumption is central to the exhaustification theory, thus, it cannot give account of the occurrence of minimizers in *do*-support sentences by design.

3.3 Minimizers in positive contexts

Recent research focused on the polarity systems of languages spoken in the Iberian peninsula (Pinto 2015, San-Segundo Cachero 2019) has provided evidence of the use of noun phrases normally labeled as NPIs in positive contexts while unlicensed. These NPs tend to be derived from measure expressions and appear in partitive contexts, hence their classification as *partitive minimizers*. The examples below illustrate this phenomenon with the NP *un ápice* (from the esTenTen23 corpus 2023):

- (16) a. no nos vamos a apartar un ápice de este camino
 NEG 1PL.DAT go.PRES to separate.INF one *ápice* of this path
 ‘We will not deviate from this path even one bit’
- b. sin que tu look tenga que perder un
 without COMP 2SG.POSS look have.SUBJ COMP lose.INF one
ápice de estilo.
ápice of style
 ‘Without your look having to lose one bit of style.’
- c. Y si tuviera un ápice de dignidad, debe renunciar
 and if have.SUBJ one *ápice* of dignity must resign
 ‘And if you had even one bit of dignity, you must resign’
- d. la despedida deja un ápice de esperanza a
 DEF.F.S farewell leave.PRES one *ápice* of hope DAT
 los que quieren a Ana.
 REL.PL COMP love.PRES ACC Ana
 ‘The farewell leaves a bit of hope for those who love Ana.’

The data selection above showcases examples of partitive *un ápice* in negative (16a), D.E. (16b) non-veridical (16c), and positive environments (16d). This list illustrates the NPI uses of this expression as well as its use in positive contexts in the absence of a licenser.

My work on NPIs in both English and Spanish (Martínez García 2022, 2023) has shown that the former language boasts a set of expressions that behaves similarly to Spanish partitive minimizers: they are derived from measure nouns, are commonly classified as NPIs, but they can also appear in positive contexts. This is the case of phrases such as *a crumb* or *an iota*. The examples in (17a) exemplify the use of these phrases as NPIs, and the examples in (17b) show their use in positive contexts (from enTenTen 2022).

- (17) a. *An iota* and *a crumb* as NPIs
- i. There is not *an iota of evidence* that she questioned anything about the dreary reality in the Soviet Union
 - ii. With Campbell(...) barely garnering *a crumb of acclaim* in the pages of the unforgiving music press

- b. *An iota* and *a crumb* in positive contexts
 - i. Good thing someone in the family had *an iota of talent*.
 - ii. Many people experience heartburn and belching after having a meal with *an iota of beans* in it.
 - iii. Alas, there remains *a crumb of satisfying hope*

A common take regarding minimizer distribution is that they would trigger literal readings when in positive contexts (Tubau 2016), in which case the expressions can no longer be considered NPIs. This seems to be the case for expressions such as *a red cent*, whose only available reading in the example below is that the utterer is the owner of a cent that is red or has been painted red.

(18) I have a red cent

The choice of examples in (17b) shows that this is not always the case. Both *an iota* and *a crumb* remain idiomatic in positive contexts with an active quantificational reading similar to that of the construction *a bit of NP*. Indeed, San-Segundo Cachero (2019) sets the quantificational nature of partitive minimizers as a determinant factor in their polarity distribution. Importantly, the exhaustificational hypothesis predicts the ill-formedness of plain positive sentences containing minimizers.

3.4 Summary

The exhaustificational hypothesis endeavors to capture the distribution of minimizers as strong NPIs. However, minimizers have been found to have a distribution that both imitates and exceeds the distributional behavior of weak NPIs. They have been attested under the scope of D.E. operators, such as *few*, while also being possible in contexts barred for run-of-the-mill weak NPIs, like *do*-support and plain positive sentences. Through this section, we have seen that the exhaustificational account of the distribution of minimizers fails doubly: it fails to limit the distribution of minimizers to the kind of environments they were thought to be secluded to initially (anti-morphic and anti-additive contexts), and it also aims to exclude as part of their distribution environments in which they are attested, like positive sentences.

These failures originate from the exhaustificational hypothesis being a generalization built on incomplete data, the treatment of scales that this hypothesis is based upon, and the erroneous assumption that all minimizers should be treated equally. In what follows, I will address the latter two issues by adopting the position that partitive minimizers are better accounted for if scale-forming dimensions are left undefined and their position on the scale is compared to a standard of satisfaction, instead of a whole set of alternatives.

4 Standards and polarity: the case of *an iota*

In this section, I will spell out some features of scales relevant to the analysis of the distribution of the partitive minimizer *an iota* in positive and negative environments. I have chosen this expression given the ease of analysis its plain quantificational meaning would grant. As mentioned above, minimizers may be interpreted literally in positive contexts, but for this to be possible, the interpretation of a minimizer must have extensional value. The noun *drop*, for example, designates amounts of liquid, while *crumb* is normally used as a measure of food. Thus, the examples below can be read as referring to literally a drop of syrup and a crumb of bread.

- (19) a. I drank a drop of syrup
b. I ate a crumb of bread

As far as I am aware, the noun *iota* does not have an extensional value that would license literal interpretations. In turn, its impoverished semantic content will facilitate the development of a lexicalist analysis in section 4, in which its main semantic contribution is simply the predicate over degrees **minimal**. An analysis on these lines can be further applied to partitive minimizers with richer semantic content in the future.

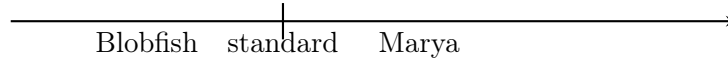
In my treatment of *an iota*, I embrace two notions central to the exhaustificational approach. First, I agree that the distribution of partitive minimizers needs to be approached from a scalar perspective, and second, I also uphold that comparison among scalar items is central to this endeavor. However, I reject that the scale-forming dimension has to be one of likelihood by default, and that the comparison needs to be between the minimizer and all its possible alternatives. Rather, scalar dimensions should be lexically encoded as a property of gradable predicates or defined by the contexts, and minimizers should be compared against a standard.

In what follows, I will introduce the concept of standard in more detail, the differences between absolute and relative standards, and the entailments pertinent to scales with absolute standards.

4.1 Different kinds of standards

Succinctly, a standard is a point that separates a scale into levels where the subjacent gradable predicate is true from those where it is false (Kennedy & McNally 2005). For example, consider a toy universe with a blobfish and Marya Bolkonskaia from Tolstoy's *War and Peace*. Let us further assume that we wish to compare their beauty. Blobfish are usually considered ugly or funny-looking, at best. Conversely, the only information we have about Marya's appearance from Tolstoy is that she is somewhat plain but has beautiful eyes and a sad expression, which was seen as an attractive physical

trait during the 19th century. Therefore, a visual comparison of their positions on a beauty scale would look like this:



In other words, blobfish do not satisfy the standard of the beauty scale, while Marya does. In turn, the predicate “x is beautiful” subjacent to the scale would turn “false” for the blobfish and “true” for Marya.

How to establish the standard depends on whether the scale has identifiable minimum values, maximum values, or neither (Kennedy & McNally 2005, Solt 2015). If a scale has minimum or maximum values, the standard will be associated with one of them. Since this is the case independently of contextual factors, the standard of the scale is absolute. When a scale has neither maximum nor minimum values, the definition of the standard depends on contextual factors; here, the standards are relative. Consider the examples below:

- (20) a. I ate bread for lunch
 b. I am tall

Since an eating event has a clear start and end, these can be mapped onto a scale and be interpreted as minimum and maximum values, respectively. One of these can serve as the standard of a bread-eating scale. Given that eating rather small portions still constitutes eating, the standard for a bread-eating scale is absolute and minimum. That is, the predicate “x ate bread” will return “true”, even if a very small amount was consumed.

On the other hand, defining the truthfulness of (20b) depends on contextual factors. Assume that the utterer of (20b) is 1.80m tall; if the comparison class in the context is a group of basketball players, the utterance in (20b) could be considered false. If the height of the utterer is compared to the height of primary schoolers, (20b) could be evaluated as true. That is, the standard for scales of tallness is relative.

For the discussion at hand, I will adopt the position that minimizers, particularly partitive minimizers, associate with scales whose standards are absolute and minimum. Additionally, I will further assume that the features of standards are lexically defined (Kennedy & McNally 2005); concretely, this means that the predicate will encode information about the standard. A desirable entailment of defining features of standards in this manner is that denying that an entity x can satisfy a gradable predicate G with a minimum absolute standard entails that x has G to a zero degree (Kennedy & McNally 2005: 358).

This allows drawing common implicatures connected to minimizers without appealing to exhaustificational operators, such as their compliance with Fauconnier’s scale principle applied to negated gradable predicates (1975:

362): if a property does not hold for the lowest element in a scale, it will not hold for any other element.

To sum up, similarly to the exhaustificational approach, I will give an account of the distribution of the partitive minimizer *an iota* in positive and negative environments focusing on their scalar features. However, unlike exhaustification, I will allow the dimension of measurement to be defined by a gradable predicate that, in turn, encodes a minimum absolute standard for its scale. This setup permits inferences commonly associated with minimizers in negative contexts without postulating abstract focal operators as part of their semantics.

5 HPSG/LRS treatment

In this section, I will present an analysis of the phrase *an iota of talent* cast in the HPSG feature geometry of Lexical Resource Semantics (LRS). LRS is a system of underspecified semantics combinatorics that uses standard representation languages such as HoL or Ty2 while implementing constraints and metavariables to allow for multiple possible final representations (Richter & Sailer 2004). An LRS principle at the heart of the present analysis is that lexical items make semantic contributions that are put together in well-formed formulas.

To date, several LRS analyses have attempted to capture the distribution of minimizers; noteworthy among these are the work of Rizea & Sailer (2019, 2020) on Romanian NPIs and Sailer (2021) use-conditional theory of expressions licensed in *do*-support environments. Rizea & Sailer (2019, 2020) propose complex feature geometries that implement both standard satisfaction for polarity-sensitive constructions and exhaustificational operators for minimizers. Likewise, Sailer (2021) proposes the licensing of *lift-a-finger* type of expressions by an appropriate operator constrained by contextual felicity of use. My proposal differs in that the feature geometry I implement for the analysis of the partitive minimizer *an iota* makes use of vanilla LRS feature-value pairs, does not invoke special exhaustificational operators, and does not require licensing at the use-conditional level.

Rather, I assume a simple semantics that depends on lexically encoded features of both the minimizer phrase *an iota* and the gradable predicate that supplies scalar attributes, such as the dimension of measurement and a standard.

I will illustrate the representational constraints closely following the feature geometry proposed by Levine et al. (in press) while introducing the lexical entries pertinent to the phrase *an iota of talent*. Let us start with the determiner *an*:

$$(21) \left[\begin{array}{c} \text{word} \\ \text{PHON} \\ \text{SYNS|LOC|CAT} \\ \text{LRS} \end{array} \left[\begin{array}{c} \langle an \rangle \\ \text{CONT} \left[\begin{array}{c} \text{INDEX} \left[\begin{array}{c} \text{DR } \boxed{1a} \\ \text{PHI } \left[\text{NUM } sg \right] \end{array} \right] \\ \text{MAIN } \boxed{1b} \end{array} \right] \\ \left[\begin{array}{c} \text{EX-CONT } \boxed{1} \boxminus \boxed{1a} [\alpha : \beta] \\ \text{IN-CONT } \alpha : \beta \\ \text{PARTS } \boxed{2} \langle \boxed{1a}, \boxed{1b}, \boxed{1} \rangle \end{array} \right] \end{array} \right] \right]$$

$\& \boxed{1a} \triangleleft \alpha \ \& \ \boxed{1a} \triangleleft \beta$

In the AVM above, The MAIN contribution of the determiner is an existential quantifier. At this point, we remain agnostic as to what sort of entities this quantifier ranges over. I illustrate this by simply placing the tag $\boxed{1a}$ as its index value. Additionally, the lexical entry includes the feature structure LRS subsuming the feature-value pairs EX(TERNAL) CONT(ENT), IN(TERNAL) CONT(ENT), and PARTS.

The value for EX-CONT is the semantic representation of the maximal head projection. The lexical entry for *an* has a specified value for its EX-CONT, but it may be allowed to remain underspecified. The value for IN-CONT specifies that part of the representation that is scoped over by all the scope-taking operators along a maximal projection. Since *an* does not provide information concerning restrictor or scope values, IN-CONT will contain only the metavariables that stand for the restrictor and the scope respectively: α and β . These metavariables will be saturated as the derivation continues. The value for PARTS contains the contribution constraints supplied by every lexical item. Here, the PARTS value specifies that a quantifier, its restrictor and scope, as well as an indexical value have been contributed. Finally, the entry is accompanied by component constraints that specify the relation between the referential index and the IN-CONT value: the index should appear both at the restrictor and the scope of the quantifier.

Let us now focus on the lexical entry for *iota*.

$$(22) \left[\begin{array}{c} \text{word} \\ \text{PHON} \\ \text{SYNS|LOC|CAT} \\ \text{LRS} \end{array} \left[\begin{array}{c} \langle iota \rangle \\ \text{CONT} \left[\begin{array}{c} \text{INDEX} \left[\begin{array}{c} \text{DR } \boxed{1a}d \\ \text{PHI } \left[\text{NUM } sg \right] \end{array} \right] \\ \text{MAIN } \boxed{3}\mathbf{minimal} \end{array} \right] \\ \left[\begin{array}{c} \text{EX-CONT } me \\ \text{IN-CONT } \mathbf{minimal}(d) \\ \text{PARTS } \boxed{4} \langle \boxed{1a}, \boxed{3}\mathbf{minimal}, \boxed{1a}d \rangle \end{array} \right] \end{array} \right] \right]$$

The index value for the entry for *iota* shares a tag with that of the determiner. However, here that value has been made explicit: the quantifier binds a degree argument. The semantic import of *iota* is limited to the predicate over degrees **minimal**, adapted from Sailer’s (2006) lexical entry for the German minimizer *ein Dreck*. This predicate designates a degree that satisfies the standard provided by a gradable predicate either by sharing its location with the standard or slightly higher. Such a definition of the predicate guarantees that the use of the minimizer *an iota* in positive contexts is allowed. Let us turn now to the entry of the word *of*.

$$(23) \left[\begin{array}{c} \text{PHON } \langle of \rangle \\ \text{SYNS|LOC|CAT} \\ \text{LRS } [5] \end{array} \left[\begin{array}{c} \text{HEAD} \\ \text{CONT } [4] \end{array} \left[\begin{array}{c} \text{prep} \\ \text{SELECT} \\ \text{LRS } [5] \end{array} \left[\dots \left[\begin{array}{c} \text{CAT} \\ \text{CONT } [4] \end{array} \left[\begin{array}{c} \text{HEAD } noun \\ \text{COMPS } \langle \rangle \end{array} \right] \right] \right] \right] \right] \right] \right]$$

This lexical entry, as well as basic theoretical notions concerning the syntactico-semantic characteristics of *of* in pseudo-partitive constructions, have been adapted from Van Eynde & Kim (2023). Importantly, I will assume with these authors that *of* is semantically transparent. Likewise, I will adopt their classification of pseudo-partitives, and propose that partitive minimizers form structures of type B. This means that *of* does not head a PP, but it selects an NP that ultimately projects. That is, the final structure formed by *of* and the downstairs noun is equivalent to the one in (24b):

- (24) a. *of*+NP= PP
b. *of*+NP= NP

In type B pseudopartitives, *of* behaves like a head-selecting functor, rather than a fully fleshed-out head of a phrase. Thus, a mechanism of selection must be established other than valence feature saturation, as is normally done in HPSG. As a solution, Van Eynde & Kim (2023) implement the SELECT feature defined as a value of HEAD in the feature geometry of functors. This allows functors to impose constraints on the head daughter of the phrase, an NP in this case. For more details, see Van Eynde (1998).

Finally, *of* lifts the semantic content from the downstairs noun given its semantic transparency. This is represented by the tag sharing of the CONTENT and LRS values of the preposition and the selected noun. The final lexical entry is that of *talent*.

$$(25) \left[\begin{array}{l} \text{word} \\ \text{PHON} \quad \langle \text{talent} \rangle \\ \text{SYNS|LOC|CAT} \quad \left[\text{CONT } \boxed{4} \left[\text{MAIN } \mathbf{talent} \right] \right] \\ \text{LRS} \quad \boxed{5} \left[\begin{array}{l} \text{EX-CONT } me \\ \text{IN-CONT } \boxed{6} \mathbf{talent}(x)(d) \wedge d \geq \text{stand}_{min} \\ \text{PARTS} \quad \boxed{7} \langle \mathbf{talent}(x)(d), x, d, \text{stand}_{min} \rangle \end{array} \right] \end{array} \right]$$

The main contribution of *talent* is the semantic constant **talent**, which is further defined as a gradable predicate with minimum absolute standards of satisfaction.

The combination of the determiner and the upstairs noun generates the following structure:

$$(26) \left[\begin{array}{l} \text{phrase} \\ \text{PHON} \quad \langle \text{an iota} \rangle \\ \text{LRS} \quad \left[\begin{array}{l} \text{EX-CONT } \boxed{1} \\ \text{IN-CONT } \mathbf{minimal}(d) \\ \text{PARTS} \quad \boxed{2} \oplus \boxed{4} \end{array} \right] \end{array} \right] \& \mathbf{minimal}(d) \triangleleft \alpha$$

While the resulting structure shares the EX-CONT value with the determiner, it has the IN-CONT value of the noun. This is because the predicate **minimal**(d) is, at this point, the most deeply embedded subformula in the derivation. Additionally, another component constraint has been introduced: the predicate introduced by the minimizer needs to saturate the restrictor position of the quantifier, which to this point is the place held by the metavariable α . Finally, the phrase collects the contribution constraints from each lexical item contained in their PARTS value.

The structure *of talent* generates an NP represented as follows:

$$(27) \left[\begin{array}{l} \text{phrase} \\ \text{PHON} \quad \langle \text{of talent} \rangle \\ \text{SYNS|LOC|CAT} \quad \left[\text{CONT } \boxed{4} \right] \\ \text{LRS} \quad \boxed{5} \end{array} \right]$$

The phrase has identical CONTENT and LRS values to those of the entry for *talent*, due to the lifting performed by *of*.

The following is the representation for the phrase *an iota of talent*:

$$(28) \quad \left[\begin{array}{l} \text{phrase} \\ \text{PHON } \langle \text{an iota of talent} \rangle \\ \text{LRS } \left[\begin{array}{ll} \text{EX-CONT} & \boxed{1} \\ \text{IN-CONT} & \boxed{6} \\ \text{PARTS} & \boxed{2} \oplus \boxed{4} \oplus \boxed{7} \end{array} \right] \end{array} \right] \& \boxed{6} \triangleleft \beta$$

The EX-CONT value of the final representation is identical to that of *an*. This illustrates that the contributions of the other lexical items will be scoped over by the quantifier $\exists$ contributed by the determiner. On the other hand, the IN-CONT is identical to that of *talent* because the main semantic contribution by this lexical item will be part of the scope of the quantifier, thus constituting the most deeply embedded subformula in the representation. Precisely, the final component constraint added to the AVM (i.e., $\& \boxed{6} \triangleleft \beta$) intends to ensure that the IN-CONT be part of the scope of $\exists$. All the contribution constraints have been collected in PARTS.

Considering the EX-CONT and IN-CONT values collected in the final entry, a final possible semantic representation for *an iota of talent* is as follows:

$$(29) \quad \exists d[\mathbf{minimal}(d) : \mathbf{talent}(x)(d) \wedge d \geq \text{stand}_{min}]$$

So far, I have shown in a stepwise fashion how the different components of the phrase *an iota of talent* contribute to its final representation using the combinatorial tools of LRS. The representation makes no use of exhaustificational operators since their implementation is antithetical to the distribution of *iota* in positive contexts. However, little has been said concerning the behavior of *iota* in negative contexts.

We have partially addressed this issue in section 3, by proposing that minimizers (partitive minimizers, in particular) associate with scales whose standards are absolute and minimal. Negating a sentence with a gradable predicate that complies with these requirements would ensure that the gradable predicate cannot be had at any degree. That is, for any gradable predicate G with absolute minimal standards, if $\neg G_{min}(x)$ holds, x has a zero degree of G -ness. Let us call this the zero G -ness entailment, (Kennedy & McNally 2005). Zero G -ness due to negation renders the predication concerning degrees higher up in the scale contradictory. In practical terms, this means that a sentence such as the one below is necessarily a contradiction:

$$(30) \quad \text{She doesn't have an iota of talent, but she is somewhat talented.}$$

This is desirable, since inferential patterns such as the one illustrated in (30) are expected of minimizers used as NPIs, but they are usually attributed to the presence of a focal operator (Tubau 2016). Here, the weight of generating the right sort of inferences is shifted to the interaction of negation with a predicate with minimum absolute standards.

To represent this interaction more formally, I will assume here that the operator $\neg$ contributed by negation is scopally ambiguous. This means that there are, at least, two possible representations of the interaction between $\neg$ and the formula in (29), each one with a distinctive reading:

- (31) a. $\neg \exists d[\mathbf{minimal}(d) : \mathbf{talent}(x)(d) \wedge d \geq stand_{min}]$
b. $\exists d[\mathbf{minimal}(d) : \neg \mathbf{talent}(x)(d) \wedge d \geq stand_{min}]$

An approximate reading for (31a) would be that there is no degree of talent above or equal to the standard; for (31b), there is a minimal degree, but it is not the case that it reaches the standard set for talent (i.e, it is below the standard). Both readings are compatible with the zero G-ness entailment generated by the interaction of negation with gradable predicates with absolute minimum standards.

The semantic combinatorics of LRS deal with ambiguity by allowing metavariables to scope over subformulae on which the negative operator could *plug* without imposing constraints on the scope of the operator itself (Richter & Sailer 2004, Sailer & Richter 2021). That is, we remain agnostic about the scope of $\neg$, and do not commit to a fully-specified representation. Below, I enrich the representation in (29) and the negative operator $\neg$ with metavariables.

- (32) a. $\neg \xi$
b. $\gamma \exists d[\mathbf{minimal}(d) : \delta \mathbf{talent}(x)(d) \wedge d \geq stand_{min}]$

In (33a) the negative operator plugs γ , scoping over the entire formula generating a representation corresponding to (31a). The scope of the negative operator in (33b) plugs δ , generating a representation equivalent to (31b):

- (33) a. $\neg$ with a wide scope
i. $\xi = \gamma = \neg \exists d[\mathbf{minimal}(d) : \mathbf{talent}(x)(d) \wedge d \geq stand_{min}]$
ii. Resulting reading:
 $\neg \exists d[\mathbf{minimal}(d) : \mathbf{talent}(x)(d) \wedge d \geq stand_{min}]$
b. $\neg$ with a narrow scope
i. $\xi = \delta = \exists d[\mathbf{minimal}(d) : \neg \mathbf{talent}(x)(d) \wedge d \geq stand_{min}]$
ii. Resulting reading:
 $\exists d[\mathbf{minimal}(d) : \neg \mathbf{talent}(x)(d) \wedge d \geq stand_{min}]$

6 Conclusion

In this paper, I have proposed a novel analysis of the partitive minimizer *an iota* that intends to capture its distribution based on scalar semantics. I began by critically analysing the exhaustificational account, which relies on the comparison of minimizers with a set of alternatives on a likelihood scale

to model their occurrence in anti-additive and anti-morphic environments. I have shown that this account cannot explain the attestation of minimizers in contexts such as *do*-support and positive sentences, the latter of which welcomes partitive minimizers.

The analysis developed here rests on two main assumptions: first, the dimension of measurement is not one of likelihood by default, and second, the meaning of *iota* should be evaluated relative to a standard of satisfaction: minimizers in positive sentences sit above the standard, while they are located below the standard in negative contexts. I have further proposed that minimizers associate with scales holding absolute minimal standards. This association explains the implicatures generated by minimizers in negative contexts, normally attributed to exhaustificational operators.

This article has finished with a detailed analysis of the phrase *an iota of talent*, making emphasis on the semantic contributions that each lexical item provides towards a final representation. The analysis has been cast in the feature geometry of HPSG utilizing the combinatoric tools of LRS. The implementation proposed here shows that a lexicalist scalar account can capture the attested distribution of partitive minimizers without recourse to special focal or exhaustificational operators.

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Virtual lexical items: On the (impersonal) passive in Danish and other Germanic languages

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 113–136



Keywords: passive, Germanic, lexicon, lexical rules

Müller, Stefan. 2025. Virtual lexical items: On the (impersonal) passive in Danish and other Germanic languages. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 113–136. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.6.

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Abstract

This paper deals with the passive in Germanic languages. The variation is explained including quirky case in Icelandic. Danish poses an interesting puzzle, since it allows for impersonal passives, although Danish requires a subject. Due to such a subject requirement, languages like English do not allow an impersonal passive. Danish solves the problem by inserting an expletive. The paper argues that there is a general process of expletive insertion in Danish and that the impersonal passive is just a special case. This would require lexical items that contradict the subject requirement. The paper argues for virtual lexical items that can be used as input for lexical rules but not in syntactic analyses. I also discuss passives in German, which involve participles that can be used in the perfect and in the passive and which would lead to a contradiction, if the Argument Realization Principle would apply to them. So, criteria for exempt lexical items are developed.

1 Introduction

This paper deals with the passive in Germanic languages. The variation is explained including quirky case in Icelandic. Danish poses an interesting puzzle, since it allows for impersonal passives, although Danish requires a subject. Due to such a subject requirement, languages like English do not allow an impersonal passive. Danish solves the problem by inserting an expletive. The paper argues that there is a general process of expletive insertion in Danish and that the impersonal passive is just a special case. This would require lexical items that contradict the subject requirement. The paper argues for virtual lexical items that can be used as input for lexical rules but not in syntactic analyses. I also discuss passives in German, which involve participles that can be used in the perfect and in the passive and which would lead to a contradiction, if the Argument Realization Principle would apply to them. So, criteria for exempt lexical items are developed.

2 The phenomenon

The Germanic languages are a great subject since the class of languages is relatively small but nevertheless shows a lot of variation. The languages differ from each other in permitting impersonal passives or not. There is a difference as far as the objects that can be promoted to subject are concerned. Most languages only permit the promotion of the direct object (differing in which object is the direct object), but languages like Danish allow for the promotion of either object. Most Germanic languages promote accusative objects to subject and subjects are nominative. But there is Icelandic, which allows quirky case subjects (genitive, dative, accusative).

[†]I thank the participants of HPSG 2025 for comments on my presentation and Jakob Maché, the local organizer, for inviting me to Lisbon. Thanks to two reviewers for comments on the post-conference submission and to Bjarne Ørsnes for discussion.

Almost all of the Germanic languages are V2 languages. English is the only exception. There are two classes as far as the basic order of subject, object, and verb is concerned. One group is SOV (Afrikaans, Dutch, German, ...) and another one SVO (Danish, English, Icelandic, ...).

SOV languages allow for subjectless constructions. The order of arguments is usually free. There is no special position for the subject. This is different for SVO languages, which have a fixed subject position. It is only natural that SVO languages require a subject. The only exception among the Germanic languages is Icelandic (Thráinsson 2007: 264):

- (1) a. Oft var talað um þennan mann. (Icelandic)
 often was talked about this man.ACC.SG.M
 'This man was often talked about.'
 b. Aldrei hefur verið sofð í þessu rúmi.
 never has been slept in this bed.DAT
 'This bed has never been slept in.'

Danish is SVO and it requires a subject. While English simply does not allow impersonal passives, Danish has a patch that allows impersonal passives and adherence to the subject condition: Danish inserts an expletive that fills the subject position:

- (2) a. * Was laughed.
 b. I går blev der grinet hele aftenen.
 yesterday was there laughed whole evening.DEF
 'There was laughing yesterday the whole evening.'

A good characterization of the passive is that it is the suppression of the subject. If there is an accusative object in the active, it is promoted to subject. If there is no accusative object, we get impersonal passives:

- (3) dass gelacht wurde (German)
 that laughed was
 'that there was laughing there'

(3) shows a passive with a monovalent verb and (4) shows the passive of bivalent verbs that do not govern an accusative object in the active:

- (4) a. Des Opfers wurde gedacht. (German)
 the.GEN victim AUX remembered
 'The victim was remembered.'
 b. Dem Mann wurde geholfen.
 the.DAT man AUX helped.
 'The man received help.'

If there is an accusative object, it is realized as nominative in the passive:

- (5) a. Kim liest den Roman. (German)
 Kim reads the.ACC novel
 ‘Kim reads the novel.’
 b. Der Roman wird gelesen.
 the.NOM novel is read
 ‘The novel is read.’

If the language requires a subject, impersonal passives are ruled out, unless the language has some means to provide a subject, as in (2b).

In what follows, I discuss the analysis of the passive so far and point out the problems of the analysis of Danish by Bjerre & Bjerre (2007) and Müller & Ørsnes (2013a). I also point out a problem for the combined analysis of the perfect and passive (Haider 1986a, Müller 2003) in connection with the Argument Realization Principle.

3 The analysis of the passive

Earlier analyses of the passive just mapped lexical items governing a nominative and a accusative onto a lexical item just governing a nominative (Kiss 1992: 276). The problem with such proposals is that they need to mention the accusative explicitly, since the case of the NP in the passive has to be realized as nominative while keeping the linking to the respective argument. If the concept of structural case is used, case assignment can be done with reference to the actual usage environment and hence it becomes possible to see the passive as a unified phenomenon in which the personal and impersonal passive are treated by the same rule: the passive is just suppression of the subject. That the accusative object is realized in the nominative, if there is any, follows from independent principles.

3.1 Structural and lexical case

If the case of arguments depends on the syntactic environment, one speaks of *structural case*. Otherwise the arguments have *lexical case*. Examples of structural cases are:

- (6) a. Der Installateur kommt. (German)
 the.NOM plumber comes
 ‘The plumber comes.’
 b. Der Mann läßt den Installateur kommen.
 the man lets the.ACC plumber come
 ‘The man lets the plumber come.’
 c. das Kommen des Installateurs
 the coming of.the.GEN plumber
 ‘the coming of the plumber’

In (6) the case of the subject of *kommen* ‘to come’ is expressed in different ways according to the environment, and in (7) the case of the object of *schlagen* ‘to defeat’ is accusative and nominative:

- (7) a. Judit schlägt *den* *Weltmeister*. (German)
 Judit defeats the.ACC world.champion
 ‘Judit defeats the world champion.’
 b. *Der* *Weltmeister* wird geschlagen.
 the.NOM world.champion AUX defeated
 ‘The world champion is defeated.’

Genitive dependent on the verb is a lexical case: the case of a genitive object does not change with passivization.

- (8) a. Wir gedenken *der* *Opfer*. (German)
 we.NOM remember the victims.GEN
 ‘We remember the victims.’
 b. *Der* *Opfer* wird gedacht.
 the.GEN victims AUX remembered
 ‘The victims are remembered.’
 c. **Die* *Opfer* wird / werden gedacht.
 the.NOM victims AUX.3SG AUX.3PL remembered

(8b) is an impersonal passive, there is no subject.

I assume that all four cases can be lexical (Müller 1999: 272, Thiersch 1978: 54). All datives are lexical (Haider 1986a: 9, Müller 2001: 219–220, 2023: 186–189). Subjects in Icelandic can have all cases (Zaenen et al. 1985). The case of genitive, dative, and accusative subjects is lexical too.

3.1.1 The Case Principle

The Case Principle that is usually assumed in HPSG builds on work by Yip et al. (1987). Within HPSG it is assumed that all arguments are represented in a list, which is called ARGUMENT-STRUCTURE list or ARG-ST. This is assumed for all languages that have valence. Koenig & Michelson (2012) argue that Oneida does not have syntactic valence and hence this language would not have an ARG-ST representation. An example of an ARG-ST list is provided in (9), which shows the ARG-ST list of a ditransitive verb like *geben* ‘give’:

- (9) ARG-ST value for ditransitive verb in German and Icelandic:
 ⟨ NP[*str*], NP[*ldat*], NP[*str*] ⟩

str stands for structural case and *ldat* for lexical dative.

There are language dependent linking constraints: for SVO languages, the first argument is the subject (SPR), the others COMPS. In the SOV languages, all ARG-ST

elements of finite verbs are in COMPS. This follows from the Argument Realization Principle, if one assumes that the SPR list contains the subject for SVO languages and is the empty list for SOV languages (Müller 2023: 75).

The Case Principle can be formulated as follows:

Case Principle (Przepiórkowski 1999, Meurers 1999)

- In the ARG-ST list of a verbal head, the leftmost element with structural case is assigned nominative, unless it is raised by a superordinate head.
- All other elements in the list that are not raised and have a structural case are given accusative case.
- In nominal environments, elements with a structural case are assigned the genitive case.

To illustrate how the principle works, I want to discuss some prototypical ARG-ST lists:

- (10) a. *schläft* ‘sleeps’: ARG-ST $\langle \text{NP}[\text{str}]_i \rangle$
 b. *unterstützt* ‘supports’: ARG-ST $\langle \text{NP}[\text{str}]_i, \text{NP}[\text{str}]_j \rangle$
 c. *hilft* ‘helps’: ARG-ST $\langle \text{NP}[\text{str}]_i, \text{NP}[\text{ldat}]_j \rangle$
 d. *gibt* ‘gives’: ARG-ST $\langle \text{NP}[\text{str}]_i, \text{NP}[\text{ldat}]_j, \text{NP}[\text{str}]_k \rangle$

(10) shows a mono-valent intransitive verb, two bi-valent verbs (one transitive and one intransitive) and a ditransitive verb. The first element in the ARG-ST list gets nominative. All others with structural case get accusative. This gives the desired result for the examples in (10): the first NP is always the subject and the case principle assigns it nominative. (10b) has a direct object in second position and it gets accusative. The direct object of the ditransitive verb is in third position and gets accusative as well, since it is the second NP with structural case. All NPs with lexical case get the case assigned lexically. In the example above this is dative. For the comparison with the passive, the NPs are marked with small indices (i, j, k).

Passivizing the verbs and combining them with the auxiliary results in the following ARG-ST lists for *wird* ‘is’:

- (11) a. *geschlafen wird* ‘slept is’: ARG-ST $\langle \text{V} \rangle$
 b. *unterstützt wird* ‘supported is’: ARG-ST $\langle \text{NP}[\text{str}]_j, \text{V} \rangle$
 c. *geholfen wird* ‘helped is’: ARG-ST $\langle \text{NP}[\text{ldat}]_j, \text{V} \rangle$
 d. *gegeben wird* ‘given is’: ARG-ST $\langle \text{NP}[\text{ldat}]_j, \text{NP}[\text{str}]_k, \text{V} \rangle$

In (11b–d) another NP is now in first place. The first NP with structural case gets nominative. Lexical case as in (11c–d) remains as it is, namely lexically specified.

3.2 The passive lexical rule

The lexical item for the passive is licenced by the following lexical rule, which maps a stem onto a fully inflected participle form. Haider (1986a: 10) suggested to designate one argument in the list of arguments of a verb. For transitive verbs and unergatives the designated argument corresponds to the subject. Unaccusative verbs do not have a designated argument, since their subject does not have subject properties but behaves like an object (for example when it comes to the formation of participle adjectives). Heinz & Matiassek (1994) and Müller (2003) formalized Haider's ideas within the framework of HPSG. Haider used underlining to designate an argument. Heinz & Matiassek and Müller use a list-valued feature `DESIGNATED ARGUMENT (DA)`. The `DA` value can be the empty list in the case of unaccusative verbs or it can contain one element which is then identical to the subject of transitive and unergative verbs. With this list-based representation of subjects a lexical rule for the passive can be specified that simply subtracts the `DA` list from the argument structure of the input verb stem.

A preliminary form of the participle formation rule is given in (12):

- (12) Lexical rule for the formation of the participle (provisional):

$$\left[\begin{array}{l} \text{stem} \\ \text{HEAD} \quad \left[\begin{array}{l} \text{verb} \\ \text{DA} \quad \boxed{1} \end{array} \right] \\ \text{ARG-ST} \quad \boxed{1} \oplus \boxed{2} \end{array} \right] \mapsto \left[\begin{array}{l} \text{word} \\ \text{ARG-ST} \quad \boxed{2} \end{array} \right]$$

$\boxed{1}$ is the list with the designated argument, if there is any, and this list is subtracted from the `ARG-ST` list of the input stem. The remaining list $\boxed{2}$ is the `ARG-ST` list of the output of the lexical rule.

- | (13) | ARG-ST | DA |
|---------------------------|--|-----------------------------|
| a. tanzen (dance, unerg): | $\langle \boxed{1} \text{NP}[\text{str}] \rangle$ | $\langle \boxed{1} \rangle$ |
| b. lesen (read, trans): | $\langle \boxed{1} \text{NP}[\text{str}], \text{NP}[\text{str}] \rangle$ | $\langle \boxed{1} \rangle$ |
| c. geben (give, ditrans): | $\langle \boxed{1} \text{NP}[\text{str}], \text{NP}[\text{ldat}], \text{NP}[\text{str}] \rangle$ | $\langle \boxed{1} \rangle$ |
| d. helfen (help, unerg): | $\langle \boxed{1} \text{NP}[\text{str}], \text{NP}[\text{ldat}] \rangle$ | $\langle \boxed{1} \rangle$ |

The resulting `ARG-ST` list of the participle is either empty or begins with an object of the active form:

- | (14) | ARG-ST |
|------------------------------|---|
| a. getanzt (danced, unerg): | $\langle \rangle$ |
| b. gelesen (read, trans): | $\langle \text{NP}[\text{str}] \rangle$ |
| c. gegeben (given, ditrans): | $\langle \text{NP}[\text{ldat}], \text{NP}[\text{str}] \rangle$ |
| d. geholfen (helped, unerg): | $\langle \text{NP}[\text{ldat}] \rangle$ |

The first element of the ARG-ST list with structural case gets nominative case. So, for example, *der Aufsatz*, the underlying object of *lesen* ‘to read’, is nominative in (15):

- (15) Der Aufsatz wurde gelesen.
 the.NOM paper AUX read
 ‘The paper was read.’

In the following subsections, I show what kind of variation there is in the Germanic languages and how it can be covered with the machinery introduced so far. The analysis of Danish and English was first done by Müller & Ørsnes (2013a) and the analysis of Icelandic was first published in Müller (2023: 199–200).

3.3 Typological variation in Germanic

The previous section covered the analysis of the passive in German. In what follows, I deal with other Germanic languages and show in what respect they differ. The differences are handled by differing statements of required cases (structural or lexical) and the absence of some cases in some of the languages. For example Danish and English do not have a dative.

3.3.1 English: Promotion of a different object and lack of dative

I assume that the Germanic languages have ARG-ST lists in which the arguments are in the same order. The order basically corresponds to the surface order in English and other SVO languages and to the unmarked order in SOV languages (see Höhle (1982) for the notion of unmarked order). The advantage of this is that the linking between ARG-ST list and the semantic roles is uniform across Germanic languages:

- (16) a. dass Kim dem Kind den Roman gab (German)
 that Kim.NOM the.DAT child the.ACC novel gave
 b. that Kim gave the child the novel

Note that what is often called the direct object is the first object in English and the second object in German. I will return to the mapping from ARG-ST to valence features in Section 3.4. The direct object is the first element of the COMPS list in SVO languages and the last element of the COMPS list of SOV languages: the element that is combined first with the verb (in normal order).

(17) shows the verbs that have been used in (13) for English:

- (17) ARG-ST
- a. dance (unerg): $\langle \text{NP}[\textit{str}] \rangle$
 - b. read (trans): $\langle \text{NP}[\textit{str}], \text{NP}[\textit{str}] \rangle$
 - c. give (ditrans): $\langle \text{NP}[\textit{str}], \text{NP}[\textit{str}], \text{NP}[\textit{lacc}] \rangle$
 - d. help (trans): $\langle \text{NP}[\textit{str}], \text{NP}[\textit{str}] \rangle$

The NPs that differ are marked in blue in (17) and in the lexical items for other languages discussed below.

English does not distinguish a dative case. The first object has structural case and the second object of *give* has lexical accusative. The fact that the secondary object has lexical accusative may seem irrelevant since it is the primary object¹ that will get nominative in the passive and any additional element with structural case would get accusative anyway, but I will show in the following section that Danish allows the promotion of either object and I assign the difference between Danish and English to the specification of lexical case.

A difference between German and English is that German promotes the second object, while English promotes the first object (the object that is closer to the verb, OV vs. VO):

- (18) a. dass dem Jungen der Ball gegeben wurde (German)
 b. because the boy was given the ball

This follows from the status of the case of the arguments as structural case or lexical dative in the current analysis.

A further difference between the languages is that German has an impersonal passive for *helfen*, while English has a personal one:

- (19) a. weil ihm geholfen wurde (German)
 because him.DAT helped was
 b. because he was helped

Again, this is due to the lack of dative in English. The object of *help* is just a normal object with structural case that can be promoted to subject. In contrast, the object of *helfen* ‘to help’ is in the dative and passivization does not change this case, hence there is no subject and an impersonal passive results. See Müller (2002: Section 3.2.3) for the dative passive.

3.3.2 Danish: Primary and secondary objects

Danish is interesting, since both objects can become the subject:

- (20) a. fordi manden giver drengen bolden (Danish)
 because man.DEF gives boy.DEF ball.DEF
 ‘because the man gives the boy the ball’
 b. fordi drengen bliver givet bolden
 because boy.DEF AUX given ball.DEF
 ‘because the boy is given the ball’

¹I follow Pollard & Sag (1992: 280) in using the term *primary object* to refer to the linearly first object in English and the term *secondary object* for the object that follows the primary object. Thus the primary object of German ditransitive verbs is the dative object, while the direct object is the accusative object.

additionally also a list in which the order of the two NPs is swapped, that is, the second NP with structural case is placed first.

This provides the following results:

- (24) ARG-ST
- a. *danset* (dance, unerg): $\langle \rangle$
 - b. *læst* (read, trans): $\langle \text{NP}[\textit{str}]_j \rangle$
 - c. *givet* (give, ditrans): $\langle \text{NP}[\textit{str}]_j, \text{NP}[\textit{str}]_k \rangle$
 $\langle \text{NP}[\textit{str}]_k, \text{NP}[\textit{str}]_j \rangle$
 - d. *hjulpet* (help, trans): $\langle \text{NP}[\textit{str}]_j \rangle$

As one can see, there are two values for ARG-ST for the ditransitive verb *givet* ‘to give’: the first one has the primary object in initial position (with the index *j*) and the second one has the secondary object in initial position (with the index *k*). The initial NPs with structural case get nominative, are mapped to the valence feature *SPR* and hence, are realized as subjects.

3.3.3 Icelandic: Oblique subjects

As for case and grammatical functions, Icelandic is the most interesting language among the Germanic languages. It is the only Germanic language with subjects in oblique cases. So it may come with some surprise that the lexical items for the verbs that are used within this paper are exactly the same as in German:

- (25) ARG-ST
- b. *dansa* (dance, unerg): $\langle \text{NP}[\textit{str}] \rangle$
 - c. *lesa* (read, trans): $\langle \text{NP}[\textit{str}], \text{NP}[\textit{str}] \rangle$
 - d. *gefa* (give, ditrans): $\langle \text{NP}[\textit{str}], \text{NP}[\textit{ldat}], \text{NP}[\textit{str}] \rangle$
 - e. *hjálpa* (help, trans?): $\langle \text{NP}[\textit{str}], \text{NP}[\textit{ldat}] \rangle$

The passive with monovalent intransitive verbs like *dansa* ‘to dance’ is parallel to the impersonal passive of German *tanzen* ‘to dance’ (see (1b)), but *hjálpa* ‘to help’ does not form an impersonal passive but a personal passive with a quirky subject (Zaenen et al. 1985: 456): The dative in (26) is in subject position. The object position would be the one following the participle.

- (26) Í prófinu var honum víst hjálpað. (Icelandic)
 in the.exam was he.DAT apparently helped
 ‘Apparently he was helped in the exam.’

gefa ‘give’ allows two variants: the dative object can be realized as an oblique subject or the object with the structural accusative is realized as the subject. Zaenen, Maling & Thráinsson (1985: 460) give the following examples:

- (27) a. Var ambfittin gefin konunginum? (Icelandic)
 AUX the.maidservant.NOM.SG given.F.SG the.king.DAT
 ‘Was the slave given to the king?’
 b. Voru konunginum gefnar ambfittir?
 were the.king.DAT given.F.PL maidservants.NOM.F.PL
 ‘Was the king given slaves?’

As Zaenen, Maling & Thráinsson point out, subjects are realized before the participle and objects follow it. So, (27) shows that the accusative object of the passive can be promoted to subject and the same is true for the dative object.

Wechsler (1995: 147–148) suggests that the highest allowable item becomes the subject. This includes NPs with lexical case in Icelandic. If one assumes the relational constraint *promote* to reorder the argument structure list in Icelandic, one would get the ARG-ST values in (28) with the respective mappings to the valence features:

- | | | | |
|----------------------------|---|--|--|
| (28) | ARG-ST | SPR | COMPS |
| a. dansað (dance, unerg): | $\langle \rangle$ | $\langle \rangle$ | $\langle \rangle$ |
| b. lesið (read, trans): | $\langle \text{NP}[\textit{str}]_j \rangle$ | $\langle \text{NP}[\textit{str}]_j \rangle$ | $\langle \rangle$ |
| c. gefið (give, ditrans): | $\langle \text{NP}[\textit{ldat}]_j, \text{NP}[\textit{str}]_k \rangle$ | $\langle \text{NP}[\textit{ldat}]_j \rangle$ | $\langle \text{NP}[\textit{str}]_k \rangle$ |
| | $\langle \text{NP}[\textit{str}]_k, \text{NP}[\textit{ldat}]_j \rangle$ | $\langle \text{NP}[\textit{str}]_k \rangle$ | $\langle \text{NP}[\textit{ldat}]_j \rangle$ |
| d. hjálpað (help, trans?): | $\langle \text{NP}[\textit{ldat}]_j \rangle$ | $\langle \text{NP}[\textit{ldat}]_j \rangle$ | $\langle \rangle$ |

The alternative is to keep the order of *ldat* and *str*, but to map the first element of the ARG-ST list to subject (lexical or structural), or in the case of a start with lexical case, take the first NP with structural case. The approach to take the first NP with structural case as subject was suggested by Müller (2002: 155–157), since certain remote passive constructions result in ARG-ST lists starting with a dative.

- (29) Der Erfolg wurde uns nicht auszukosten erlaubt.² (German)
 the success.NOM AUX us.DAT not to.enjoy permitted

Wechsler’s principle would have to be relaxed so that instead of allowing just the highest possible role less prominent roles could be realized as subject as well.

3.4 Argument realization

I started discussing argument realization in the subsection on Icelandic. The mapping is usually regulated by a very general principle: the Argument Realization Principle (ARP Ginzburg & Sag 2000: 397). (30) shows a simplified version of this principle that is adapted to the grammars I developed:

²Haider (1986b: 110)

(30) Argument Realization Principle (adapted from Ginzburg & Sag 2000: 397):

$$\left[\begin{array}{ll} \text{SUBJ} & \boxed{1} \\ \text{SPR} & \boxed{2} \\ \text{COMPS} & \boxed{3} \\ \text{ARG-ST} & \boxed{1} \oplus \boxed{2} \oplus \boxed{3} \end{array} \right]$$

Ginzburg & Sag (2000: 397) subtract extracted elements from the `COMPS` list. I do not do this since I assume traces for extraction, hence, non-local dependencies are not introduced in the lexicon. In order to prevent overgeneration, the values of `SUBJ` and `SPR` have to be constrained. Otherwise all elements from the `ARG-ST` list could be mapped to `SUBJ` or `SPR` and none to `COMPS`. So, for SVO languages it is usually assumed that the `SPR` list contains the subject, hence, there is a constraint saying that there is exactly or at least one element in `SPR`.³ I follow Pollard (1996: 295), Kiss (1995: 57, 78) and others in assuming that all arguments of finite verbs are represented on the `COMPS` list for SOV languages. So the value of `SPR` is the empty list for finite verbs in SOV languages.

3.5 Impersonal passive

This brings us to one of the problems discussed in this paper: the impersonal passive in Germanic languages. German and Icelandic allow subjectless constructions. So, mappings from empty `ARG-ST` lists to valence features is possible, since there is no constraint saying that there should be at least one element in the `SPR` list.

English and Danish map the first NP/VP/CP to `SPR` and the remaining arguments to `COMPS` (Müller & Ørsnes 2015). Both languages require a subject to be present. Because of the respective requirement, it is explained why there is no impersonal passive in English. But Danish allows for an impersonal passive: Danish inserts an expletive if there are no other elements, that could function as a subject. Without any special mechanisms, Danish poses a problem for the Argument Realization Principle. Danish is a problem for a general mapping: since the `ARG-ST` list of *danset* in (24a) is the empty list, both `SPR` and `COMPS` are empty as well, if the ARP is applied to the lexical item. If there is a requirement that `SPR` is non-empty, a contradiction results.

4 Expletives

Danish makes it possible to have impersonal passives by inserting an expletive that can function as the subject. The following subsection discusses previous attempts to cover this phenomenon by introducing the expletive in the argument mapping from `ARG-ST` to valence features.

³Icelandic really complicates the picture, since subjectless constructions are possible. The story for Icelandic would be: if there is an NP argument on the `ARG-ST` list with structural or lexical case or a sentential subject, this argument has to be realized as subject. If there is no nominal or sentential argument, `SPR` may be the empty list.

4.1 The problem of impersonal passives

Bjerre & Bjerre (2007), Müller & Ørsnes (2013a: 149), and Müller (2023: 201) suggested that an expletive NP is inserted in the mapping from ARG-ST to SPR and COMPS. Ørsnes and Müller suggested this for impersonal passives:

(31)	ARG-ST	SPR	COMPS
danset (dance, unerg):	$\langle \rangle$	$\langle \text{NP}_{\text{ergnl}} \rangle$	$\langle \rangle$

Focusing on wheather verbs, Bjerre & Bjerre (2007) assumed the following disjunctive statement for the mapping:

$$(32) \quad \left[\begin{array}{l} \textit{word} \\ \text{SS|L|CAT|HEAD|VFORM } \textit{active} \end{array} \right] \Rightarrow \left[\begin{array}{l} \text{SS|L|CAT} \left[\begin{array}{ll} \text{SUBJ} & \langle \boxed{1} \rangle \\ \text{COMPS} & \boxed{2} \\ \text{SYN-ARGS} & \langle \boxed{1} \mid \boxed{2} \rangle \end{array} \right] \\ \vee \\ \text{SS|L|CAT} \left[\begin{array}{ll} \text{SUBJ} & \langle \textit{det} \rangle \\ \text{COMPS} & \langle \rangle \\ \text{SYN-ARGS} & \langle \rangle \end{array} \right] \end{array} \right]$$

Rather than an ARG-ST they used SYN-ARGS. For verbs with at least one argument, the first argument is mapped to SUBJ and all others to COMPS. The second disjunct applies to verbs that do not have any element in SYN-ARGS. An expletive element is inserted for the subject. This constraint works for weather verbs (which it was intended to cover), but highly specialized constraints on the mappings would be needed for indefinites with intransitive verbs and passives.

Based on examples from German, I would argue that the expletives that are observed with weather verbs should be selected by the verb and not be inserted because of general principles. As (33) shows, expletives are obligatory in German in connection with weather verbs:

(33) a. weil es regnet (German)
because EXPL rains
b. *weil regnet
because rains

However, a general insertion of expletives would not be justified for German, since there are subjectless constructions:

(34) a. weil gelacht wurde (German)
because laughed was
b. *weil es gelacht wurde
because EXPL laughed was

So, it is not warranted to assume a general process like argument linking to insert such arguments. Of course, Danish is different from German and there could be such a principle for Danish, but since argument mapping is a rather general

principle, it seems better to not introduce detailed disjunctions into it and hence, to treat German and Danish weather verbs alike and have them select the expletive subject. So, the lexical rules formulated below insert the expletive *der* but not the expletive *det* that is needed for weather verbs. The selection of *det* is specified in the lexical items for weather verbs directly.

The following examples show that intransitive verbs can be used with an expletive subject:

- (35) a. at der ikke går en mand på gaden (Danish)
 that EXPL not walks a man in street.DEF
 ‘that there is no man walking on the street’
 b. at der ikke kommer to nye medarbejdere
 that EXPL not come two new employees
 ‘that two new employees will not be hired’
 c. at der ikke venter nogle hårde forhandlinger
 that EXPL not wait some tough negotiations
 ‘that there are no tough negotiations ahead’

The subject of the verb is then demoted to object. These examples are carefully constructed with negation, which shows that these sentences are SVO sentences and not V2 sentences. So, the *der* really is an expletive subject and not a placeholder in the first position (see Müller & Ørsnes (2011) for an account of these). Examples without negation have been provided already by Vikner (1995: 203, 205).

Vikner (1995: 198, 200) pointed out that expletives are impossible with transitive verbs:

- (36) a. *at der har spist nogen et æble
 that EXPL has eaten somebody an apple
 Intended: ‘that somebody has eaten an apple’
 b. *at der har spist et æble nogen
 that EXPL has eaten an apple somebody
 Intended: ‘that somebody has eaten an apple’

The no-object constraint trivially applies to the passive of intransitive verbs. They neither have a subject nor an accusative object:

- (37) a. fordi der ikke blev grinet (Danish)
 because EXPL not was laughed
 b. fordi der ikke blev arbejdet på en bog / bogen
 because EXPL not was worked at a book book.DEF

(37a) is covered by Bjerre & Bjerre (2007), but (37b) is not since the SYN-ARGS list would contain a PP.

If an object was promoted to subject, it can be demoted to object again:

- (38) fordi der ikke blev læst en bog / *bogen (Danish)
 because EXPL not was read a book book.DEF

For this to be possible, the NP has to be indefinite. If there is no argument that could function as the subject, an expletive must be added (37).

4.2 Lexical rules for adding expletives

I suggest the following lexical rules for expletive insertion. These rules map words to words.

- (39) Lexical rule for expletive insertion in impersonal passives:

$$\left[\text{ARG-ST } \boxed{1} \right] \mapsto \left[\text{ARG-ST } \langle \text{NP}[\textit{lnom}]_{\textit{expl}} \rangle \oplus \boxed{1} \right] \wedge \text{no-np-str}(\boxed{1})$$

The rule in (39) states: if there is no NP with structural case among the arguments (no subject, no object), an expletive can be added. Whether there is an NP with structural case is checked by a relational constraint walking through the ARG-ST list of the input ($\boxed{1}$). The expletive pronoun has lexical nominative. Since it is the only NP on the ARG-ST list, it could have structural case as well. It would be assigned nominative then. So there is no testable difference between the assumption of lexical or structural case for this lexical rule.

The second lexical rule adds an expletive subject to intransitive verbs or passives with a subject but no further object:

- (40) Lexical rule for expletive insertion with intransitive verbs or passives with an NP argument:

$$\left[\text{ARG-ST } \langle \boxed{1} \text{ NP} \rangle \oplus \boxed{2} \right] \mapsto \left[\text{ARG-ST } \langle \text{NP}[\textit{lnom}]_{\textit{expl}}, \boxed{1} \text{ NP}[\textit{DEF-}] \rangle \oplus \boxed{2} \right] \wedge \text{no-np-str}(\boxed{2})$$

If there is an NP argument (a subject), but no further NP with structural case among the arguments (no object), an expletive can be added. The former subject ($\boxed{1}$) has to be indefinite. It would be preferable to have just one lexical rule for expletive insertion, but it seems to be impossible to add the indefiniteness constraint to the subject NP. To be able to do this, one has to stipulate that there is a subject NP and this makes it impossible to subsume this case under the case when there is no NP argument at all.

The case of the inserted expletive is lexical nominative. This means that the expletive is not the first NP in the ARG-ST list with structural case and hence, all other NPs get case as usual. So, the demoted subject in (35) gets nominative, although it is the second NP on the ARG-ST list and in object position in the sentences.

The requirement that $\boxed{2}$ does not contain NPs with structural case prohibits transitive verbs to enter the lexical rule in (40) and hence rules out sentences like (36).

Usually, HPSG does not use grammatical functions like subject, direct object, indirect object, and so on. The work by Kathol (1991), Pollard (1994), Ryu (1997), Hellan & Nordgård (2001) has to count as exceptions. But these authors had a list-valued feature that singled out the direct object, if there was any. Having such

a list would make the relational constraint *no-np-str* superfluous. One could simply require that there is no direct object by requiring that the value of the respective feature be the empty list.

Figure 1 shows the analysis of (38). It demonstrates the application of the passivization lexical rule to the stem *læs* ‘read’ followed by the application of a lexical rule for expletive insertion.⁴

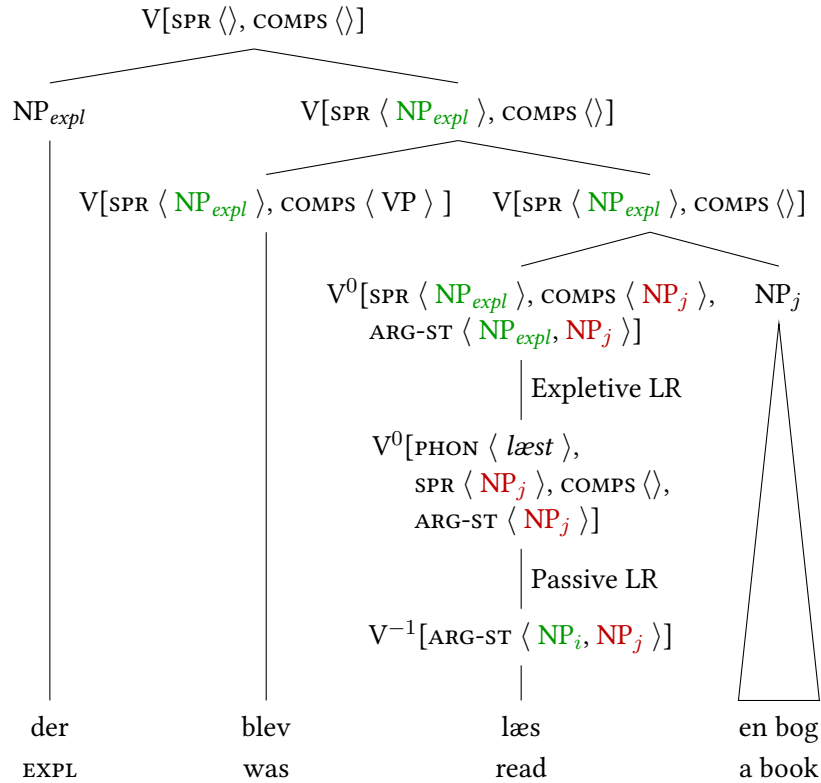


Figure 1: Passivization with promotion of object to subject and expletive insertion with demotion of subject to object

Linking phrasal patterns to grammatical functions in the way suggested by Culicover & Jackendoff (2005: Chapter 6.3) is not able to capture the interaction of valence changing processes (Müller 2013). For example, if one analyzes the passive as an alternative linking pattern in a phrasal configuration, one commits to a certain structure. Applying a further rule about expletives on top of the linking that was established earlier would result in a contradiction. The only way to get out of this would be to assume a combined linking construction that combines the effects of expletive insertion and passive and hence ignoring the fact that one is dealing with two independent phenomena.

⁴ All NP_{expl} in Figure 1 are identical, as are all NP_j . This is usually specified by using structure sharing, that is, numbered boxes. To maintain readability, I omitted the tags in the figure.

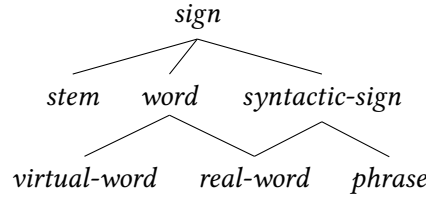


Figure 2: Subtypes of *sign* including *virtual-word* and *real-word*

5 Virtual and exempt lexical items

Section 3.4 already described the Argument Realization Principle that is usually assumed in approaches with an ARG-ST list. The arguments from this list are distributed to valence features like SUBJ, SPR, and COMPS. Some approaches do not assume SUBJ to be a valence feature but a head feature (Kiss 1995: Chapter 3.1.1, Müller 1999: Chapter 1.7, 2002: Chapter 1.6). In any case it has to be ensured that not all arguments are mapped to SUBJ or SPR. So it is necessary to constrain the values of the latter features. For the Germanic languages the specification of SPR depends on the language or rather language group. For SOV languages, the SPR list of verbs is always the empty list. But for SVO languages with a subject requirement, the SPR list contains exactly one or in the case of Danish at least one element (Müller & Ørsnes 2013b: 81).

Now, the problem is that the passivization of intransitive verbs results in lexical item that do not have an NP argument that could function as a subject. In fact, passive participles of mono-valent intransitive have an empty ARG-ST list. This means that SUBJ, SPR, and COMPS have to be the empty list as well, since there is no other way to split an empty list into three parts. Since there is the subject requirement in Danish, the lexical item would be ill-formed. This poses some dilemma, since this lexical item is needed as input for the lexical rule inserting an expletive.

A way to solve this problem is to distinguish between real words and virtual ones. The virtual words are lexical items that are not allowed to be used in the syntax. One way to capture this is to introduce types for real and virtual words. Figure 2 shows the type hierarchy including other subtypes of *sign*: *stem*, *syntactic-sign*, and *phrase*. Only real words are the ones that are inserted into the syntax. Immediate dominance schemata require their daughters to be of type *syntactic-sign*. So, to function as a daughter a sign has to be of type *real-word* or *phrase*.

With this type hierarchy it is possible to state the subject requirement for real words only:

$$(41) \left[\begin{array}{c} \text{real-word} \\ \text{SYNSEM|LOC|CAT|HEAD verb} \end{array} \right] \Rightarrow \left[\text{SYNSEM|LOC|CAT|SPR ne_list} \right]$$

The participle with the empty SPR list would be of type *virtual-word* and hence exempt from the subject requirement.

While this looks nice, there is a problem with this solution: Lexical rules are typed (Meurers 2000). Some are subtypes of *word*, some are subtypes of *stem*. If the participle *danset* ‘danced’ is licenced by a passive lexical rule, it has the type of this rule, say *passive-lr*. This means that subtypes of respective lexical rules for virtual and real lexical items are needed: *virtual-word-passive-lr*, *real-word-passive-lr*. While *virtual-word-passive-lr* would probably be the only subtype of *virtual-word* all other types of lexical rules licensing words would have to have subtypes that are also subtypes of *real-word*. A simpler solution would be to assume a boolean feature and allow only those elements in syntax that have the value +.

Frank Van Eynde and Dan Flickinger suggested that alternative approaches like Ginzburg & Sag (2000) already used virtual lexical items, namely lexemes. I do not use the type *lexeme* in the grammars of the CoreGram project (Müller 2015). Lexical objects are either of type *stem* or of type *word*. The passive lexical rule adds the inflectional material for participles and hence licenses words. The expletive lexical rules map words to words. It would be cumbersome to assume that fully inflected participles are lexemes if their ARG-ST list is empty, but words otherwise. If the expletive lexical rules could map lexemes to words, these rules could be wrongly used to create words from uninflected lexical items.

A further problem is the analysis of passives/perfect in German. Haider (1986a) suggested that the participle is a lexical item with the designated argument blocked. The auxiliary for the perfect deblocks the subject and the one for the passive left it blocked. According to the implementation of Haider’s ideas by Müller (2003), the arguments of the ARG-ST list are all mapped to the COMPS list, as it would be required for the perfect and the designated argument is represented under SUBJ. This is necessary to be able to have one auxiliary for the perfect and modal infinitives (*haben* ‘to have’). But if the ARG-ST list of the perfect/passive lexical item in German is a list without the designated argument/subject and the subject is represented under SUBJ nevertheless, the lexical item is incompatible with the Argument Realization Principle. Earlier versions of the theory simply used SUBCAT and SUBJ without a mapping principle. That there is an inconsistency only became apparent to me when an earlier version of Müller (2026) was adapted to use ARG-ST. While first it looked as if there was a deeper problem in the theory, it turned out that this sort of inconsistency was expected: the lexical item is used both for the passive and for the perfect. This means that it has properties of both and hence is not a regular lexical item. It has to be exempt from the ARP. The boolean feature can be used for exemption of the subject requirement in Danish and for lexical items exempt of the Argument Realization Principle as well.

6 Further research

Bjarne Ørsnes (p.c. 2025) pointed out to me that the insertion of expletives is possible with passives of ditransitives:

- (42) Der blev tilbudt dem en ny kontrakt.
EXPL was offered them a new contract
‘A new contract was offered to them.’

The lexical rules provided above rule such sentences out, since they allow maximally one NP with structural case in post-verbal position: the NP that would occur in subject position without the presence of the expletive. The lexical rules were set up this way to rule out expletives with transitive verbs as in (36). So, the case in (43a) has to be ruled out, while the case in (43b) has to be permitted:

- (43) a. * Expl NP[*str*] NP[*str*] (active)
b. Expl NP[*str*] NP[*str*] (passive)

Even if one refers to the grammatical functions of the NPs as in (44a,b), no clear picture emerges.

- (44) a. * Expl Subj Obj (active)
b. Expl Subj Obj (passive)
c. Expl Obj Obj2 (passive with grammatical functions in the active)

One could refer to the grammatical functions of the respective NPs in the active and state that the occurrence of an underlying subject together with an underlying object in postnominal position is ruled out. This would rule out the expletive within active sentences and permit expletives in passive sentences, since the underlying subject is not expressed. But it is somehow unclear what the deeper reason behind this would be. For HPSG, this approach would entail that features pointing to underlying object NPs would be needed, something that is usually not assumed within HPSG (for exceptions see Section 4.2).

Of course one could further specify the input conditions of the lexical rule so that they apply to actives only or make the constraints on the ARG-ST list dependent on the *VFORM* value. But there may be a generalization that covers the cases discussed in Section 4 and (42). If it would be possible to cover these expletives and the positional expletives that were analyzed by Müller & Ørsnes (2011) in one general approach to expletive insertion, this would be a big step forward. As for now we have at least working formal analyses of several phenomena involving expletives and I leave it for further research to unify the approaches.

7 Conclusion

This paper provides an analysis for the passive in Germanic. It accounts for personal and impersonal constructions, quirky subjects in Icelandic, promotion of

different objects, and subjectless constructions and impersonal passives. A general Argument Realization Principle is used for the mapping from argument structure to valence features, although there are cases in the German grammar in which the principle cannot apply. Similarly, some lexical items in the analysis of expletive insertion in the impersonal passive in Danish would violate the subject condition. The respective items are treated as virtual lexical items that can be used as input to lexical rules but may not be used in syntactic analyses as subjectless lexical items. Parts of the analyses are implemented in TRALE (Müller 2015, 2023).

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An integrated type-based analysis of the Korean verb *ha-* with verbal nouns and psych verbs

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 137–158



Keywords: verbal nouns, psych verbs, complex predicates, agentivity, Korean, HPSG

Oh, Jieun. 2025. An integrated type-based analysis of the Korean verb *ha-* with verbal nouns and psych verbs. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 137–158. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.7.  CC-BY 4.0

Abstract

This paper examines the properties of the Korean verb *ha-*, focusing on its behavior in constructions with verbal nouns and psych verbs. It is assumed that the verb *ha-* does not function consistently across these constructions. That is, it does not always contribute to the agentive property. To examine this issue, an acceptability judgment experiment was conducted with Korean native speakers. The participants rated sentences with the verb *ha-* combined with either a verbal noun or a psych verb, each modified with the adverb *uytocekulo* ‘intentionally’. The findings demonstrate that the verb *ha-* exhibits distinct syntactic and semantic functions depending on the type of element it combines with. Based on the experimental results, an analysis is proposed within the HPSG framework. These results have implications for the typological classification of the verb *ha-* and contribute to a type-based analysis of the Korean verb *ha-*.

1 Introduction

This paper investigates the Korean verb *ha-*, which occurs in various constructions. The verb *ha-* is assumed to exhibit diverse syntactic behaviors and semantic interpretations across these constructions. As seen in (1), the verb *ha-* functions basically as a general verb¹ conveying the meaning of ‘doing something’ (cf. Jeong 2016: 98). In addition, it can serve as an auxiliary verb, particularly in causative constructions. In these cases, the connective marker *-key* should be attached to the embedded verb to form the causative construction, as shown in (2). This is not only the case, but the verb *ha-* also combines with nouns, such as verbal nouns (e.g., *kongpwu* ‘study’ in (3a)) as well as psych nouns (e.g., *hayngpok* ‘happiness’ in (3b) and *kekceng* ‘worry’ in (3c)). In these constructions, the verb *ha-* primarily functions as a verbalizer, converting a noun into a verb. Moreover, the verb *ha-* can combine with psych verbs (e.g., *mwusep-* ‘be scary’, in (4)). Because of its diverse uses, the verb *ha-* has attracted considerable attention. However, its properties in these constructions have not yet been fully captured.

- (1) Hyenwu-ka pap-ul ha-n-ta.
 Hyenwu-NOM rice-ACC do-PRS-DECL
 ‘Hyenwu is doing to cook rice.’

¹When the verb *ha-* is used as a general verb, it can be replaced with another verb (e.g., *cis-* ‘cook’), as seen in (i). Through the verb *ha-*, the meaning of ‘doing something’ can be added. However, when the verb *ha-* functions as a light verb combined with verbal nouns, substitution with other verbs is not observable (cf. Jeong 2016: 97–98).

- (i) Hyenwu-ka pap-ul cis-nun-ta.
 Hyenwu-NOM rice-ACC cook-PRS-DECL
 ‘Hyenwu cooks rice.’

- (2) Hyenwu-ka namtongsayng-eykey/ul/i pang-ul chiwu-key
 Hyenwu-NOM younger.brother-DAT/ACC/NOM room-ACC clean-CONN
 ha-n-ta.
 do-PRS-DECL
 ‘Hyenwu has his younger brother clean the room.’
- (3) a. haksayng-tul-i yenge-lul kongpwu-ha-n-ta.
 student-PL-NOM English-ACC study.N-do-PRS-DECL
 ‘Students study English.’
 b. Hyenwu-ka omul cengmal hayngpok-ha-(*n)-ta.
 Hyenwu-NOM today so happiness-do-PRS-DECL
 ‘Hyenwu is really happy today.’
 c. Hyenwu-ka namtongsayng-ul kekceng-ha-n-ta.
 Hyenwu-NOM younger.brother-ACC worry.N-do-PRS-DECL
 ‘Hyenwu is worried about his younger brother.’
- (4) Hyenwu-ka kangaci-lul mwuse-we ha-n-ta.
 Hyenwu-NOM puppy-ACC be.scary-CONN do-PRS-DECL
 ‘Hyenwu is scared of the puppy.’

As illustrated in sentences (1)–(4), the verb *ha-* can function as a general verb, an auxiliary verb in causative constructions, and can be combined with nouns and psych verbs. This raises the question of what syntactic and semantic functions it serves (cf. Chae 1997: 590–598; Jung 2002b: 24–39, 2002a: 61–71; Jung 2016: 103–108, a.o.). This paper aims to identify the types of the verb *ha-* in the constructions with verbal nouns (3a) and psych verbs (4), and to address the unresolved question of what underlies its syntactic function and which semantic properties it exhibits.

Before examining how the verb *ha-* combines with other elements, it is necessary to clarify what is meant by verbal nouns and psych verbs in this paper. Verbal nouns are, first of all, nouns. In a sentence, they function as the head of a noun phrase and can be marked with a case marker, just like any other noun. For instance, the verbal nouns like *kongpwu* ‘study’ and *chotay* ‘invitation’ can serve as the head of an NP, and they may appear with case markers such as *-i/ka* or *-ul/lul*, as shown in (5). Psych verbs like *mwusep-* ‘be scary’ or *sulphu-* ‘be sad’, on the other hand, function as predicates that express psychological states or emotions, as shown in (6).

- (5) verbal nouns
- a. Hyenwu-nun pan-eyse kongpwu-lul ceyil cal
 Hyenwu-TOP classroom-in.LOC study.N-ACC most well
 ha-n-ta.
 do-PRS-DECL
 ‘Hyenwu is the best at studying in the class.’

- b. Hyenwu-nun ecey cenyek chotay-lul pat-ass-ta.
 Hyenwu-TOP yesterday dinner invitation-ACC receive-PST-DECL
 ‘Hyenwu received a dinner invitation yesterday.’

(6) psych verbs

- a. na-nun holangi-ka mwusep-ta.
 I-TOP tiger-NOM be.scary-DECL
 ‘A tiger is scary to me.’
- b. ku sosel-un kyelmal-i mwuchek sulphu-ta.
 the novel-TOP ending-NOM very be.sad-DECL
 ‘The ending of that novel is very sad.’

The following examples illustrate how the verb *ha-* combines with verbal nouns and psych verbs. With verbal nouns, as in (7), the verb *ha-* attaches to a verbal noun, and the resulting combination functions as the predicate of a sentence (e.g., *kongpwu-ha-* ‘study’, *chotay-ha-* ‘invite’). With psych verbs, as in (8), the verb *ha-* combines with the stem of a psych verb. When the verb *ha-* is added, the second argument may take the accusative marker *-ul/lul*, which contrasts with the case marking pattern observed when a psych verb is used alone.

(7) with verbal nouns

- a. Hyenwu-ka yeksa-lul kongpwu-ha-n-ta.
 Hyenwu-NOM history-ACC study.N-do-PRS-DECL
 ‘Hyenwu studies history.’
- b. na-nun sahoi kakchung lite-tul-ul chotay-ha-n-ta.
 I-TOP social classes leader-PL-ACC invitation-do-PRS-DECL
 ‘I invite leaders from various social classes.’

(8) with psych verbs

- a. Hyenwu-ka holangi-lul mwuse-we ha-n-ta.
 Hyenwu-NOM tiger-ACC be.scary-CONN do-PRS-DECL
 ‘Hyenwu is scared of a tiger.’
- b. na-nun i saken-ul sulph-e ha-n-ta.
 I-TOP this incident-ACC be.sad-CONN do-PRS-DECL
 ‘I feel sad about this incident.’

This paper is based on the hypothesis that the verb *ha-*² does not always display the same properties. Namely, it does not always convey the agentivity. Rather, its agentive interpretation depends on the elements with which it combines.

²The Korean verb *ha-* generally functions as a main verb with agentive properties.

It is structured as follows. In Section 2, a brief review of previous analyses is provided. Section 3 introduces an experiment designed to investigate the research question. The experiment tested the acceptability of sentences modified with adverbs such as *uytocekulo* ‘intentionally’ in these constructions. Based on the results of the experiment, lexical entries for the verb *ha-* are proposed in Section 4, depending on the types of combined predicates, and a classification of the verb *ha-* is presented within the framework of Head-driven Phrase Structure Grammar (HPSG; Pollard & Sag 1994, Müller et al. 2021). Finally, the conclusions of the paper are summarized in Section 5.

2 Previous analysis and syntactic properties of the verb *ha-*

This section briefly reviews previous research related to the verb *ha-*, especially focusing on how it has been investigated.

In previous studies, it has been argued that predicates possess agentive values, which are determined by whether their subject functions as an AGENT. According to the agentivity hierarchy, these values can be classified into agentive and non-agentive types, with further distinctions such as inherently or non-inherently agentive and non-agentive, as illustrated in Figure 1.

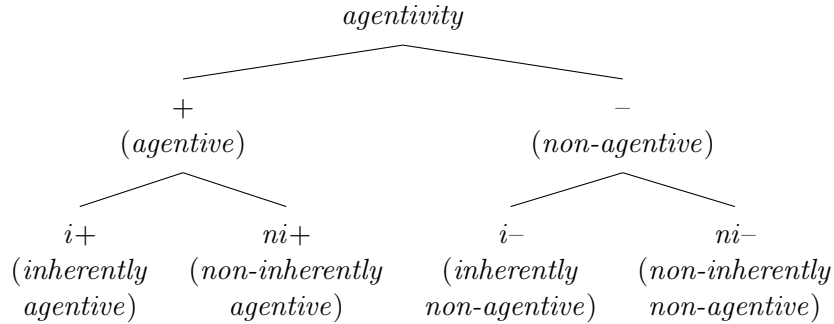


Figure 1: Classification of agentive types

Importantly, in Korean, the case assignment of arguments can depend on whether the head verb is agentive (AG +) or non-agentive (AG -). When the verb is agentive, the object typically receives accusative case, whereas with non-agentive verbs, the object often appears in nominative case. This demonstrates that the agentivity of the predicate directly influences case assignment. To account for these patterns, a case principle for Korean has been proposed, as illustrated in (9).

(9) Case Principle (for Korean)

For an unresolved structural NP that is a daughter of a phrase α

- a. it is [acc], if it is a COMPS-DTR of α whose head is [AG +], and
- b. it is [nom], if it is a SUBJ-DTR of α , or a COMPS-DTR of α whose head is [AG -].

(from Yoo 2002: 1025)

The following examples show the case principle in Korean. As shown in (10a), the verb *kongpwu-ha-* ‘study’ is agentive, so the object (e.g., *yeksa* ‘history’) receives accusative case. In contrast, as shown in (10b), the verb *mwusep-* ‘be scary’ is non-agentive, so the THEME (e.g., *holangi* ‘tiger’) is realized as a nominative NP marked with *-i/ka*.

- (10) a. Hyenwu-ka yeksa-lul kongpwu-ha-n-ta.
 Hyenwu-NOM history-ACC study.N-do-PRS-DECL
 ‘Hyenwu studies history.’
- b. Hyenwu-nun holangi-ka mwusep-ta.
 Hyenwu-TOP tiger-NOM be.scary-DECL
 ‘A tiger is scary to Hyenwu.’

Regarding auxiliary verb constructions, it has been proposed that auxiliary verbs, being generally transparent in terms of agentive values, inherit the agentive properties of their embedded verbs (cf. Yoo 2002: 1011–1013).

However, like main verbs, auxiliary verbs can also be assigned their own agentive values in the lexicon. Yoo proposes a dual lexical entry for the verb *ha-*, allowing it to either inherit or share the agentive value of the embedded verb. Specifically, it has been argued that the verb *ha-*³ is restricted to combining with embedded verbs that have the agentive values *ni+*, *ni-* and *i-*, as it has been argued, it never combines with verbs that have the agentive value *i+*. It has been claimed that when combined with verbs that have the agentive values *ni+* or *ni-*, the auxiliary verb *ha-* shares its agentive property. It is specified in (11a). Additionally, when the auxiliary verb *ha-* combines with a lexically non-agentive psych verb, it imposes its inherent agentive property. As a result, in such constructions, the argument is realized as the accusative NP, aligning with the entry in (11b). To account for the phenomenon in constructions with the verb *ha-*, the dual lexical entry of the verb *ha-* was introduced, as illustrated in (11) (cf. Yoo 2002: 1029).

- (11) *ha-*
- a. [AG $\square$, GOV< V[AG $\square$ *ni* α] >]
 - b. [AG +, GOV< V[AG *i-*] >]

³It has been argued that the verb *ha-* with psych verbs (‘act like, show signs of some emotion’) carries an agentive meaning (cf. Yoo 2002: 1029).

Looking more closely at the lexicon of the verb *ha-*, when the verb *ha-* combines with the psych verb that exhibiting an [AG *i-*] value, it retains its inherent agentive property, thus satisfying the lexical entry given in (11b). So, as shown in (12), the second argument is realized as an accusative object, as the predicate is agentive. In contrast, as shown in (13), when the verb *ha-* combines with a verb exhibiting value [AG *ni±*], the AG value may be shared. In such cases, the value is inherited from the embedded verb's value [AG *ni-*], resulting in the second argument being marked with the nominative case marker *-i/ka*. This is specified in (11a).

- (12) *nay-ka* {**paym-i* / *paym-ul*} *mwuse-we* *ha-n-ta*.
 I-NOM snake-NOM snake-ACC be.afraid-CONN do-PRS-DECL
 ‘I am afraid of a snake.’

<i>nay-ka</i>	<i>paym-ul</i>	<i>mwuse-we</i>	<i>ha-n-ta</i> .
	ACC	[AG <i>i-</i>]	[AG +]

(from Yoo 2002: 1031)

- (13) *ku-nun* {*pam-i* / **pam-ul*} *twulyep-key* *toy-ko*
 he-TOP night-NOM night-ACC be.scared-CONN become-CONN
siph-e *ha-n-ta*.
 want-CONN do-PRS-DECL
 ‘He wants to be scared of the night.’

<i>ku-nun</i>	<i>pam-i</i>	<i>twulyep-key</i>	<i>toy-ko</i>	<i>siph-e</i>	<i>ha-n-ta</i>
	NOM	[AG <i>i-</i>]	[AG <i>ni-</i>]	[AG <i>ni-</i>]	[AG <i>ni-</i>]

(from Yoo 2002: 1031)

According to the lexicon proposed in Yoo (2002), when the verb *ha-* combined with a psych verb, it is assigned an agentive value. However, it remains unclear whether constructions in which the verb *ha-* combines with a psych verb truly exhibit agentive properties. To assess the property of agentivity, one can examine it with structures such as *kyelsim-ha-* ‘decision-do-’ or *nolyek-ha-* ‘effort-do-’ which clearly describe agentive or voluntary actions ⁴. As shown in (15), sentences involving complex predicates formed

⁴Moreover, the compatibility of an event with the adverb intentionally can serve as an additional diagnostic, as demonstrated in examples (i) and (ii) (cf. Dowty 1991: 553–555; Verhoeven 2010: 224–227).

- (i) *Hyenwu-ka yeksa-lul uytocekulo/ilpwule kongpwu-hay-ss-ta*.
 Hyenwu-NOM history-ACC intentionally study.N-do-PST-DECL
 ‘Hyenwu intentionally studied English.’
- (ii) ??*Hyenwu-ka holangi-lul uytocekulo/ilpwule mwuse-we hay-ss-ta*.
 Hyenwu-NOM tiger-ACC intentionally be.scary-CONN do-PST-DECL
 ‘Hyenwu was intentionally scared of the tiger.’

by the verb *ha-* and a psych verb appear incompatible with such agentive structures, unlike the sentences with the verb *ha-* and verbal nouns as shown in (14). Given this contrast, it can be assumed that constructions involving the verb *ha-* with psych verbs are perceived as lacking agentivity, or at least displaying a lower degree of agentive properties compared to the verb *ha-* combined with verbal nouns. Thus, it is assumed that the verb *ha-* does not always serve the same function or exhibit the same semantic properties. Rather, it depends on the type of embedded predicate.

- (14) a. Hyenwu-ka yeksa-lul kongpwu-ha-lyeko
 Hyenwu-NOM history-ACC study.N-do-CONJ
 nolyek-hay-ss-ta.
 effort-do-PST-DECL
 ‘Hyenwu made an effort to study history.’
- b. Hyenwu-ka yeksa-lul kongpwu-ha-kilo
 Hyenwu-NOM history-ACC study.N-do-CONJ
 kyelsim-hay-ss-ta.
 decision-do-PST-DECL
 ‘Hyenwu decided to study history.’
- (15) a. ?? Hyenwu-ka holangi-lul mwuse-we ha-lyeko
 Hyenwu-NOM tiger-ACC be.scary-CONN do-CONJ
 nolyek-hay-ss-ta.
 effort-do-PST-DECL
 ‘Hyenwu made an effort to be scared of a tiger.’
- b. ?? Hyenwu-ka holangi-lul mwuse-we ha-kilo
 Hyenwu-NOM tiger-ACC be.scary-CONN do-CONJ
 kyelsim-hay-ss-ta.
 decision-do-PST-DECL
 ‘Hyenwu decided to be scared of a tiger.’

An experiment was conducted to determine whether both types of the verb *ha-* constructions exhibit the property of agentivity. The following section provides a detailed discussion of this experiment.

3 Testing agentivity with the verb *ha-*

In this section, I introduce the experiment that was conducted to test the hypotheses discussed earlier. This paper assumed that the verb *ha-* exhibits different behaviors depending on whether it combines with a verbal noun or a psych verb. Building on the discussions in Section 2, I designed a repeated-measures acceptability judgment study using a 1–5 Likert scale (where 1 indicates “very awkward” and 5 indicates “perfectly acceptable”).

This experiment aimed to determine whether the verb *ha-* functions in the same way across constructions with verbal nouns and psych verbs.

The goal of the experiment was to investigate how native Korean speakers perceive these constructions. Specifically, the study addressed the following questions:

- Do speakers perceive these constructions as equally agentive?
- If not, what factors influence their perception?

To address these questions, I conducted an experiment examining the acceptability of sentences in which the verb *ha-* constructions were modified by the adverb *uytocekulo* ‘intentionally’, as shown in (16) and (17). The experiment was designed with two factors. The first factor was the type of embedded predicates that the verb *ha-* selects: verbal nouns & psych verbs. The first factor, Combined Element Type, distinguished whether the verb *ha-* combines with a verbal noun (e.g., *kongpwu-ha-* ‘study.N-do’) or a psych verb (e.g., *mwuse-we ha-* ‘be.scary-CONN do-’). When the verb *ha-* combines with a verbal noun, it is natural to imagine an AGENT intentionally performing the action. In contrast, the agentivity of the verb *ha-* in constructions with psych verbs is less transparent and may be perceived as weaker.

- (16) Hyenwu-ka yeksa-lul uytocekulo kongpwu-ha-n-ta.
 Hyenwu-NOM history-ACC intentionally study.N-do-PRS-DECL
 ‘Hyenwu intentionally studies history.’
- (17) ?? Hyenwu-ka holangi-lul uytocekulo mwuse-we
 Hyenwu-NOM tiger-ACC intentionally be.scary-CONN
 ha-n-ta.
 do-PRS-DECL
 ‘Hyenwu is intentionally scared of a tiger.’

The second factor, Subject Person Type, manipulated whether the subject of the sentence was first-person or third-person. This factor is motivated by the Agentivity-Based NP Hierarchy (cf. Silverstein 2016: 163–170), which ranks noun phrases according to their typical association with agentive roles. In general, first- and second-person pronouns occupy the upper tier of the hierarchy, as they directly refer to the speaker or hearer and have a strong tendency to serve as agents. Otherwise, third-person NPs, including proper names and common nouns, occupy the lower tier. Since they are generally outside the immediate speech situation, they are less strongly associated with agentive roles.⁵

⁵In some languages, ergative marking may be used to highlight Agentivity (cf. Merchant 2006: 10).

According to this hierarchy, first-person subjects can be expected to be rated as slightly more acceptable than third-person subjects in sentences modified with the adverb *uytocekulo* ‘intentionally’, particularly in constructions with psych verbs.⁶ Although both conditions may be somewhat unacceptable, the difference in ratings would reflect the stronger association of first-person subjects with agentive roles, as represented in (18) and (19).

- (18) ?? *nay-ka holangi-lul uytocekulo mwuse-we hay-ss-ta.*
 I-NOM tiger-ACC intentionally be.scary-CONN do-PST-DECL
 ‘I was intentionally scared of a tiger.’
- (19) * *Hyenwu-ka holangi-lul uytocekulo mwuse-we*
 Hyenwu-NOM tiger-ACC intentionally be.scary-CONN
hay-ss-ta.
 do-PST-DECL
 ‘Hyenwu was intentionally scared of a tiger.’
- (with psych verbs)

To test these predictions, this experiment employed a 2×2 design with two factors: COMBINED ELEMENT TYPE (verbal nouns vs. psych verbs) and SUBJECT PERSON TYPE (1st vs. 3rd). The dependent variable was the acceptability of sentences that could be modified with the adverb *uytocekulo* ‘intentionally’. Ten instances of the verb *ha-* with verbal nouns and ten with psych verbs were used as target items, as illustrated above.⁷ These items included the second factor, SUBJECT PERSON TYPE, together with an

⁶When the verb *ha-* combines with verbal nouns, sentences with both first- and third-person subjects are expected to be acceptable.

⁷Regarding the reviewer’s question about the selection of the 10 verbal nouns and 10 psych verbs, the selection criteria and full lexical lists are provided below. For the verb *ha-* with verbal nouns, items were chosen that clearly denote agentive and controllable actions in everyday contexts. The items have comparable phonological length (mostly 2–4 syllables) to minimize lexical bias. The items consisted of:

- *kongpwu-ha-* ‘study-do-’, *yoli-ha-* ‘cook-do-’, *chotay-ha-* ‘invitation-do-’, *yenkwu-ha-* ‘research-do-’, *yensup-ha-* ‘practice-do-’, *cosa-ha-* ‘investigate-do-’, *cwunpi-ha-* ‘prepare-do-’, *pangmwun-ha-* ‘visit-do-’, *enkup-ha-* ‘mention-do-’, *sanchayk-ha-* ‘take.a.walk-do-’

For the verb *ha-* with psych verbs, lexical bases encoding distinct emotional reactions were selected to ensure broad semantic coverage. These predicates also fall within a comparable syllable range. The items for psych verbs consisted of:

- *mwusep-* ‘be scary’, *twulyep-* ‘be scary’, *culkep-* ‘have fun’, *pwukkulep-* ‘feel ashamed’, *sulphe-* ‘feel sad’, *anthakkap-* ‘feel regret’, *aswip-* ‘feel disappointed’, *selep-* ‘feel sorrowful’, *nollap-* ‘be surprised’, *oylop-* ‘feel lonely’

additional 20 filler sentences.⁸ The experiment was presented online on IBEX.

The expectations were as follows: (a) Regarding the first factor COMBINED ELEMENT TYPE, when the verb *ha-* combines with a psych verb, it would be more difficult to fully accept that the subject can act intentionally. This factor is expected to result in lower sentence acceptability ratings. (b) The second factor SUBJECT PERSON TYPE is expected to affect acceptability ratings in such a way that first person subjects would be more likely to allow the sentence to be modified with the adverb *uytocekulo* ‘intentionally’.

A total of forty-nine native Korean speakers ($n = 49$) participated in the study, including 21 females and 28 males. The average age of the participants was 27.5 years and all participants lived in South Korea. Figure 2 for the acceptability of sentences modified with the adverb *uytocekulo* ‘intentionally’ shows that the second factor, the subject type, does not have an impact on the acceptability of sentences. From this result, it is supposed that the structure with the verb *ha-* combined with verbal nouns and psych verbs is not influenced by whether the subject is in the first- or third-person.

However, Figure 3 shows⁹ the frequency distribution of the scores indicates a significant difference in acceptability with respect to the first factor, COMBINED ELEMENT TYPE. With verbal nouns, sentences exhibit higher acceptability, as evidenced by an average value of 4.2. In contrast, those with psych verbs demonstrate lower acceptability, with an average value of 2.4. This reveals that this factor plays a significant role in determining the acceptability of sentences.¹⁰

To sum up, the experimental results suggest that the verb *ha-*, when

⁸Regarding the filler items, information on their properties is provided. Filler sentences were included to prevent participants from focusing solely on the core experimental factor and to reduce potential strategy effects. These fillers were designed to be similar to the experimental items in length and syntactic complexity, ensuring a balanced comparison. Representative examples of the filler sentences used in the experiment are shown in (i) and (ii). Some fillers contained agentive verbs, but they were independent of the core agentivity manipulation. These examples illustrate that the fillers closely matched the experimental sentences while maintaining independence from the main experimental condition.

- (i) na-nun chwukha insa-ka ilpwule/uytocekulo kippu-ta.
I-TOP congratulatory message-NOM intentionally pleasing-DECL
(Literally) ‘The congratulatory message is intentionally pleasing to me.’
- (ii) na-nun sakwa-lul ilpwule/uytocekulo mek-nun-ta.
I-TOP apple-ACC intentionally eat-PRS-DECL
‘I intentionally eats an apple.’

⁹Given that no significant difference between first- and third-person, it was assumed that the first factor does not affect sentence acceptability. Thus, the data in Figure 3 were analyzed without distinguishing between the subject types.

¹⁰The results indicated a substantial difference between the two groups. The calculated t-statistic was 24.521, reflecting a large difference between the group means, and the corresponding *p*-value was $< 2.2\text{e-}16$.

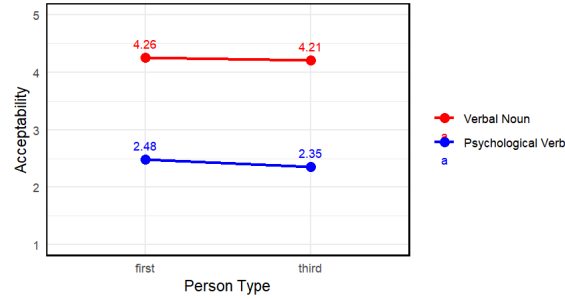


Figure 2: Acceptability of sentences with the adverb *uytocekulo* ‘intentionally’ (95% C.I.)

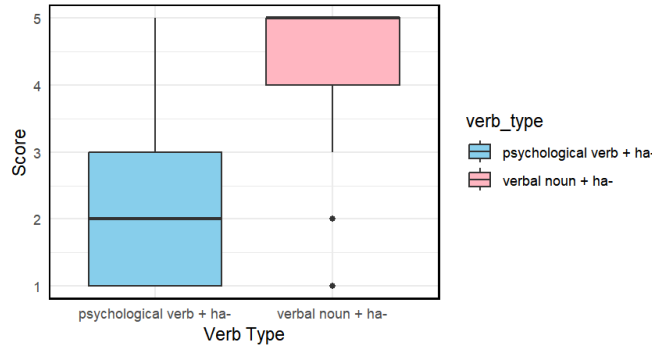


Figure 3: Frequency distribution of scores (95% C.I.)

combined with verbal nouns or psych verbs, exhibits distinct functions in each construction, regardless of the subject person type. When combined with verbal nouns, the verb *ha-* allows the subject to be interpreted as an AGENT. In contrast, when combined with psych verbs, the verb *ha-* does not contribute to agentivity, and these sentences describe emotional state¹¹.

¹¹A reviewer pointed out that it remains unexplained why the complex predicate, the verb *ha-* with a psych verb differs from a typical non-agentive stative verb (e.g., *mwusep-* ‘be scary’, *sulphe-* ‘feel sad’). I will briefly clarify this point. I assume that there is indeed a distinction between the verb *ha-* with a psych verb and ordinary non-agentive stative verbs. As shown in (i), the present tense marker *-(nu)n* and the so-called progressive auxiliary verb *-ko iss-* can attach to the complex predicate formed with the verb *ha-* and a psych verb, whereas such combinations are generally not available with non-agentive stative verbs, as shown in (ii). This asymmetry indicates that the complex predicate does not simply encode a stative meaning. Rather, it describes the onset of an emotion and its persistence over time. Furthermore, in (i.b), the marker *iss-* does not introduce a progressive meaning, but instead denotes a continuous emotional state (cf. Lee 2006: 705–707). For this reason, the combination of the verb *-ha* with a psych verb can occur with the marker *iss-*; when it does, the construction denotes a state that continues over time, rather than a progressive event. Whereas a non-agentive stative psych verb denotes

Moreover, subject person type did not significantly affect acceptability ratings, suggesting that the syntactic and semantic behavior of the verb *ha-* is primarily determined by the type of embedded element rather than by the person of the subject. These findings support a typological classification of the verb *ha-* and provide the basis for the theoretical analysis presented in the next section.

4 An HPSG-based analysis of the Korean Verb *ha-*

Based on the experimental results, this section proposes an analysis of the verb *ha-* when it combines with verbal nouns and psych verbs.

Let us first consider the argument structure of verbal nouns. In constructions where the verb *ha-* combines with a verbal noun, the verb *ha-* itself does not determine the argument structure. Rather, the argument structure depends on the verbal noun. The following sentences illustrate this point. In (20a), the second argument is realized as a PP, while in (20c), the dative case marker is attached to the second argument. In this latter example (20c), three arguments are realized : a nominative NP, an accusative NP, and a PP. These examples demonstrate that the verb *ha-* does not influence the argument structure. Instead, it is determined by the verbal noun (Grimshaw & Mester 1988, Chae 1997, 2004, Jun 2006, Kim et al. 2007)).

- (20) a. Hyenwu-ka Yuna-lang kyelhon-hay-ss-ta.
 Hyenwu-NOM Yuna-with marriage-do-PST-DECL
 ‘Hyenwu married Yuna.’
 b. Hyenwu-ka Yuna-eykey cenhwa-hay-ss-ta.
 Hyenwu-NOM Yuna-DAT call-do-PST-DECL
 ‘Hyenwu called Yuna.’

a pure state, the complex predicate formed with the verb *ha-* and a psych verb denotes the initiation of an emotional response and its temporal continuation.

- (i) a. Hyenwu-ka kangaci-lul mwuse-we ha-n-ta.
 Hyenwu-NOM puppy-ACC be.scary-CONN do-PRS-DECL
 ‘Hyenwu is scared of a puppy.’
 b. Hyenwu-ka kangaci-lul mwuse-we ha-ko iss-ta.
 Hyenwu-NOM puppy-ACC be.scary-CONN do-CONN be.cont-DECL
 ‘Hyenwu is scared of a puppy.’
 (ii) a. *Hyenwu-nun kangaci-ka mwusep-nun-ta.
 Hyenwu-TOP puppy-NOM be.scary-PRS-DECL
 b. *Hyenwu-nun kangaci-ka mwusep-ko iss-ta.
 Hyenwu-TOP puppy-NOM be.scary-CONN be.cont-DECL

- c. Hyenwu-ka Yuna-lul myengtan-ey chwuka-hay-ss-ta.
 Hyenwu-NOM Yuna-ACC list-to.LOC addition-do-PST-DECL
 ‘Hyenwu added Yuna to the list.’

Furthermore, the verb *ha-* can be omitted, as shown in (21). However, when the verbal noun is omitted, the sentence becomes ungrammatical. In other words, the verbal noun is obligatory. This observation supports the claim that verbal nouns in Korean possess their own argument structure, independent of the verb *ha-*.

- (21) a. Hyenwu-ka chinkwu-lul cip-ulo chotay
 Hyenwu-NOM friend-ACC home-to.LOC invitation
 ‘The invitation Hyenwu made to his house’
 b. Hyenwu-ka chinkwu-lul cip-ulo
 Hyenwu-NOM friend-ACC home-to.LOC
 *(chotay-)hay-ss-ta.
 invitation-do-PST-DECL

The lexical entry for the verb *ha-* when it combines with a verbal noun is presented in (22) (cf. Müller 2002: 85–93, 2013: 241–246, 2019: 4–6).¹² In this construction, the verb *ha-* must combine directly with the verbal noun, since no other constituent can intervene between two predicates. It indicates a strong syntactic unit. Structurally, the verb *ha-* functions as the head of the complex predicate, while its arguments—both the subject and the object—are inherited from the verbal noun with which it combines. Crucially, the subject NP is interpreted as an AGENT. Semantically, as represented in the lexical entry, this construction denotes a *doing* event, clearly expressing agentivity. The subject is interpreted as an AGENT performing an action, which aligns with the patterns observed in the experimental result.

- (22) Lexical entry of the verb *ha-* with a verbal noun:

$$\left[\begin{array}{l} \text{PHON } \langle ha \rangle \\ \text{CAT } \left[\text{ARG-ST } \boxed{1} \langle \text{NP}_{\boxed{3}} \rangle \oplus \boxed{2} \oplus \langle \text{VN} | \text{LEX+}, \text{SUBJ } \boxed{1}, \text{COMPS } \boxed{2} | : [\text{INDEX } \boxed{4}] \rangle \right] \\ \text{CONT } \left[\begin{array}{l} \text{IND } \boxed{5} \text{ event} \\ \text{RELS } \left\langle \left[\begin{array}{l} \text{agent} \\ \text{ARG0 } \boxed{5} \\ \text{ARG1 } \boxed{3} \end{array} \right], \left[\begin{array}{l} \text{do} \\ \text{ARG0 } \boxed{5} \\ \text{ARG1 } \boxed{4} \end{array} \right] \right\rangle \end{array} \right] \end{array} \right]$$

For instance, sentence (23) denotes an event of “doing some studying”, with a clearly defined AGENT. This combination of the verb *ha-* and a verbal

¹²Kim (2016: 121–143) provides a detailed analysis of a verbal noun and the light verb *ha-* constructions, discussing their properties, the role of the light verb *ha-*, and relevant theoretical approaches (see also Ahn 1989; Lapointe 1993; Manning 1993; Chae 1996, 1997; Lee 2011; Park 2013, a.o.).

noun is illustrated in Figure 4. In summary, when combined with verbal nouns, the verb *ha-* functions as an agentive verbalizer, introducing a subject as the AGENT argument and emphasizing the action of doing.

- (23) Hyenwu-ka yeksa-lul kongpwu-ha-n-ta.
 Hyenwu-NOM history-ACC study.N-do-PRS-DECL
 ‘Hyenwu studies history.’

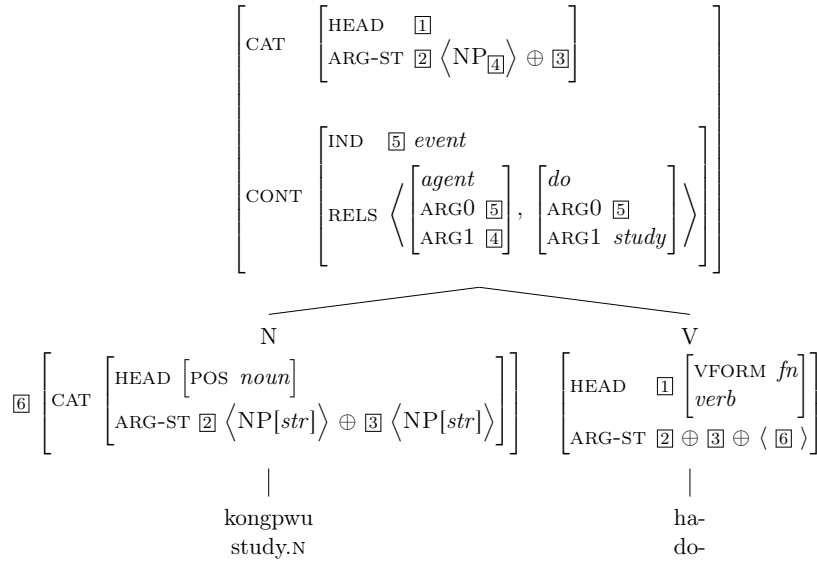


Figure 4: Analysis of the complex predicate, the verb *ha-* and a verbal noun

Now, let us turn to psych verbs. These predicates denote psychological states or emotions (e.g., *mwusep-* ‘be scary’, *sulphu-* ‘be sad’, *kipu-* ‘be glad’). Unlike verbal nouns, psych verbs are canonically classified as verbs, and they inherently possess verbal properties such as argument structure. They can appear as predicates without the verb *ha-*.

Based on the analysis proposed by Bak (2017), psych verbs in Korean are argued not to take the EXPERIENCER argument directly. Instead, the EXPERIENCER is introduced by a covert predicate such as *feel*. For example, in a sentence (24), the noun *horangi* ‘tiger’ functions as the THEME and the argument of the verb *mwusep-* ‘be scary’. The EXPERIENCER is not directly selected by the verb *mwusep-* ‘be scary’ and introduced by the covert predicate *feel*.¹³

¹³Bak, drawing on Kratzer 1996’s proposal, suggests that psych verbs do not directly take an argument bearing the semantic role of EXPERIENCER. Rather, the EXPERIENCER argument is introduced by a covert predicate such as *feel*. The EXPERIENCER role is not syntactically realized as the subject, but may instead be projected from an covert predicate

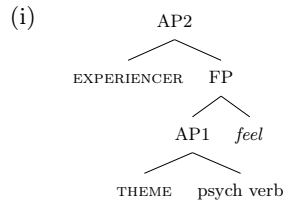
- (24) na-nun holangi-ka mwusep-ta.
 I-TOP tiger-NOM be.scary-DECL
 ‘A tiger is scary to me.’

As shown in (25a), even when the EXPERIENCER is marked with nominative case, the sentence is not acceptable. As indicated in (25b) and (25c), the EXPERIENCER may instead appear as a dative NP or may be omitted altogether. In particular, when the THEME argument is missing, the sentence becomes incomplete (e.g., “What is scary?”). In contrast, when the EXPERIENCER is unexpressed, the sentence remains interpretable. These facts suggest that the EXPERIENCER is not an argument directly selected by psych verbs.

- (25) a. ?nay-ka holangi-ka mwusep-ta.
 I-NOM tiger-NOM be.scary-DECL
 b. na-eykey(-nun) holangi-ka mwusep-ta.
 I-DAT-TOP tiger-NOM be.scary-DECL
 ‘A tiger is scary to me.’
 c. holangi-ka mwusep-ta.
 tiger-NOM be.scary-DECL

Based on the observations and experimental results, the lexical entry of the verb *ha-* when it combines with a psych verb, such as *mwusep-* ‘be scary’ is proposed as represented in (26) (cf. Müller 2002: 85–93, 2013: 241–246, 2019: 4–6). In this construction, the verb *ha-* combines with the psych verb through the connective marker *-e*¹⁴. As in the case of verbal nouns, the verb *ha-* functions as the head of the complex predicate. However, the argument structure differs from that of verbal noun constructions. Specifically, the second argument—originally the subject of the psych verb—is raised to function as the object of the complex predicate. Meanwhile, the EXPERIENCER argument is introduced by the complex predicate *-e ha-*. As a result, the

such as *feel*, as illustrated in (i) (cf. Bak 2017: 50).



¹⁴In the construction with the verb *ha-* and a psych verb, the connective marker *-e* is essential for the combination: without it, the psych verb cannot combine with the verb *ha-*. Therefore, in the lexical entry of the verb *ha-*, the connective marker is explicitly constrained as a required feature, ensuring proper combination with psych verbs.

construction appears syntactically transitive, but its semantic interpretation remains state rather than event.

Crucially, the predicate does not exhibit agentivity. The complex predicate construction does not assign an intentional or volitional role to the subject. Instead, it denotes a psychological state of experience. This observation aligns with the experimental findings that the complex predicate with the verb *ha-* and a psych verb is semantically non-agentive. It describes an EXPERIENCER who undergoes an emotional state.

To sum up, these constructions are argued to be structurally transitive but semantically non-agentive.

(26) Lexical entry of the verb *ha-* with a psych verb:

$$\left[\begin{array}{l} \text{PHON } \langle ha \rangle \\ \text{CAT } \left[\text{ARG-ST } \langle \text{NP}_{[1]} \rangle \oplus [2] \oplus \langle \text{V} [\text{VFORM } -e, \text{LEX+}, \text{SUBJ } [2]] : [\text{INDEX } state] \rangle \right] \\ \text{CONT } \left[\begin{array}{l} \text{IND } [0] \\ \text{RELS } \left\langle \begin{array}{l} \text{experiencer} \\ \text{ARG0 } [0] \\ \text{ARG1 } [1] \end{array} \right\rangle \end{array} \right] \end{array} \right]$$

Figure 5 presents the analysis of a complex predicate in which the verb *ha-* combines with a psych verb, illustrating the transitive syntactic structure and the non-agentive semantic interpretation, in contrast to constructions with verbal nouns where the verb *ha-* functions as an agentive verbalizer.

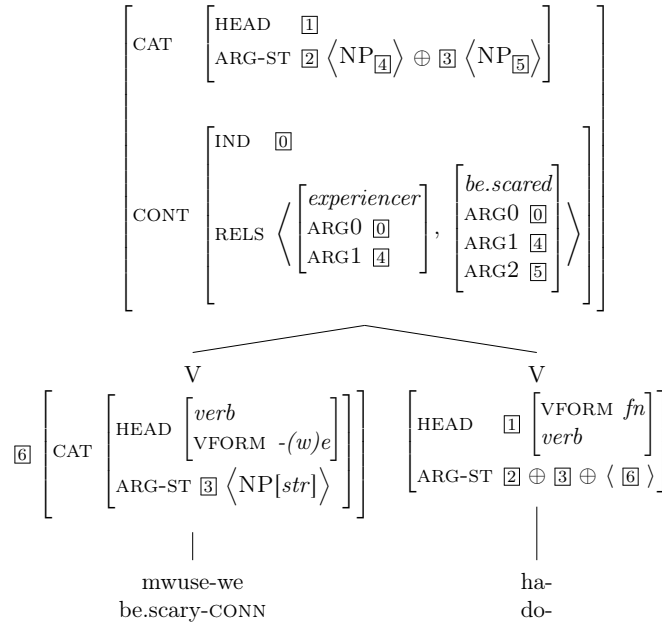


Figure 5: Analysis of the complex predicate, the verb *ha-* and a psych verb

Based on the analysis, this paper propose that there are two distinct types of the verb *ha-*, an agentive verbalizer and a non-agentive transitivizer. Figure 6 illustrates the relationship between these two types. Both derive from a more general the verb *ha-* lexeme, but they differ in their syntactic and semantic functions. The agentive verbalizer type functions primarily to convert a noun into a verb, thereby emphasizing the notion of doing. In this construction, the verb *ha-* transforms a verbal noun into a verb and introduces an agentive subject and the *doing* event. In contrast, the non-agentive transitivizer type introduces an additional argument, rendering the psych verb syntactically transitive. Here, the verb *ha-* does not include the *doing* event. The subject undergoes a psychological state.

In sum, the function of the verb *ha-* depends on the element it combines with. The verb *ha-* in constructions shows distinct syntactic and semantic properties, reflecting its roles as an agentive verbalizer and a non-agentive transitivizer.

5 Conclusion

This paper examined the Korean verb *ha-* in complex predicate constructions, focusing on its combination with verbal nouns and psych verbs. The goal was to clarify the syntactic and semantic functions of the verb *ha-* and to determine whether it contributes agentivity across constructions. Based on prior claims that the verb *ha-* with psych verbs also yields agentive interpretations, this paper hypothesized that the verb *ha-* does not consistently encode agentivity and that its contribution depends on the type of embedded predicate it combines with.

To address this question, an acceptability judgment experiment was conducted, manipulating predicate type (verbal noun vs. psych verb) and subject person (first vs. third). The results revealed that the verb *ha-* does not perform the same function in constructions with verbal nouns and psych verbs. When combined with verbal nouns, the verb *ha-* contributes agentivity to the predicate. That is, the subject is interpreted as an AGENT engaged in an action. In contrast, when combined with psych verbs, the verb *ha-* does not add agentivity. So, the subject functions as an EXPERIENCER of a psychological state, and the resulting complex predicate remains semantically state. This finding suggests that the verb *ha-* does not perform the same function across these constructions.

Based on the experimental results, the paper proposed that the verb *ha-* has two distinct subtypes: an agentive verbalizer, used in constructions with verbal nouns, and a non-agentive transitivizer, used in constructions with psych verbs. The first subtype introduces an AGENT and a “doing” event, whereas in the second subtype, the verb *ha-* does not introduce the event, and its subject functions as an EXPERIENCER. This analysis, formalized within

the HPSG framework, provides an account of how the syntactic and semantic behavior of the verb *ha-* varies depending on the type of element it combines with.

Acknowledgements

I am deeply grateful to Stefan Müller, whose encouragement and sustained support made it possible for me to complete this work. I also thank Antonio Machicao y Priemer, Giuseppe Varaschin, and Paola Fritz-Huechante for their invaluable guidance and thoughtful criticism, as well as the anonymous reviewers whose careful reading and constructive critiques significantly strengthened the final version of this paper. Finally, I am grateful to the participants of the 31st International Conference on Head-Driven Phrase Structure Grammar for their insightful comments on earlier versions of this paper.

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A phrasal construction for an “ex quō libet falsum” inference

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 159–179



Keywords: Construction, HPSG, German, Negation, Idiomaticity

Sailer, Manfred. 2025. A phrasal construction for an “ex quō libet falsum” inference. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 159–179. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.8.  CC-BY 4.0

Abstract

The paper looks at the German constructional idiom *wenn S dann bin ich der Kaiser von China* ‘if S then am I the Emperor of China’, which is used to express ‘I strongly reject the idea that S.’ It is argued that this expression should be treated as an idiosyncratic construction. At the same time, almost all its properties seem to be fully regular. The idiosyncrasy lies in the pragmatic properties that are connected to a particular syntactic structure and its meaning. This makes the expression an interesting test case for (i) the interaction of different modules of grammar, and (ii) our understanding of the interplay of regularity and idiosyncrasy in language.

1 Introduction

In this paper, I discuss a German construction that expresses the rejection of the truth of the antecedent in a conditional, (1a), or the rejection of an immediately preceding proposition, (1b). In either case, the rejection is encoded as stating that the speaker is *der Kaiser von China* ‘the Emperor of China’.¹

- (1) a. Also, wenn das stimmt, bin ich der Kaiser von China.
 thus if this is correct am I the emperor of China
 ‘This cannot be correct.’
 (lit.: ‘If this is correct, I am the emperor of China.’)
- b. A: “Wir verwenden die besten [...] Materialien für unsere T-Shirts”
 ‘We use the best [...] materials for our t-shirts’
 B: Und ich bin der Kaiser von China!
 and I am the emperor of China
 ‘This is nonsense!’ (lit.: ‘And I am the emperor of China.’)

The relevant statement in (1) requires that the communication participants are aware that the speaker is not really the Emperor of China. Transparently, then, the utterance is to be understood in the following way: The preceding claim is so wrong that if you accept it, anything follows from it, even that the speaker is the Emperor of China. This means that the construction relies on an *ex falso quodlibet* reasoning, i.e., the fact that anything follows from a false assumption.

[†]This research was funded by the Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) as part of the CRC 1629 “Negation in Language and Beyond” (project number 509468465), project B05 (*Negative Polarity Items in non-negative contexts*). I would like to thank my project colleagues for comments and discussion: Pascal Hohmann, Nicolas Lamoure, and Frank Richter. I would also like to thank the reviewers – both of the conference abstract and of this proceeding submission – for their comments and insightful suggestions, as well as the audiences of *HPSG 2025* and of the syntax-semantics colloquium at Goethe University, Frankfurt, and the proceedings editors, Stefan Müller and Shūichi Yatabe. All errors are mine.

¹Unless stated otherwise, all examples are from the deTenTen23 corpus, accessed via <https://www.sketchengine.co.uk/>. Constructed examples are followed by the marking “...^c”.

However, it is by making an “anything” (*quodlibet*) statement that the speaker indicates that they consider the previous statement false. In this paper, I will refer to the construction(s) in (1) as the *Emperor-of-China* construction (short: EoC construction). I will refer to the *if* part in (1a) and to the initial statement in (1b) as the *antecedent*. As the two realizations of the EoC construction in (1a) and (1b) have different properties, I will refer to them as *und*-EoC and *dann*-EoC respectively.

In Section 2 I will try to establish that it is justified to refer to the EoC-construction as a construction in the technical sense. I will, then, discuss the syntactic, semantic, and pragmatic aspects of this construction and provide the respective parts of the overall analysis in Sections 3, 4, and 5. Since the EoC construction shows an interaction of regular and idiosyncratic properties in the syntax, semantics, and pragmatics, sign-based architecture of grammar, such as HPSG, is required to capture it in a natural way.

2 Data

The empirical basis of the paper are examples from the German internet corpus deTenTen23, retrieved via sketchengine (Kilgarriff et al. 2014). I also use examples from other corpora, and introspection.² The main questions addressed in this section are: (i) Do we have reason enough to classify it as a lexicalized unit (i.e., as an idiosyncratic construction or phrasal idiom) rather than as a free combination? (ii) If so, what are the properties of the EoC construction?

A first argument in favor of the idiomaticity of the expression is that it is listed in dictionaries. For example, the *Digitales Wörterbuch der Deutschen Sprache* (<https://www.dwds.de>) has an entry for the *dann*-EoC (*wenn ... , dann bin ich der Kaiser von China*) as a multiword expression. This entry mentions the *und*-EoC (*und ich bin der Kaiser von China*) as a variant.³ Similarly, the idiom dictionary from the Duden series –*Duden 11: Redewendungen* – lists the *dann*-EoC variant as *wenn ... [dann] bin ich der Kaiser von China* (Dudenredaktion 2002: 391). These entries suggest a rather strict form with the following properties:

- It is a verb-second, unembedded clause.
- It is either the consequent of a conditional or a conjunct with *und* ‘and’.
- It is a copular clause in the present tense.
- The speaker is the subject.
- The predicative complement is the noun phrase *der Kaiser von China* ‘the Emperor of China’.

²The basic dataset used here is available at <https://osf.io/5ut2g>.

³<https://www.dwds.de/wb/wenn%20E2%80%A6%2C%20bin%20ich%20der%20Kaiser%20von%20China>, last checked 2025-11-01.

This fixed form is said to have the meaning that the speaker does not believe the content of some antecedent proposition. This would be the proposition in the *if* clause in the *dann*-EoC, and the content of the (explicit or implicit) first conjunct in the *und*-EoC.

The noun phrase *der Kaiser von China* ‘the Emperor of China’ is clearly the dominant lexicalization for this expression. In the deTenTen23 corpus, there are 582 hits for the (simple, lemma) query *der Kaiser von China*, out of which 28 contain the sequence *und ich bin der Kaiser von China*. In comparison, there are 882 hits for *der König von Frankreich* ‘the King of France’, none of which being of the form *und ich bin der König von Frankreich* ‘and I am the King of France’. When looking for variants of the *und*-EoC with other titles or countries,⁴ *der Kaiser von China* is clearly dominating: It occurred in 28 out of 31 relevant hits. There was one instance of *König von China* ‘King of China’, and two instances of *Kaiser* ‘Emperor’ of a fantasy-land.

The female form *Kaiserin* ‘Empress’ is attested. Out of 68 hits for the (simple, lemma) query *die Kaiserin von China* ‘the Empress of China’, there were 3 hits for the *dann*-EoC, 1 for the *und*-EoC, and 1 with *ansonsten* ‘otherwise’ as introduction particle for the *falsum*, see (2).

- (2) Aber das niemand perfekt ist, stimmt wohl. Ansonsten bin ich
 but that nobody perfect is ist correct PARTICLE otherwise am I
 die Kaiserin von China.
 the Empress of China
 ‘Sure, it is correct that nobody is perfect. Otherwise, I am the Empress of China.’

In all of the relevant hits, the above-mentioned formal properties of the EoC construction hold, except for the gender variation. While it is only clear in one case that the speaker must be female, my native speaker intuition suggests that the occurrence of the *-in* suffix is a case of (optional) gender agreement.

In the following, I restrict my focus to the 582 hits for the (simple, lemma) query *der Kaiser von China*, mentioned above. In order to further test the formal properties of the EoC construction, I looked for cases in which the verb *sein* ‘be’ would follow the predicative complement. This was the case in 91 of the hits, none of which, however, expressed the meaning of the EoC construction. This confirms the observation that the EoC construction is restricted to main clause uses.

This sets it apart from another predicative use of the expression *der Kaiser von China*, illustrated in (3). Here, being the Emperor of China is meant to express that someone is (or considers themselves) important or rich.

⁴The query

[word="und|Und"] [word="ich"] [word="bin"] [word="der"]
 [word="König|Kaiser|Prinz|Herzog|Herrscher"] [word="von"]

has 35 hits, out of which are 3 irrelevant, and 1 is unclear unclear.

- (3) Wer die Hand an den Hof legt, kriegt die Kugel. Und wenn es der
 whoever the hand on the farm lays gets the bullet and if it the
 Kaiser von China wäre.
 Emperor of China were
 ‘Whoever lays a hand on the farm gets a bullet. Even if it were the
 Emperor of China.’

Out of the 582 hits, there were 26 relevant instances of the pattern *und NP sein_lemma der Kaiser von China*, i.e. of the *und*-EoC. In all of them, the subject was *ich* ‘I’ and the verb *sein* ‘be’ was used in present tense. In fact, there was no instance of another verb, nor was there an instance of the Subject-Verb order without the coordination particle *und* ‘and’.

The *dann*-EoC is attested in 24 hits, 9 with *dann* ‘then’, 15 without. Again, in all of these cases, the subject was *ich* ‘I’, the verb was *bin* ‘(I) am’.

Let us next look at the non-fixed material of the expressions. I will first consider the presence or absence of the antecedent and then additional material in the constructionally fixed part.

The DWDS description suggests that the antecedent proposition is part of the *wenn* ‘if’ clause in the *dann*-EoC and contextually provided in the *und*-EoC. This has also been the case in the initial examples in (1). My data contain one instance of a *dann*-EoC without a *wenn* ‘if’ clause, see (4). It is clear, however, that the preceding clause provides the antecedent.

- (4) PEGIDA: “Wir sind das Volk!!!”? Hmm, dann bin ich der Kaiser von
 PEGIDA we are the people hmm then am I the Emperor of
 China.
 China
 ‘I consider it nonsense that the political organization PEGIDA claims for
 itself to be the people.’

The *und*-EoC can be found with explicit complete or fragmentary antecedents, see (5).

- (5) [Context: Something about independent critical journalism]
 Ja, ja ... unabhängig, und ich bin der Kaiser von China.
 yes yes independent and I am the emperor of China
 ‘Right, independent – I don’t believe a word of it.’

One example reports a cartoon in which a police officer sees an ambulance parking in a spot reserved for disabled persons. Issuing a parking ticket the police officer utters the *und*-EoC-continuation *Und ich bin der Kaiser von China*. This suggests that non-linguistic antecedents are possible as well.

While both variants are quite restricted in their lexical material, they may contain additional words that are not mentioned in their dictionary descriptions above. This is illustrated in (6) with one example for each of the two variants.

- (6) a. ... dann bin ich wie gesagt der Kaiser von China
 then am I as said the Emperor of China
 ‘... then I am the Emperor of China, as I have said before’
 = ‘... is nonsense, as I have said before’
- b. Und ich bin übrigens der Kaiser von China!
 and I am by the way the Emperor of China
 ‘And, by the way, I am the Emperor of China’
 = ‘And this is utter nonsense, by the way.’

As indicated in the non-idiomatic paraphrases below the examples, the additional material in (6) is parenthetical. However, there is one example in my dataset in which only a literal interpretation of the extra material is possible:

- (7) Wenn der Potential für die Bundesliga hat bzw. hatte, bin ich
 if he potential for the Bundesliga has respectively had am I
 ab sofort der Kaiser von China
 from now on the Emperor of China
 ‘If he has the potential for playing in the Bundesliga, then I am the
 Emperor of China from now on.’

This brings me to another interesting property of the expression. Some examples contain the expression together with other phrases that refer to unrealistic or unreal properties, see (8). Clearly, the second clause is meant as an emphasis to the absurdity, but it is not conventionalized.

- (8) und ich bin der Kaiser von China. Und der Schwiegersohn des Tankwarts
 meines Kollegen ist der Zauberer von Oz.
 ‘and I am the Emperor of China. An the son-in-law of my colleague’s gas
 station attendant is the Wizzard of Oz.’

Getting back to the initial question in this section, the data presented here confirm that the EoC construction is an idiosyncratic, conventionalized form-meaning pairing. Under the particular meaning of disbelief, doubt, or rejection, it is very restricted in its syntactic variation. However, the literal meaning cannot be fully ignored, and the expression can be combined with ad-hoc formations that have the same effect. In this paper, I will try to maneuver between these properties by claiming that on the one hand, there is a construction, but, on the other, its effect is pragmatic and the same pragmatic effect can be achieved by ad-hoc formations.

In the next sections, I will argue that the construction is a regular combination, though restricted (Section 3 for syntax and Section 4 for semantics). At the level of pragmatics, however, its effect is hard-wired into the construction.

3 The syntax of the EoC construction

In this section, I will present the syntactic aspects of my analysis. I will argue that the construction is syntactically fully regular, but it is restricted to the occurrence of particular lexical expressions and to begin a copula structure.

For the sake of concreteness, I pick a particular HPSG approach to each of the aspects that need to be expressed. Other choices are certainly possible, but my purpose here is merely to show that everything that needs to be expressed can be expressed within HPSG. The resulting phrasal lexical entry is given in (9).

(9) The syntax of the EoC construction:

$$\left[\begin{array}{l} \text{unembedded-phrase} \\ \\ \text{HDTR(DTRS | HDTR)}^* \\ \\ \text{COLL} \end{array} \left[\begin{array}{l} \text{word} \\ \text{LEXEME } \textit{sein-lex} \\ \text{COMPS } \left\langle \text{NP} \left[\begin{array}{l} \text{LEXEME } \textit{Kaiser-v-China-lex} \\ \text{PRED } + \\ \text{SUBJ } \left\langle \text{NP[1SG]} \right\rangle \\ \text{SPR } \left\langle \text{DP[DEF +]} \right\rangle \end{array} \right] \right\rangle \right] \\ \text{irregular} \end{array} \right] \right]$$

To mark the expression as an idiosyncratic construction, I follow Richter & Sailer (2009). In their theory a feature *COLL* specifies whether a sign is regular or irregular, i.e., exempt from some principles of grammar. All irregular signs have a *COLL* value of type *irregular*. This type has subtypes expressing the type of irregularity (syntactic, semantic, pragmatic, ...). These reflect the idiosyncrasy classification of Fillmore et al. (1988). In (9), I simply put *irregular*. We will see in the next sections how this value can be more finetuned, once we identified the exact subsort required for this construction.

It is an idiosyncratic property of the construction that it must occur as an independent utterance. Richter (1997) and Höhle (2019) use a special subtype of signs for this, which they call *unembedded-sign*. Building on this, I specify the EoC as being of this type. As an *unembedded-phrase* the possibility of a verb-final realization is excluded.

The description in (9) specifies a path along the head line until its lexical pivot. This allows for an underspecified description of the syntactic structure that it is compatible with both the *und*-EoC and the *dann*-EoC variant. It is worth noting that this is a non-local construction and, as such, not directly compatible with a framework like Sign-Based Construction Grammar (Sag 2012). However, it satisfies the locality conditions specified in Sailer (2012), i.e., there is a single, idiosyncratic node in the tree, but it may restrict which elements must occur in the structure as well.

The lexical head selects a predicative noun phrase that requires a first person subject. This is specified in the SUBJ value of the predicative complement.

The construction requires some specific words: the copula *sein* ‘be’, and the expression *Kaiser von China* ‘Emperor of China.’ Such occurrence requirements can be dealt with by a mechanism of lexeme-based selection. I use the feature LEXEME for this purpose. The construction specifies that it must be headed by an instance of the lexeme *sein* ‘be’, for which I stipulate the lexeme type *sein-lex(eme)*.

The expression *Kaiser von China* ‘Emperor of China’ must be lexically selected as well. For simplicity, I treat this nominal projection as a lexicalized unit, but it could also be directly composed from its component parts. To capture the occurrences of the female form *Kaiserin* ‘Empress’, one can make either of the following assumptions about the suffix *-in*: (i) It is used here as a mere marker of gender agreement. As such it does not change the LEXEME value. (ii) It is a derivational suffix and can change the LEXEME value of its base. Nonetheless, the value of the base should still be accessible from the outside. For simplicity, I tentatively opt in favor of the first assumption.

A reviewer suggests to require a particular phonological realization, i.e., a particular PHON specification. I do not adopt this solution because I think that there is some phonological variation: First, the female form *Kaiserin* ‘Empress’ would not be included automatically. Second, parts of the expression may be camouflaged by a placeholder expression such as *Dingsbums* ‘thingamajig’ or *du-weißt-schon-wer/was/...* ‘you know who/what/...’.

- (10) Die helfen uns ... ‘They are going to help us ...’
 und ich bin der Dingsbums von China/ der Kaiser von
 and I am the thingamajig of China the Emperor of
 du-weißt-schon-wo.^c
 you-know-where

Since placeholder expressions may occur inside idioms, Sailer & Dörner (2020) argue that they change the PHON value, but not the LEXEME value.

In (9), I specify that the predicative complement must be marked as $\left[\text{DEF} + \right]$. This is intended to capture the obligatoriness of the definite article. As a reviewer point out, this specification might not be sufficient to guarantee the presence of a definite article as there are other determiners as well that give rise to a definite noun phrase. These include demonstratives and possessives. To avoid this, a lexeme-selection approach could be preferable here, i.e., the DP in the SPR value can be required to have the LEXEME value of the definite determiner.

The EoC is a copula construction. While the EoC construction always requires a definite determiner, this is not in the case in general with occurrences of the phrase *Kaiser von China* ‘Emperor of China,’ as shown in (11).

- (11) Ich war Kaiser von China. (booktitle)
 I was Emperor of China

It seems that in the variant with or without determiner, we have a predicational copula clause, as both NPs can be coordinated with adjectives:

- (12) Ich bin (der) Kaiser von China und richtig reich!^c
 I am the Emperor of China and really rich
 ‘I am the Emperor of China and really rich.’

All other properties of the construction will follow from its semantic and pragmatic properties, which will be elaborated on in the following sections.

4 The semantics of the EoC construction

The main question of this section is whether the core semantics of the EoC construction is the negation of the antecedent proposition. The answer to this question will be “no.” After settling this question, I will look at what the semantics is instead, and I will introduce the framework of the syntax-semantics interface assumed in this paper.

A construction is an idiosyncratic form-meaning pairing. Since we treat the EoC construction as a phrasal construction, it could be assigned some holistic idiosyncratic meaning, such as the negation of the antecedent proposition. Let’s use the example in (13) for illustration.

- (13) a. Wenn Alex einen Preis gewonnen hat,
 if Alex has a price won
 bin ich der Kaiser von China!^c
 am I the emperor of China (*dann*-EoC)
 b. Alex hat einen Preis gewonnen
 Alex has a price won
 und ich bin der Kaiser von China!^c
 and I am the emperor of China (*und*-EoC)

There are two straightforward ways in which the construction could express negativity: First, by directly negating the antecedent, i.e., expressing something like (14a). Second, it could encode some adversative attitude towards the antecedent, as indicated in the paraphrase in (14b).

- (14) a. I am convinced that it is not the case that Alex won a price.
 b. I strongly doubt that Alex won a price.

The most reliable test for the presence of some (even weak) type of semantic negativity in a structure is to check if a weak negative polarity item (NPI) such as *je(mals)* ‘ever’ is licensed in it. Just like its English counterpart, German *je(mals)* can occur with all explicit NPI licensors, in contrast to an NPI such as *einen Finger krumm machen* ‘lift a finger’, (15). However, *je(mals)* is excluded from contexts of purely pragmatic licensing, such as (16) (Sedivy 1990, Sailer 2022).

- (15) a. Niemand hat/ Nur wenige haben das jemals gesehen.^c
 nobody has only few has that ever seen
 ‘Nobody has/ Only few have ever seen that.’
- b. Niemand hat/ *Nur wenige haben einen Finger
 nobody has only few have a finger
 krumm gemacht.^c
 lifted
 ‘Nobdy has/ *Only few have lifted a finger.’
- (16) a. *Aber Alex HAT das doch jemals gesehen.^c
 but Alex HAS that PARTICLE ever seen
 ‘But Alex has seen that at some point/*ever’
- b. Aber Alex HAT doch einen Finger krumm gemacht.^c
 but Alex has PARTICLE a finger lifted
 ‘But Alex HAS lifted a finger.’

The NPI *je(mals)* is licensed by a clause-mate negation, as in (15a), but also in the complement clause of an adversative predicate, see (17).

- (17) Ich bezweifle stark, dass Alex jemals einen Preis gewinnt.^c
 I doubt strongly that Alex ever a price win
 ‘I strongly doubt that Alex will ever win a price.’

We can use this observation to test if NPIs can occur in the antecedent of the EoC construction. Under either of the two negative readings suggested in (14) would we expect licensing of *ever*. However, as shown in (18a), the NPI is grammatical in the *dann*-EoC – though not in the *und*-EoC, (18b).

- (18) a. Wenn Alex jemals einen Preis gewonnen hat, bin ich der Kaiser
 if Alex ever a price won has am I the emperor
 von China.^c
 of China
 ‘If Alex has ever won a price, I am the emperor of China.’
- b. *Alex hat jemals einen Preis gewonnen und ich bin der Kaiser
 Alex has ever a price won and I am the Emperor
 von China.^c
 of China

The data in (18) show that the EoC construction does not behave uniformly with respect to NPI licensing. Note, however, that this behavior is also found in clausal coordination structures and conditionals without any special pragmatics, see (19).

- (19) a. Wenn Alex jemals einen Preis gewonnen hat, bin ich beeindruckt.^c
 if Alex ever a price won has am I impressed
 ‘I am impressed if Alex has ever won a price.’
 b. * Alex hat jemals einen Preis gewonnen und ich bin beeindruckt.^c
 Alex has ever a price won and I am impressed
 Intended: ‘Alex has won a price (at least once) and I am impressed.’

This means that we have no evidence for a special constructional semantics of the EoC construction. Instead, its semantics must be just its literal meaning. Let us, therefore, briefly look at the literal meaning. As argued for above, we have a predication copula clause with a definite noun phrase. I will assume the framework of *Lexical Resource Semantics* (LRS) for modelling the semantic combinatorics (Richter & Sailer 2004) and for the semantics-pragmatics interface (Sailer 2024).

LRS is a system of underspecified semantics, just like *Minimal Recursion Semantics* (MRS, Copestake et al. 2005). LRS differs from MRS in many respects. For example, LRS uses a standard semantic representation language. Underspecification is not done at the level of elementary predications (as in MRS), but at the level of each expression in the semantic representation language. Another major difference is that the resolution of the underspecification happens within the linguistic sign in LRS.

We can illustrate all this with a simple example, see (20). To integrate an LRS combinatorics with the rest of the grammar, we introduce a new feature LRS at the level of the sign. The value of the LRS feature is an object of type *lrs*. This sort has other features defined on it. From these, we will use EX(TERNAL-)CONT and PARTS here.

(20) Sketch of the LRS analysis of *Alex is tall* .:

$$\left[\begin{array}{c} \text{sign} \\ \text{LRS} \left[\begin{array}{c} \text{lrs} \\ \text{EXCONT } \mathbf{tall}(\mathbf{alex}) \\ \text{PARTS } \langle \mathbf{alex}, \mathbf{tall}, \alpha(\beta) \rangle \end{array} \right] \end{array} \right]$$

Let’s assume that sentence *Alex is tall* has the simple reading **tall(alex)**. This would be the overall semantic representation, which is the value of the feature EXCONT. There is also a list-valued feature PARTS, whose value contains all the subexpressions contributed by the sign itself or by the signs that it dominates. These expressions would be: **alex**, **tall**, and the means to combine the two. I will write $\alpha(\beta)$ for this, where α and β are meta-variables over expressions of the semantic representation language. A principle guarantees that the EXCONT value is an expression that consists only of elements of the PARTS list and that every element of the PARTS list is a subexpression of the EXCONT value. This requirement is clearly met in (20).

In (21) I add the semantic specification to the AVM from (9). Note that there is no need to specify the PARTS list of the construction, as its value will be determined by the signs it dominates. However, the elements from the PARTS list must be such that they can be combined into one of the given EXCONT values. Just as the EoC construction has no idiosyncratic syntax, but a very specific syntax, so is its semantics. All words and phrases have their ordinary meaning, but the construction imposes strong restrictions on what may occur in it.

(21) The Syntax and semantics of the EoC construction:

$$\left[\begin{array}{l} \text{unembedded-phrase} \\ \\ \text{HDTR(DTRS | HDTR)*} \\ \\ \text{LRS} \\ \text{COLL} \end{array} \left[\begin{array}{l} \text{word} \\ \text{LEXEME } \textit{sein-lex} \\ \text{COMPS} \left\langle \text{NP} \left[\begin{array}{l} \text{LEXEME } \textit{Kaiser-v-China-lex} \\ \text{PRED } + \\ \text{SUBJ } \left\langle \text{NP[1SG]} \right\rangle \\ \text{SPR } \left\langle \text{DP[DEF +]} \right\rangle \end{array} \right] \right\rangle \\ \text{EXCONT } (\phi \wedge \psi[\text{EoC}(\text{speaker})]) \\ \text{or } (\phi \rightarrow \psi[\text{EoC}(\text{speaker})]) \\ \text{irregular} \end{array} \right] \right]$$

In particular, we only speak of an EoC construction if its overall semantics, i.e. its EXCONT value, is that of either an implication ($(\phi \rightarrow \psi)$, for the *dann*-EoC), or of a conjunction ($(\phi \wedge \psi)$ for the *und*-EoC). In either case, the subexpression ψ must, itself, have a subexpression that encodes the meaning ‘I am the Emperor of China’. For simplicity, I write **EoC(speaker)** for this semantic expression. In LRS, a constraint of the form $\alpha[\beta]$ means that the expression β must be a subexpression of α .⁵ I use this notation in the specification of the construction, writing $\psi[\text{EoC}(\text{speaker})]$ inside the EXCONT value.

5 The pragmatics of the EoC construction

Since the semantics of the EoC construction does not encode a negation of the antecedent, the question is where does this effect come from and how does it arise. When we look at the indicated overall semantic representations (i.e. the EXCONT value) in Fig. 21, ϕ is the antecedent proposition and ψ the proposition containing the EoC continuation. In this section, I will argue that the apparent negation effect is the result of an interaction of conventional implicatures (or use-conditional meaning more general) and a generalized conversational implicature.

⁵See Sailer & Richter (2021) for a more detailed presentation of the notation.

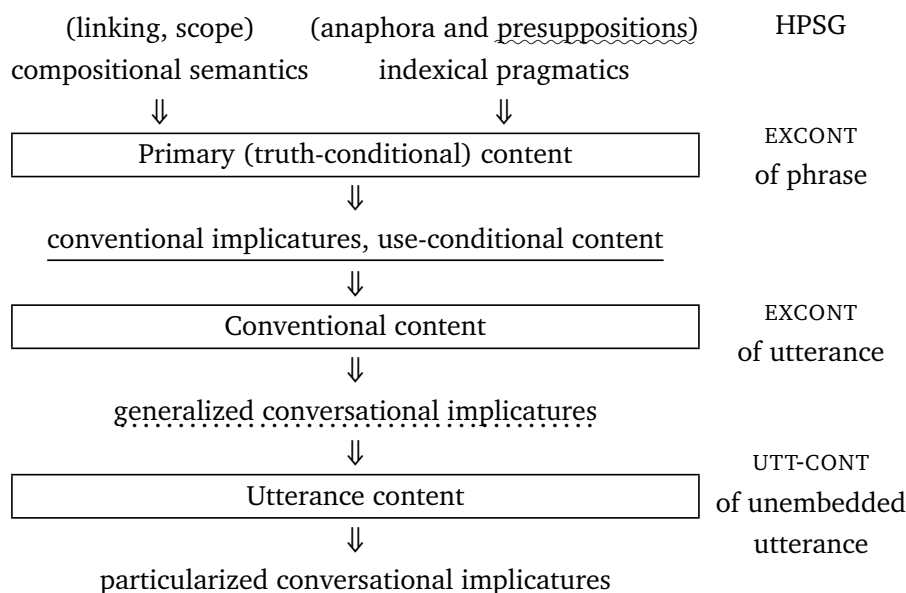


Figure 1: The semantics-pragmatics interface in HPSG (Sailer 2024)

Since the only idiosyncrasy that we find in the construction seems to be pragmatic, we can specify the COLL value further. In Sailer (2010) I have extended the sort hierarchy for types of idiosyncrasy to also include pragmatic idiosyncrasy – which had been established already in Fillmore et al. (1988) but not included into the system in Richter & Sailer (2009). The appropriate sort is *only-prag(matically)-irr(egular)*. As a consequence of this specification, all rules and constraints of syntactic and semantic combinatorics apply as usual.

I will rely on the integration of various inference types into HPSG as used in Sailer (2024) and given here in Fig. 1. On the left, we see the model of the semantics-pragmatics interface as developed in Levinson (2000) and expanded with convention implicatures in Sailer (2021). The boxes in the model indicate levels of representation: Primary content, Conventional content, and Utterance content. Semantic and pragmatic resolution and inference processes are given in the figure as well and are applied to map from one level of representation to the next. On the right we see where these levels will appear in the HPSG feature geometry.⁶

As indicated in the figure, presuppositions are part of the primary truth-conditional content (though typically not at issue). Together with conventional implicatures/use conditional content, this forms the *conventional content*.

⁶In the less LRS-specific presentation in Sailer (2024) I wrote CONT instead of EXCONT, but, clearly EXCONT had been intended.

prevent that the Common Ground be updated with the antecedent proposition. This parallelism is illustrated in (23), where the same antecedent proposition (expressed in *A*'s utterance) can be rejected either by a VERUM (preventing downdate to $\neg\neg p$, i.e. to p) in (23a), or by a EoC construction in (23b). The difference between the two constructions lies in the fact that the VERUM construction compositionally states the negation of the contextual claim, whereas the EoC construction does not alter the polarity of the antecedent at the surface.

- (23) A: Alex might have won a price.
- a. B: Alex HAT keinen Preis gewonnen.^c
 Alex has+VERUM no price won
 ‘Alex DIDN’t win a price.’
 - b. Alex hat einen Preis gewonnen – und ich bin der Kaiser von
 Alex has a price won and I am the Emperor of
 China.^c
 China
 ‘Alex has won a price – and I’m the Emperor of China.’

To support the idea that the EoC construction rejects a contextually salient claim, (24) shows that it is infelicitous when it is explicitly said that such a claim has not been made.

- (24) Wenn Alex einen Preis gewinnt, bin ich der Kaiser von China
 – #aber es hat ja auch niemand behauptet, dass Alex was gewinnt.^c
 ‘If Alex wins a price, I am the Emperor of China.
 – #But noobody has actually claimed that Alex would win anything.’

In my analysis, I assume an LRS-compatible HPSG treatment of use-conditional meaning as proposed in Sailer & Am-David (2016) and Rizea & Sailer (2020). Since use-conditional meaning is conventional, it is not predictable on general grounds, but an idiosyncratic property of a sign – a morpheme, a word, or a phrasal construction. The relevant meaning components are, therefore, introduced as members of a list C(ONVENTIONAL)I(MPLICATURE).

Use-conditional meaning is also projective. This means that the members of the CI list percolate up along the syntactic projection and can only be retrieved in the immediate scope of a speech act operator. This last property guarantees that use-conditional meaning is integrated into the Conventional content of an utterance at the utterance level.

I adopt this approach to the EoC construction. In my final analysis in (25), I add the above-mentioned use-condition to the CI list of the construction. With the overall construction being an unembedded sign and the use-conditional constraint being added only at that level, it will be integrated into the Conventional content of the utterance. Consequently, the two varieties of the EoC construction share their use-conditions.

(25) The syntax, semantics, and pragmatics of the EoC construction:

$$\left[\begin{array}{l} \text{unembedded-phrase} \\ \text{HDTR(DTRS | HDTR)*} \\ \text{LRS} \\ \text{COLL} \end{array} \left[\begin{array}{l} \text{word} \\ \text{LEXEME } \textit{sein-lex} \\ \text{COMPS } \left\langle \text{NP} \left[\begin{array}{l} \text{LEXEME } \textit{Kaiser-v-China-lex} \\ \text{PRED } + \\ \text{SUBJ } \left\langle \text{NP[1SG]} \right\rangle \\ \text{SPR } \left\langle \text{DP[DEF +]} \right\rangle \end{array} \right] \right\rangle \\ \text{EXCONT } (\phi \wedge \psi[\text{EoC}(\text{speaker})]) \\ \text{or } (\phi \rightarrow \psi[\text{EoC}(\text{speaker})]) \\ \text{CI } \left\langle \begin{array}{l} \text{prevent-downdate}(\wedge \phi), \\ \neg \text{EoC}(\text{speaker}) \end{array} \right\rangle \end{array} \right] \right]$$

only-prag-irr

Let me address the second use-conditional meaning. The construction is only felicitous if the speaker is actually not the Emperor of China. Consequently, I assume a second member in the CI list: $\neg \text{EoC}(\text{speaker})$. This clearly must be a conventional, i.e. arbitrary meaning contribution, as we cannot enforce in general that, conversationally, the opposite holds of what the speaker says. This felicity condition cannot be canceled either. It can be evaluated independently of the Primary content, but it interacts with the Primary content in an interesting way.

I will now show how this, second, use-conditional content suffices to derive the negation-effect of the *dann*-EoC. With a global retrieval of use-conditional meaning, a sentence of the *dann*-EoC variant has a semantic representation of the form $(\phi \rightarrow \text{EoC}(\text{speaker})) \mid \neg \text{EoC}(\text{speaker})$, where the symbol “|” separates the truth-conditional and the use-conditional meaning. This formula can only be used felicitously and express a true statement, if the antecedent, ϕ , is false. This shows that, even though, the semantic representation does not contain a negation of the antecedent, the sentence can only be true if the antecedent is false.

Matters are a bit more challenging for the *und*-EoC variant. The Conventional content has a semantic representation of the form in (26).

$$(26) (\phi \wedge \text{EoC}(\text{speaker})) \mid \neg \text{EoC}(\text{speaker}).$$

The formula is either false, or cannot be used felicitously. In what follows, I will argue that we can appeal to a *generalized conversational implicature* (GCI) to achieve the same effect for the *und*-EoC that we derived for the *dann*-EoC just by virtue of the use-conditional meaning.

Coordination structures can trigger various types of pragmatic enrichment which are usually treated as a GCI. Most prominent are GCIs of temporal order or causal connection. Horn (2004) provides a convincing argument in favor of deriving such enriched readings of coordination by GCIs. He illustrates this with the temporal reading of *and* (*They got a baby and married.* vs. *They married and got a baby.*). The same argument applies to the causal or inferential uses of *and* – as in *The earth rotates and we experience day and night.*), which is interpreted with an implicit “*and, therefore.*”

GCIs are very different from use-conditional meaning. They do have an influence on the truth-conditional content of an utterance. However, they do not project, but rather have the surprising property of having an effect on embedded elements in a semantic representation if this leads to a stronger reading.

To model this, it is proposed in Sailer (2021) that a CGI are optional rewriting rules mapping the Conventional content to the Utterance content. These rule apply late, but can access any parts within a semantic representation. They have the form $\alpha \mapsto_{GCI} \beta$, which means that an occurrence of the subformula α should be replace with the expression β . For the inferences that Horn (2004) describes, I assume the following GCI: $(\phi \wedge \psi) \mapsto_{GCI} (\phi \rightarrow (\phi \wedge \psi))$.⁷

To guarantee the independence of the truth-conditional and the use-conditional layers, a GCI needs to apply at a single layer. For our case, the mentioned GCI only applies to the truth conditions. This leads to the following derivation for our running example.

- (27) Alex gewinnt einen Preis – und ich bin der Kaiser von China.^c
 Alex wins a price and I am the Emperor of China
 Primary content: $(\text{win}(\text{alex}) \wedge \text{EoC}(\text{speaker}))$
 Conventional content: $(\text{win}(\text{alex}) \wedge \text{EoC}(\text{speaker}) \mid \neg \text{EoC}(\text{speaker}))$
 GCI: $(\phi \wedge \psi) \mapsto_{GCI} \phi \rightarrow (\phi \wedge \psi)$
 $\text{win}(\text{alex}) \rightarrow (\text{win}(\text{alex}) \wedge \text{EoC}(\text{speaker}) \mid \neg \text{EoC}(\text{speaker}))$

With this GCI, the original semantics of the *und*-EoC, $(\phi \wedge \psi) \wedge \neg \psi$, can be rewritten as $(\phi \rightarrow (\phi \wedge \psi))$. This formula is logically equivalent to the semantic representation of the *dann*-EoC variant, $(\phi \rightarrow \psi)$. Under the felicity condition that the speaker is not the Emperor of China, this formula can only be true, if the antecedent is false.

⁷I need to modify the formalization of GCIs from Sailer (2021) slightly. There, GCIs are rewriting rules at the mapping between the conventional content and the utterance content. They take the form $\alpha \mapsto_{GCI} \beta$ and are interpreted as follows: When the formula α occurs in the conventional content, it can (optionally) be replaced with the formula $(\alpha \wedge \beta)$ in the utterance content. This way, GCIs always enrich the semantic representations and do not remove material. However, Sailer’s formulation is too restrictive. I will, therefore, adopt the following, weaker definition of GCIs: For any formulae α and β , such that α is a subformula of β : $\alpha \mapsto_{GCI} \beta$ is interpreted as follows: When the formula α occurs in the conventional content, it can be replaced with β in the utterance content. To reflect the intuition of a “monotonic enrichment”, α must be a subexpression of β . This new definition maintains the idea of enrichment but is more flexible.

It should be noted that GCI are *conversational*, not *conventional*. This means that they do not have to be considered as idiosyncratic contributions of a sign. Instead, they are general, optional, mappings that apply to the Conventional content when it is mapped to the Utterance content. Consequently, there is no feature GCI in the specification of the construction in (25).

Taken together the two non-at-issue semantic contributions of the EoC construction guarantee: (i) that the speaker signals that the antecedent should not be integrated into the common ground, and (ii) that the speaker signals independently that the sentence is only true if the antecedent is false. This takes care of the semantics and pragmatics of the construction.

Let us briefly come back to NPI licensing. NPIs such as *je(mals)* ‘ever’ can occur in the antecedent of a conditional. This explains why it can occur in (18a). But why would the NPI not be felicitous in the final representation in (18b)? The contrast between the licensing of *ever* and *lift a finger* has been discussed in Sailer (2021, 2022). An NPI like *je(mals)* ‘ever’ must be licensed in the Primary content. Consequently, this NPI cannot be licensed through an *und*-EoC. An NPI such as *einen Finger krumm machen* ‘lift a finger’ can be licensed in the Utterance content. However, NPIs of that type require a stronger licenser than the antecedent of a conditional, they must be in the scope of a negation. This excludes them even from the enriched semantic representation.

6 Conclusion

I have discussed empirical properties of the EoC construction in German. These established that this is a specialized, idiosyncratic construction, which, nonetheless, has a regular syntactic structure, and is interpreted in a standard way with its literal meaning. I proposed a fairly underspecified phrasal lexical entry to capture the syntactic regularity and flexibility. As its construction-specific meaning, I propose that it introduces the use-conditions that the speaker is not the Emperor of China and that the antecedent of the construction should not be integrated into the common ground. These assumptions are sufficient to get the correct reading for the conditional variant of the construction. For the coordination variant, we arrive at a meaning that is identical to that of the conditional variant via a generalized conversational implicature.

HPSG makes it possible to formulate the complex syntactic, semantic, and pragmatic properties of the EoC construction: A *constructional framework* is required to express the idiosyncrasy. However, it must also allow for the appropriate degree of underspecification to capture that (i) the construction is overall built according to the general rules of the language, and (ii) it comes in two syntactically different variants. A concrete proposal of the *semantics-pragmatics interface* is necessary to allocate the different meaning components of the construction and to indicate which aspects are idiosyncratic and, thus, need to be expressed in the lexical description of the construction, and which ones follow

from general semantic combinatorics or from general mechanisms of meaning enrichment.

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Inner and outer aspect in Cantonese

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 180–195



Keywords: aspect, Cantonese, Chinese, HPSG, specifier, computational grammar

Sio, Joanna Ut-Seong & Francis Bond. 2025. Inner and outer aspect in Cantonese. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar*, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal, 180–195. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.9.

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Abstract

Aspect is a core part of Chinese verbal expressions. This analysis covers the main types of aspect for Cantonese (inner/situation and outer/viewpoint), modeling their semantics and constraining their combinations. Outer aspectual particles are treated as verbal markers that combine with their head using the head marker rule and constrain its aspect. They must combine with a verb that is a lexeme, not a phrase. Inner aspectual particles also combine with lexemes, but differ from outer aspectual particles in that they introduce a one-place predicate. This behavior is similar to resultative verbs. We therefore treat inner aspectual particles as defective resultative verbs with three special properties: (i) one subclass (event) takes the predicate of the first verb as an argument, the other subclass (individual) takes the ARG1 or ARG2 of the head verb. (ii) Both types constrain the (viewpoint) aspect of the head verb to be perfective or experiential. This also ensures that once the inner aspect is added, it is only compatible with a subset of outer aspectual particles (e.g., not progressive, continuous or delimitative). (iii) The inner aspectual particles cannot be main verbs. The analysis is implemented in an open-source Cantonese HPSG, available at <https://github.com/neosome/yue>.

1 Introduction

Chinese languages have a rich aspectual system, including post-verbal aspectual particles and a variety of other indicators. There is a large literature on Mandarin Chinese, but less on other varieties such as Cantonese (see Matthews & Yip 2013 and Yip 2025 for a recent discussion). In this paper, we first give a selective summary of the literature, then we sketch an analysis for Cantonese. Our goal is to have an analysis suitable for implementation in a broad computational grammar. We are using the DELPH-IN framework (Uszkoreit 2002) for the grammars, with Minimal Recursion Semantics for the meaning representation (Copestake et al. 2005).

The notion of aspect can be divided into two kinds: viewpoint aspect and situation aspect. Viewpoint aspect is concerned with the temporal perspective of the event. It encodes how much of a situation is made visible grammatically (Smith 1991): perfective and imperfective viewpoints. Situation aspect (lexical aspect or aktionsart) is concerned with the internal structure of the situation. There are five situation types: state, accomplishment, achievement, activity, and semelfactive, which can be expressed in terms of binary feature composition (+/-telic, +/-durative, +/-static) (Smith 1991), as shown in Table 1.

It has been claimed that there are no mono-morphemic verbs in Mandarin that express accomplishments or achievements: mono-morphemic verbs in Mandarin express either states or activities, accomplishments and achievements are derived syn-

[†]We would like to thank Dan Flickinger for his help in developing this analysis and debugging the implementation; the HPSG reviewers for their useful comments; the participants of DELPH-IN 2025 and HPSG 2025 for their illuminating discussion and finally Stefan Müller for his help with the final proof.

Table 1: Situation types

state	‘know’	–telic,	+durative,	+static
activity	‘run’	–telic	+durative,	–static
accomplishment	‘build a house’	+telic,	+durative,	–static
achievement	‘die’	+telic,	–durative,	–static
semelfactive	‘cough’	–telic,	–durative,	–static

tactically (Sybesma 1997, Lin 2004).¹ For example, 看 *kàn* ‘look’ in Mandarin Chinese is an activity verb (–telic, +durative, –static), while 看到 *kàndào* ‘see’ (lit. ‘look.arrive’) is an achievement verb (+telic, –durative, –static). The post-verbal particle 到 *dào* adds an end point to the activity of looking (changing the event from –telic to +telic) and also makes the internal structure of the event inaccessible (changing the event from +durative to –durative). 看到 *kàndào* ‘see’ is incompatible with the pre-verbal progressive marker 在 *zài*. In Cantonese 擦乾 *caat3 gon1* ‘wipe dry’ is an accomplishment verb (+telic, +durative, –static). 擦 *caat3* ‘wipe’ is an activity (–telic +durative, –static) and the resultative adjective 乾 *gon1* ‘dry’ turns the event into an accomplishment (+telic, +durative, –static). 擦乾 *caat3 gon1* ‘wipe dry’ in Cantonese, unlike 看到 *kàndào* ‘see’ in Mandarin, is compatible with the progressive aspect (encoded by the post-verbal aspectual particle 緊 *gan2* in Cantonese) (Lu et al. 2019). The main verb, together with the element that is added (e.g., a verbal particle or a resultative verb/adjective), jointly determine the aspectual class of the verbal complex.²

In Chinese, there are different kinds of post-verbal particles that are related to aspectual properties. Some particles can shift the situation aspect (as shown in the previous paragraph). Structurally they are often referred to as inner aspectual particles (Sybesma 2017), as they occupy the inner most aspectual layer (closer to the root verb). There are, at least, two kinds of inner aspectual particles (relating to situation aspect): resultative particles and phase complements (Sybesma 2017). Resultative particles have lexical meaning, can be used as predicates on their own, and also provide an endpoint to the action encoded by the verb (e.g., the Mandarin 飽 *bǎo* ‘satiated’ as in 吃飽 *chībǎo* ‘eat.satiated’). Such endpoints (e.g., ‘satiated’) also encode a thematic relation either to the subject or the object (e.g., the subject is satiated in an event of ‘eat-satiated’). Phase complements (Chao 1965) are particles that are semantically bleached (e.g., 到 *dào* ‘arrive’ in 看到 *kàndào* ‘see’, lit. ‘look.arrive’), they provide an endpoint to the event (making the event + telic). For both types of inner aspectual particles, in addition to adding an end-point, they also make the internal structure of the event inaccessible (creating an achievement predicate). Resultative

¹This is not without exceptions: there are also verbs like 死 *sǐ* ‘die’, which arguably are +telic, –durative, –static.

²Mandarin data are transcribed using *Pinyin* (where tonal information is expressed with diacritics); Cantonese data are transcribed using *Jyutping* (where tonal information is expressed with numbers) following standard practice for the two languages.

particles and phase complements do not co-occur. Viewpoint aspectual particles signal whether the event has reached its endpoint or not (e.g., the perfective particle 了 *le* in Mandarin). Viewpoint aspectual particles appear to the right-hand side of inner aspectual particles. We refer to them as outer aspectual particles, so the order is always: verb - inner aspectual particle - outer aspectual particle.

Matthews & Yip (2013) identify eight viewpoint aspectual particles (outer aspectual particles). They are: 咗 *zo2* ‘perfective’, 過 *gwo3* ‘experiential’, 緊 *gan2* ‘progressive’, 住 *zyu6* ‘continuous’, 吓 *haa5* ‘delimitative’, 起上嚟 *hei2soeng5lei4* ‘inchoative’, 落去 *lok6heio3* ‘continuative’ and 開 *hoi1* (or 慣 *gwaan3*) ‘habitual’.³ In addition, Matthews & Yip (2013) identify 10 directional particles, 15 resultative particles, 3 quantifying particles and 1 adversative/habitual particle which we do not analyze in this paper. Matthews & Yip (2013) didn’t have a separate particle class that encodes situation aspect (inner aspectual particles). Yip (2025), on the other hand, identifies 14 inner aspectual particles in Cantonese based on the following criteria: (i) A morpheme following the verbal root; (ii) Contributes to aspectual meaning (situation aspect); (iii) Can be followed by the perfective suffix 咗 *-zo2* (which marks perfective viewpoint aspect); (iv) Cannot undergo verb doubling alone. Criterion (i) states that inner aspectual particles are post-verbal. Criterion (ii) states that such particles contribute to the formation of different situation types. Criterion (iii) is based on the observation that inner aspectual particles occupy a slot closer to the verb than outer aspectual particles. 咗 *-zo2* is compatible with verbs with an inner aspectual particle added. Criterion (iv) requires some explanation. Verbs in Cantonese may be doubled for contrastive topicality (Lee 2024). Consider (1) where the word 做 *zou6* ‘do’ is doubled:

- (1) Cantonese (yue)
- | | | | | | | |
|-------------|---|--------------|-------------|-------------|-------------|------------|
| 做 | ， | 佢 | 係 | 識 | 做 | 嘅 |
| <i>zou6</i> | | <i>keoi5</i> | <i>hai6</i> | <i>sik1</i> | <i>zou6</i> | <i>ge2</i> |
| do | | 3sg | be | know | do | SFP |
- ‘As for doing, s/he knows how to do [it].’

Yip (2025) observes that postverbal elements behave differently as to whether they can double alone without the verbal roots. Outer aspectual particles (e.g., 咗 *zo2*) cannot be doubled without the verbal root. For post-verbal elements that encode an endpoint, they diverge. For example, 飽 *baau2* ‘satiated’ in 食飽 *sik6baau2* ‘eat.satiated’ can be doubled alone while 完 *jyun4* ‘finish’ in 食完 *sik6jyun4* ‘eat.finish’ cannot.

In view of this contrast, Yip (2025) treats 飽 *baau2* ‘satiated’ in Cantonese as a resultative verbal complement (RVC), while 完 *jyun4* ‘finish’ in 食完 *sik6jyun4* ‘eat.finish’ as an inner aspectual particle.

³There is no Mandarin counterpart of the Cantonese progressive post-verbal particle 緊 *gan2*. In Mandarin, the pre-verbal element 在 *zài* (literally means ‘be at’) expresses progressive. In Cantonese, there is also a pre-verbal progressive marker 喺度 *hai2dou6* (literally means ‘be here’) The progressive aspectual particle 緊 *gan2* and marker 喺度 *hai2dou6* can be used concurrently.

(2) Cantonese (yue)

- a. 飽 , 佢 係 已經 食飽 咗 嘅
baau2 keoi5 hai6 ji5ging1 sik6baau2 zo2 ge2
 satiated 3SG be already eat.satiated PERF SFP
 ‘As for becoming full, s/he has already eaten and become full.’
- b. * 完 , 佢 係 已經 食完 嗰 碗 飯 嘅
jyun4 keoi5 hai6 ji5ging1 sik6jyun4 go2 wun2 faan6 ge2
 finished 3SG be already eat.finish that CL rice SFP
 Intended: ‘As for eating, s/he has finished eating that bowl of rice.’

We concur that there is a distinction in judgment between (2a) and (2b), but in both cases, such elements (飽 *baau2* ‘satiated’ and 完 *jyun4* ‘finish’) provide an endpoint to the event and the whole event becomes an achievement. They alter the situation aspect in the same way. In both cases, the progressive aspectual particle cannot be added, as opposed to other resultative state, such as 乾 *gon1* ‘dry’ in (3c):

(3) Cantonese (yue)

- a. * 佢 食飽 緊
keoi5 sik6baau2 gan2
 3SG eat.satiated PROG
 Intended: ‘S/he is in the process of eating to become satiated.’
- b. * 佢 食完 緊 嗰 碗 飯
keoi5 sik6jyun4 gan2 go2 wun2 faan6
 3SG eat.finish PROG CL bowl rice
 Intended: ‘S/he is in the process of eating that bowl of rice to completion.’
- c. 佢 抹 乾 緊 啲 蘋果
keoi5 maat3 gon1 gan2 di1 ping4gwo2
 3SG wipe dry PROG CL apple
 ‘S/he is wiping the apple(s) dry.’

In view of the above, we treat 飽 *baau2* ‘satiated’ and 完 *jyun4* ‘finish’ both as inner aspectual particles. We adopt the following slightly revised definition for inner aspectual particles: (i) A monosyllabic morpheme following the verbal root; (ii) Contributes to situation aspectual meaning; (iii) Can be followed by the aspectual particle 咗 *zo2*; (iv) Changes the event into an achievement. Note that this means, with our definition, we exclude cases like 乾 *gon1* ‘dry’ in 抹乾 *maat3 gon1* ‘wipe dry’ in Cantonese as an inner aspectual particle, because the resulted event is an accomplishment (compatible with the progressive aspect). They are resultative predicates but not inner aspectual particles, and will have different syntactic properties. This however

suggests that a line has to be drawn between what is considered an inner aspectual particle and what is considered simply a resultative predicate. We consider an element as an inner aspectual particle if it fulfills our 4 criteria.

In the Mandarin Grammar Zhong (Fan 2019), inner aspectual particles are treated as part of the verb, following the Penn Treebank segmentation, but it is not an ideal treatment due to their productivity. Most HPSG discussions of aspect and implemented grammars deal only with outer aspect (Müller & Lipenkova 2013, Fan 2019, Morgado Da Costa 2021). In this paper, we propose an HPSG implementation of both inner and outer aspectual particles for Cantonese. The analysis is implemented in an open-source Cantonese HPSG (Sio & Song 2015).⁴

2 Data

Cantonese has a rich inventory of aspectual particles. Outer aspectual particles include: 咗 *zo2* (perfective), 緊 *gan2* (progressive), 過 *gwo3* (experiential), 住 *zyu6* (continuous activity or state without change), 吓 *haa5* (delimitative) (Matthews & Yip 2013). Inner aspectual particles, as mentioned earlier on, are of two kinds: resultative particles and phase complements (Sybesma 2017). The general understanding is that resultative particles carry lexical meanings, predicative of the subject or the object and denote the end-point of events. In contrast, phase complements are particles that are generally semantically bleached and do not contain any predicative meaning. However, a closer look at a range of Cantonese inner aspectual post-verbal particles show that the clear dichotomy is not without problems. For instance, the post-verbal particle 親 *can1*, when added to an activity verbs like 撞 *zong6* ‘bump into’, denotes an unspecified degree of bodily harm to either the subject or the object (depending on factors such as animacy of the arguments) (Sio 2020). However, it cannot be used as an independent predicate. It can only be used in the post-verbal position as a particle. In contrast, the post-verbal particle 完 *jyun4* ‘finish’ has a clear lexical meaning, and yet it is not predicative of either the subject or the object when added to an activity verb like 油 *jau4* ‘paint’, it simply adds an end-point to the event of painting. This suggests that the dichotomy, as defined above, might not represent the correct division. It should also be noted that many inner aspectual particles of the resultative type are derived from main verbs, but they are not main verbs in the aspectual usage we are discussing here. They have the same forms as main verbs (and sometimes are very close in meaning), but they are a different class of syntactic entities.

In this paper, we look at three kinds of Cantonese post-verbal aspectual particles: outer aspectual particles (OAP) and inner aspectual particles (IAP) that provide an end-point to the event while rendering the internal structure of the event inaccessible. There are two kinds of IAPs: those that are predicative of an individual (IAPi) and those that are only linked to an event (IAPe). We give a full list in Table 2.

⁴The implementation, using the DELPH-IN tools, is available at <https://github.com/neosome/yue>.

We have incorporated the most common post-verbal aspectual particles into the Cantonese HPSG grammar for this paper, which would be sufficient to be illustrative of OAP, IAPi and IAPe:

- OAP: 咗 *zo2* (perfective), 緊 *gan2* (progressive), 過 *gwo3* (experiential), 住 *zyu6* (continuous activity or state without change), 吓 *haa5* (delimitative: ‘do ... for a while’)
- IAPi: 飽 *baau2* ‘satiated’, 死 *sei2* ‘die’, 親 *can1* ‘hurt to a non-specific degree’
- IAPe: 完 *jyun4* ‘finish’, 好 *hou2* ‘good’, 到 *dou2* ‘complete’ (lit. ‘arrive’), 掂 *dim6* ‘fixed’

The ordering of post-verbal particles in the verbal cluster is always V-IAP-OAP and IAPi and IAPe do not co-occur.

(4) Cantonese (yue)

- a. 我 食 咗/緊 麵
ngo5 sik6 zo2/gan2 min6
 1SG eat PERF/PROG noodles
 ‘I have eaten noodles/ ‘I am eating noodles.’ V-OAP
- b. 我 食飽 (咗) 麵
ngo5 sik6baau2 zo2 min6
 1SG eat.satiated PERF noodles
 ‘I have eaten noodles to the point that I am full.’ V-IAPi-OAP
- c. 我 食完 (咗) 麵
ngo5 sik6jyun4 zo2 min6
 1SG eat.finish PERF noodles
 ‘I have finished eating noodles.’ V-IAPe-OAP

There are selectional criteria between the event (situation type) and the OAP. Regarding our selected set of inner aspectual particles, when they are added to the root verb, the event becomes an achievement, and is consequently incompatible with any imperfective viewpoint aspect (e.g., progressive, experiential, etc.). The OAP 吓 *haa5* (delimitative) is only compatible with activities, and thus is not compatible with events that contain any IAP (which always provide an end-point, making the event +telic). Such idiosyncrasies among the different requirements of individual particles will also be taken into account.

3 Analysis

Here we give the main points of our analysis. The descriptions given are only partial, we omit information not relevant to the discussion at hand. We are trying, as far as

Table 2: Co-occurrence of inner and outer aspectual particles

Particle	Meaning	type	zo2	gwo3	gan2	zyu6	haa5
飽 <i>baau2</i>	full	x	+	+	-	-	-
死 <i>sei2</i>	die	x	+	+	-	-	-
親 <i>can1</i>	hurt	x	+	+	-	-	-
完 <i>jyun4</i>	finish	e	+	+	-	-	-
好 <i>hou2</i>	good	e	+	+	-	-	-
到 <i>dou2</i>	complete	e	+	+	-	-	-
掂 <i>dim6</i>	fixed	e	+	+	-	-	-

possible, to keep our analyses similar to those implemented for Mandarin in Zhong (Fan 2019) so we can compare them easily.

3.1 Outer Aspect

In this paper, we will model 5 outer aspectual particles (OAPs). We list the them in Table 3 and their compatibility with inner aspectual particles (IAPs) in Table 2. Because the outer aspectual particles only change the aspect of the verb they attach to, we chose to model them as markers. The head is the verb and the marker is the aspectual particle.

Table 3: Outer Aspect

Particle	Aspect	Comment
<i>zo2</i> 咗	perfective	
<i>gwo3</i> 過	experiential	
<i>gan2</i> 緊	progressive	- stative (dynamic)
<i>zyu6</i> 住	continuous	activity or state without change
<i>haa5</i> 吓	delimitative	

The SPEC feature allows markers (and determiners) to select their heads (Pollard & Sag 1994: 45). The SPEC feature on the mother will be determined by the marker. We enable aspect-markers to constrain their complement to be SPEC non-empty (notionally compatible with combining with a marker), but stamp SPEC empty on the mother to block iteration of marker attachments. Then aspectual particles propagate the SPEC value of their complement.

We show the aspect marker lexical type in (6).⁵ This is broadly similar to the treatment for Mandarin Chinese implemented in the grammar Zhong (Fan et al. 2015), although the use of SPEC is new, they instead used a special feature *marked* to block iteration. We only instantiate a version of the rule where the marker comes on the left (after the verb).

⁵We also treat sentence final particles as markers: sentence and aspect markers share a common supertype (*verbal-marker*).

(5) Head marker construction

$$\left[\begin{array}{l} \textit{head-marker} \\ \text{CAT.VAL} \left[\begin{array}{l} \text{SUBJ} \boxed{0} \\ \text{SPR} \boxed{1} \\ \text{COMPS} \boxed{2} \\ \text{SPEC} \boxed{3} \end{array} \right] \\ \text{HD-DTR} \boxed{4} \left[\begin{array}{l} \text{CAT.VAL} \left[\begin{array}{l} \text{SUBJ} \boxed{0} \\ \text{SPR} \boxed{1} \\ \text{COMPS} \boxed{2} \end{array} \right] \\ \text{NH-DTR} \left[\begin{array}{l} \text{CAT.VAL} \left[\begin{array}{l} \text{SUBJ} \langle \rangle \\ \text{SPR} \langle \rangle \\ \text{COMPS} \langle \boxed{4} \rangle \\ \text{SPEC} \boxed{3} \end{array} \right] \end{array} \right] \end{array} \right] \end{array} \right]$$

The outer aspectual particles (aspect markers) are markers and require their complement's head to be a verb or adjective (+vj). The value of SPEC of the mother is set to the SPEC value of their complement. Further, the complement is of type *lex-synsem* and thus must be non-phrasal and can not be modified.

(6) Marker lexical type

$$\left[\begin{array}{l} \textit{aspect-marker-lex} \\ \text{CAT} \left[\text{HEAD} \textit{marker} \right] \\ \text{VAL} \left[\begin{array}{l} \text{COMPS} \left\langle \left[\begin{array}{l} \textit{lex-synsem} \\ \text{CAT.HEAD} \textit{+vj} \\ \text{MODIFIED} \textit{notmod} \\ \text{VAL.SPEC} \boxed{0} \end{array} \right] \right\rangle \\ \text{SPEC} \boxed{0} \end{array} \right] \end{array} \right]$$

Individual markers inherit from *aspect-marker-lex* and set the value of the aspect. We show the perfective marker in (7).

(7) Marker lexical type

$$\left[\begin{array}{l} \textit{pfv-marker-lex} \\ \text{VAL.COMPS} \left\langle \left[\text{HOOK.INDEX.E.ASPECT} \textit{perfective} \right] \right\rangle \end{array} \right]$$

The possible values we distinguish for aspect are shown in Figure 1. We do not decompose aspect here.

3.2 Inner Aspect

Inner aspectual particles differ from outer aspectual particles in two ways: they always introduce a one-place predicate and this predicate must link to an argument. We therefore treat inner aspectual particles as defective resultative verbs with three special properties:

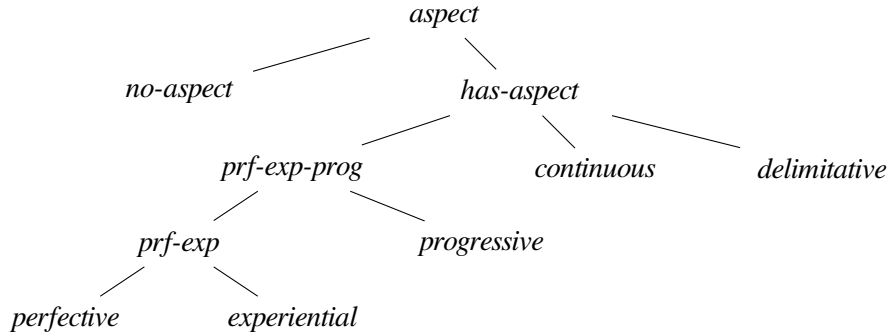


Figure 1: Aspect Type Hierarchy

1. We create a new kind of resultative verb whose predicate takes the predicate of the first verb as an argument (not the ARG1 or 2 of the head verb): this is for IAPe.
2. Both IAPe and IAPi change the aspect of the head verb to *prf-exp*. We do not model the lexical aspect directly, so cannot just change telic — to +, but this ensures that the outer aspect will be compatible (e.g. not progressive, continuous or delimitative).
3. We constrain these lexical entries so that they can not appear as main verbs.

Our initial analysis of resultative constructions is based on that for Mandarin in Zhong (Song et al. 2015) which in turn was based on Li (1990) and Lee (2013). This is a headed lexical rule, with the main verb (the head) on the left, and the result (verb or adjective) on the right. We show the type hierarchy in Figure 2 but omit some of the rarer types (inverse-oriented and no-share) for readability. We have extended it by adding event-oriented inner aspectual particles (such as 掂 *dim6*). Newly added items are shown in red, inheritance from the subject, object and event oriented types is shown with dotted lines.

We also constrain the aspect of the head daughter to be *prf-exp-prog*. We were unable to construct any grammatical examples of resultative constructions with durative or continuous aspect, and this constraint reflect this. An example is given in (8). The sentence is ungrammatical because the action of ‘wipe-dry’ (or any action that can lead to a result) is dynamic in nature, and thus is incompatible with the continuous aspect 住 *zyu6*:

- (8) Cantonese (yue)
 * 佢 抹 乾 住 啲 蘋果
keoi5 maat3 gon1 zyu6 di1 ping4gwo2
 3SG wipe dry CONT CL apple

Intended: ‘S/he is wiping the apples dry.

Another popular approach to resultatives is to use a lexical rule that changes the sub-categorization of the head verb (Müller 2002, Lu et al. 2023). We think the core ideas of the analysis are compatible with this approach, but did not find any phenomena that would distinguish the two analyses, we therefore will not further investigate it.

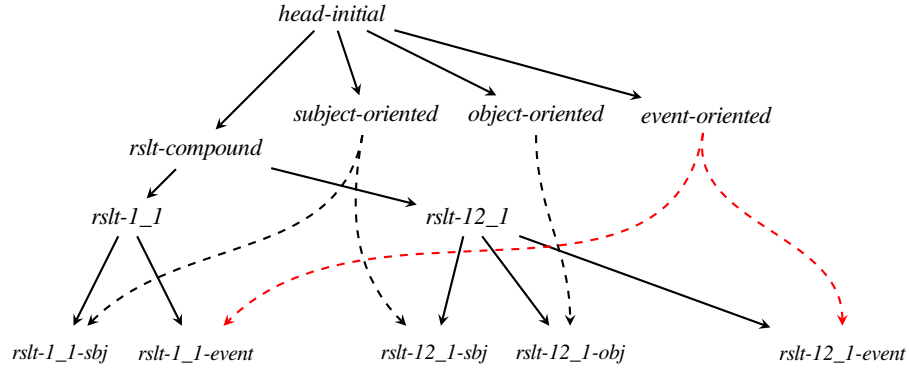


Figure 2: Extended Resultative Construction Types

The basic *rslt-compound* type is given in (9). It is a binary lexical rule, it takes two lexemes (marked as *lex-synsem*) and outputs something that is also *lex-synsem*. The *rslt* element is constructionally introduced as an individual constraint (ICON: Song 2017) to show the relatedness of the two events. We use the value of *SPEC* to block aspect on the daughters, but allow it on the mother.

- (9)
$$\left[\begin{array}{l} \text{rslt-compound} \\ \text{SYNSEM} \left[\begin{array}{l} \text{lex-synsem} \\ \text{VAL.SPEC } \langle \rangle \end{array} \right] \\ \text{HD.SYNSEM} \left[\begin{array}{l} \text{lex-synsem} \\ \text{CAT} \left[\begin{array}{l} \text{HEAD } \text{verb} \\ \text{VAL.SPEC } \langle [] \rangle \end{array} \right] \\ \text{LIGHT } + \\ \text{HOOK.INDEX } [1] \text{ [E.ASPECT } \text{prf-exp-prog}] \end{array} \right] \\ \text{NHD.SYNSEM} \left[\begin{array}{l} \text{lex-synsem} \\ \text{CAT} \left[\begin{array}{l} \text{HEAD } +vj \\ \text{VAL.SPEC } \langle [\text{HOOK.INDEX.E.ASPECT } [0]] \rangle \end{array} \right] \\ \text{LIGHT } + \\ \text{HOOK.INDEX } [3] \end{array} \right] \\ \text{C-CONT} \left[\begin{array}{l} \text{HOOK } [\text{INDEX.E.ASPECT } [0]] \\ \text{RELS } \left\langle \left[\begin{array}{l} \text{rslt} \\ \text{ARG1 } [1] \\ \text{ARG2 } [2] \end{array} \right] \right\rangle \\ \text{HCONS } \left\langle \left[\begin{array}{l} \text{HARG } [2] \\ \text{LARG } [3] \end{array} \right] \right\rangle \end{array} \right] \end{array} \right]$$

This type is then inherited by the individual result types. We have extended it with one new type *event-oriented* (10) in which the first argument of marker is the index of the verb. This models the semantics of the IAPe particles, which predicate over the main verb. That is, they introduce a predicate, which takes as its argument the predicate of the main verb.

$$(10) \left[\begin{array}{l} \textit{event-oriented} \\ \text{HD.HOOK.INDEX } \boxed{0} \\ \text{NHD.HOOK.XARG } \boxed{0} \end{array} \right]$$

For example, in (11), the predicate introduced by 完 *jyun4* ‘complete’ takes the predicate of 食 *sik6* ‘eat’ as its argument: the result is that the eating is complete. We show an example of parsing this in (14), below.

- (11) 我 食完 蘋果
ngo5 sik6jyun4 ping4gwo2
 1sg eat.finish apple

‘I ate apples until eating is finished./I ate apples until I was done.’

We also exploit SPEC to allow the resultative daughter to stamp aspect on the result relation (which is the semantic head). Crucially, inner aspectual particles will set the ASPECT of their SPEC to *prf-exp*. We are doing this because once an inner aspectual particle is added, an end-point is added and the internal structure of the event is no longer accessible. The resulting verbal complex is no longer compatible with continuous, delimitative or progressive aspect.

We show the lexical type for *inner-aspect-lex* below. It inherits from *lex-synsem*, so even though it is a verb with a saturated subject, it cannot head a sentence, which must be *phrase-synsem*.

$$(12) \left[\begin{array}{l} \textit{inner-aspect-lex} \\ \text{CAT} \left[\begin{array}{l} \text{HEAD } \textit{verb} \\ \text{VAL} \left[\begin{array}{l} \text{SUBJ } \langle \rangle \\ \text{SPEC } \langle [\text{HOOK.INDEX.E.ASPECT } \textit{prf-exp}] \rangle \end{array} \right] \end{array} \right] \end{array} \right]$$

This is further specified to two lexical types which differ as to whether the external argument is an event or a referential index.

We give an example of the sentence (13) being parsed by our grammar and the resulting semantics in Figure 3. We have shortened the lexical type names for readability. The aspect of the event of the main verb 食 *sik6* ‘eat’ (with label ②) is *perfective*, and its subject (ARG1 = ③) is coindexed with subject of the relation for the inner aspect particle 飽 *baau2* ‘be satiated’ (③ is the label of the first person pronoun 我 *ngo5*).

- (13) 我 食飽 㗎 蘋果
 ngo5 sik6baau2 zo2 ping4gwo2
 1SG eat.full PERF apple
 ‘I ate apples until I was satiated.’

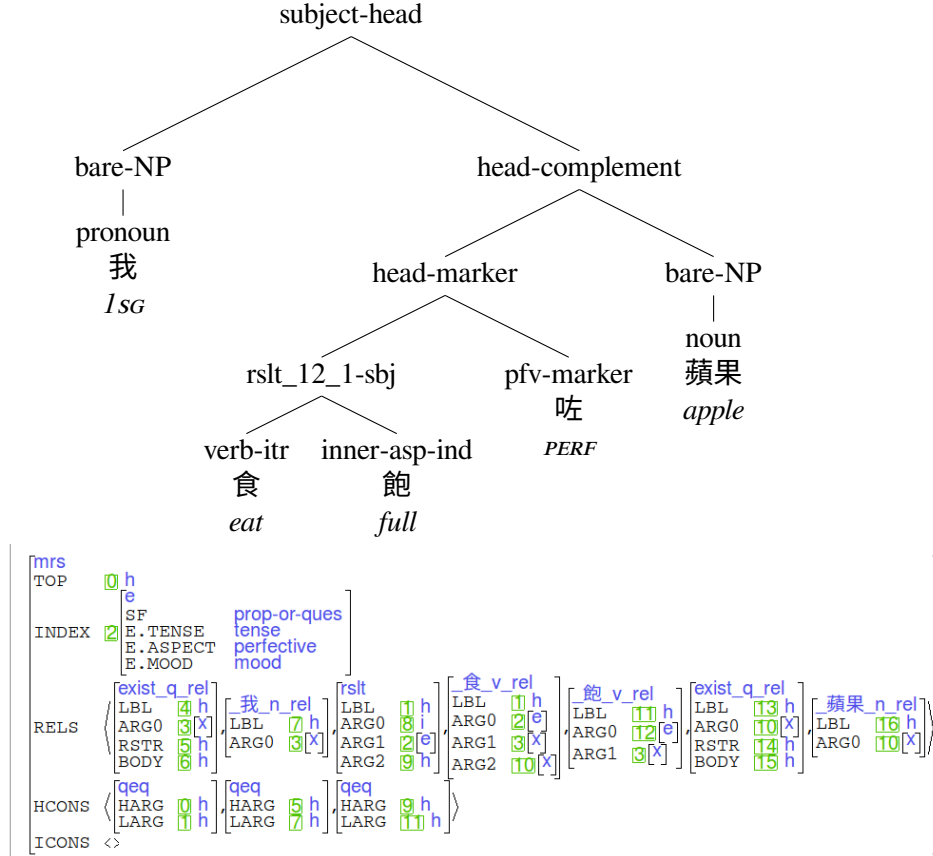


Figure 3: Derivation Tree and MRS for (13) showing both inner and outer particles

We also get a less likely reading where the apple is full, rather than the speaker being full (not shown).

Finally we show an example of parsing a sentence with an inner event particle (14) in Figure 4. The ARG1 of the aspect particle’s predicate (_完 _v_asp_rel) is the label of the predicate of 食 sik6 ‘eat’: [2], as desired.

- (14) 我 食完 蘋果
 ngo5 sik6jyun4 ping4gwo2
 1SG eat.finish apple

‘I ate apples until eating is finished.’

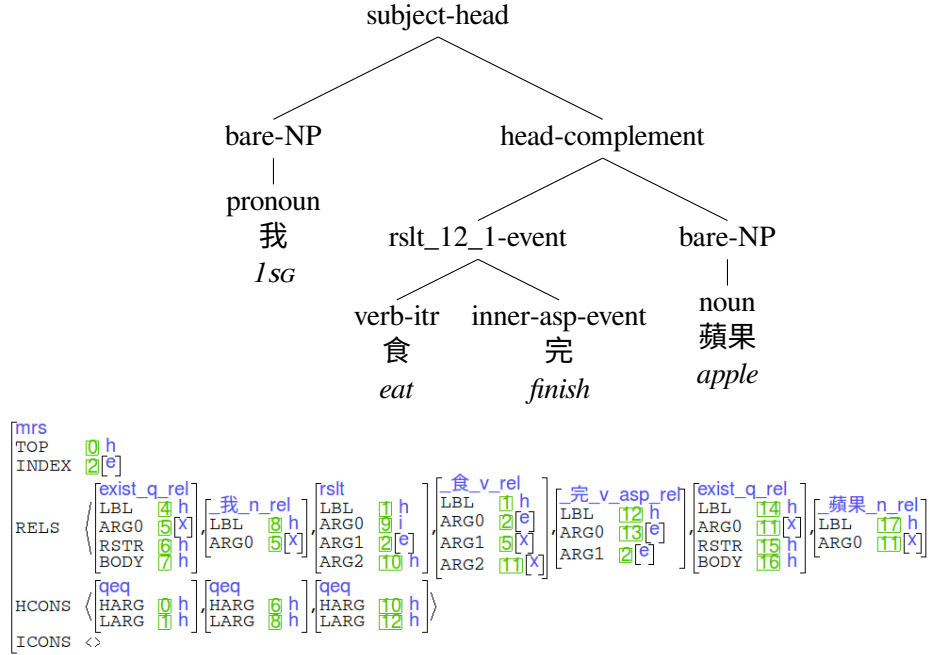


Figure 4: Derivation Tree and MRS for (14) showing an inner aspect event particle.

4 Conclusion and Future Work

This analysis covers some of the most common aspectual particles, modeling their semantics and constraining their combinations. The analysis is fully implemented in the computational grammar **yue**.

As for future work, we have only implemented a small set of common particles, while ignoring their interaction with different verbs. For instance, a verb like 知道 *zīldou3* ‘know’, being a state, is not compatible with the progressive aspectual marker 緊 *gan2* or the delimitative aspectual marker 吓 *haa5*:

- (15) Cantonese (yue)
 * 我 知道 緊/吓 段 新聞
ngo5 zīldou3 gan2/haa5 dyun6 san1man2
 1SG know PROG/DELIMIT CL news

Intended: ‘I am knowing/do a little knowing of the news’

We will deal with this by adding aspect to verbs’ lexical entries. We would also like to investigate other phenomena that interact with aspect, such as negation, verb doubling and modification.

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Part II

Contributions to the Workshop

Clause-edge markers in Bartangi: An LrFG analysis

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 197–220



Keywords: LFG, LrFG, Distributed Morphology, subordination, particles, Iranian languages, Pamir languages, Bartangi

Belyaev, Oleg. 2025. Clause-edge markers in Bartangi: An LrFG analysis. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar*, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal, 197–220. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.10.



4.0

Abstract

In this paper, I provide an analysis of the major clause-peripheral functional elements (particles and conjunctions) in Bartangi (Iranian > Indo-European) from the perspective of Lexical Realizational Functional Grammar (LrFG), a non-transformational framework that blends elements of Lexical Functional Grammar (LFG) and Distributed Morphology (DM). The analysis reveals that at least three distinct phrase structure positions for such elements – initial, second and final – are required. The coexistence of such opposite types of directionality is probably due to the interaction of two distinct contact influences: the right-branching (clause-initial and clause-second) type, as found in Persian/Tajik and most other modern Iranian languages, and the left-branching (clause-final) type, as found in languages of the adjacent South Asian linguistic area. This view on the emergence of functional layers of the clause is consistent with the LFG approach to constituent structure as a surface-based, language-specific phenomenon.

1 Introduction

While the issue of phrase structure and configurationality has received considerable attention in the literature on Lexical Functional Grammar (see Snijders 2015), there has been comparatively little research on the possible extent of dedicated functional positions in the clause. A version of X' Theory is usually assumed, with the lexical projection VP extending to the functional projections IP and CP (Bresnan et al. 2016: 102–103), which are not viewed as universal. A language, then, may lack CP or IP (which is common in so-called nonconfigurational languages, see Austin & Bresnan 1996), but these two projections are normally enough to capture all word order and constituency facts within the clause.

However, what has generally been overlooked in the LFG literature on X' theory is that languages may possess a large number of clause-level markers (conjunctions, particles) with fixed but distinct linear slots, which may require more than two functional clausal layers if these slots are identified on structural rather than prosodic grounds. In this paper, I consider the data of Bartangi, an Iranian (> Indo-European) Pamir language with a very large number of such grammaticalized functional elements, from the point of view of Lexical Realizational Functional Grammar (LrFG) – a version of LFG that abandons a strict version of lexicalism in favour of a realiza-

[†]This research has been supported by the Russian Science Foundation, project no. 24-18-00199 “Clause structure and positional phenomena in SOV languages”. I am grateful to the audiences of the Workshop on Minor Sentence Types at the 32nd International Conference on Head-Driven Phrase Structure Grammar (Lisbon, 2–3 September 2025), the 30th International Lexical Functional Grammar Conference (Barcelona, 22–24 July 2025) and the International conference on Clause Linkage in Iranian Languages and Beyond (Uppsala, 21–23 August 2025), where parts of this research were presented, for their helpful comments and suggestions. I am especially grateful to Ash Asudeh, Nadeem Siddiqi, Adam Przepiórkowski, Jaroslava Obrtelová, Vladimír Plungian and Jakob Maché, as well as to all native speakers of Bartangi. All errors are mine.

tional model that associates terminal c-structure nodes with their morphonological representations.¹

Crucially for this analysis, in LrFG the same phrase structure position can be associated with different linearizations (e.g. an affix vs. a clitic) depending on the vocabulary item (VI) that realizes this position. In other versions of LFG this is either impossible or possible to a very limited degree, cf. the analysis of Pashto endoclefts as prosodic inversion at the phonological level in Bögel (2015: 210ff.). This flexibility of LrFG allows the same c-structure to be mapped to distinct realizations, but the analysis still requires at least three different phrase structure positions for functional elements in Bartangi: initial, second and final. This means that L(r)FG must allow for a larger inventory of functional projections than traditionally assumed, and that their exact makeup and directionality are language-specific outcomes of particular diachronic processes. This generally agrees with the functional-typological approach to clause structure, and LrFG can be said to provide a more formalized version thereof.

The paper is structured as follows. In Section 2, I describe general facts on Bartangi and its clause structure, drawing on the LrFG analysis of Belyaev (2025a). In Section 3, I focus on descriptive generalizations on the behaviour of conjunctions and clause-level particles in Bartangi, which are then analyzed in Section 4. In Section 5, which concludes the paper, I offer some discussion of what the analysis means for the treatment of conjunctions, particles and other clause-peripheral elements in L(r)FG.

2 Bartangi

2.1 General information and data sources

Bartangi is a Shughni-Roshani (Iranian > Indo-European) language spoken in the lower part of the Bartang river valley in the Mountainous Badakhshan Autonomous Region (henceforth MBO), Tajikistan. Shughni-Roshani is part of the Pamir linguistic area (Edelman 1980), whose languages share a number of structural and lexical similarities due to long-term language contact but do not form their own phylogenetic group within Iranian (Wendtland 2009).

Available descriptions of Bartangi are very limited, even compared to its larger relative Shughni. The first data on Bartangi come from Zarubin (1937), reflecting the author's fieldwork in 1915–1916, which includes folk poetry and a glossary; these texts are of limited use for the purposes of this paper, as they include few instances of clause linkage markers. The only grammatical description of Bartangi is Karamxudoev (1973), which, however, has almost nothing to say on syntax; it also includes several transcribed and translated texts. Sokolova (1960) is a collection of texts and vocabulary, which nevertheless contains much valuable grammatical information in

¹Due to space constraints, I cannot provide a detailed introduction to LrFG in this paper. A reasonably detailed exposition can be found in Asudeh & Siddiqi (2023). The only part of the analysis that strongly depends on the specifics of LrFG is the treatment of the preverbal subordinators *ca* and *di_{IN}* and the interrogative particle *=o*; the relevant features of the framework will be explained in the relevant sections below.

the introduction and within lexical entries – in particular, the entries for coordinating and subordinating conjunctions. A few Bartangi texts have also been published in the collection of Pamir folklore edited by Šakarmamadov (2005).

In 2023–2025, new materials on Bartangi have been collected by the author and his colleagues (Artyom Badeev, Alexander Sergienko) during field trips to Basid (Rushan district, Mountainous Badakhshan AO, Tajikistan). These materials include both elicited texts and spoken data recorded from native speakers. The volume of newer transcribed and annotated texts is still much smaller than that of the earlier materials; therefore, I will be mainly relying on the texts published by Sokolova, Karamkhudoev and Shakarmamadov and my own elicitation. As far as clause combining is concerned, the grammar of Bartangi does not seem to have changed much between the earlier texts and the present.

2.2 Fundamentals of clause structure

Bartangi clause structure has been described and analyzed from the perspective of LrFG in Belyaev (2025a). The general organization of the simple clause is illustrated in Figure 1 for a sentence meaning ‘I drank water yesterday’. According to this representation, the clause includes a configurational VP core that includes the direct object, a TP layer where the subject is attached as a specifier, and a dedicated structural topic position immediately in front of the clitic agreement marker. Following standard LFG principles (see Bresnan et al. 2016: 90), the subject and object c-structure positions are optional, such that any argument may be displaced and appear in the topic slot before Agr. The pre-Agr topic slot, however, is not optional, which is especially evident when the agreement marker is an enclitic, such as in Figure 1.

In this example, the core arguments are found in their configurational positions and the topic position is occupied by an adverb; but more commonly, in the absence of a topical adverb, the initial position will be occupied by the subject, and the Spec, TP position will be empty, as in (1).

- (1) āz =um ʃac biroz-d
 I.NOM=1SG water drink-PST
 ‘I drank water’.

As mentioned above, Bartangi has mobile agreement markers. This means that the agreement marker is a second-position enclitic in the past and perfect tenses, but an affix in the present. The affix and the clitic are thus found in different linear positions, but they are in complementary distribution. In the LrFG analysis of Belyaev (2025a), this is modeled by VIs for both types of markers realizing the same features in the Agr node, but the affixes constrained as appearing in the present tense, and the clitics, in the past and perfect. The affix will “hop” onto the verb as per the head identification mechanism described in Asudeh et al. (2023).

In spite of certain formal complications stemming from the underdevelopment of some aspects of LrFG (discussed in the original paper), this analysis adequately models key facts with respect to Bartangi basic word order. However, the position of other

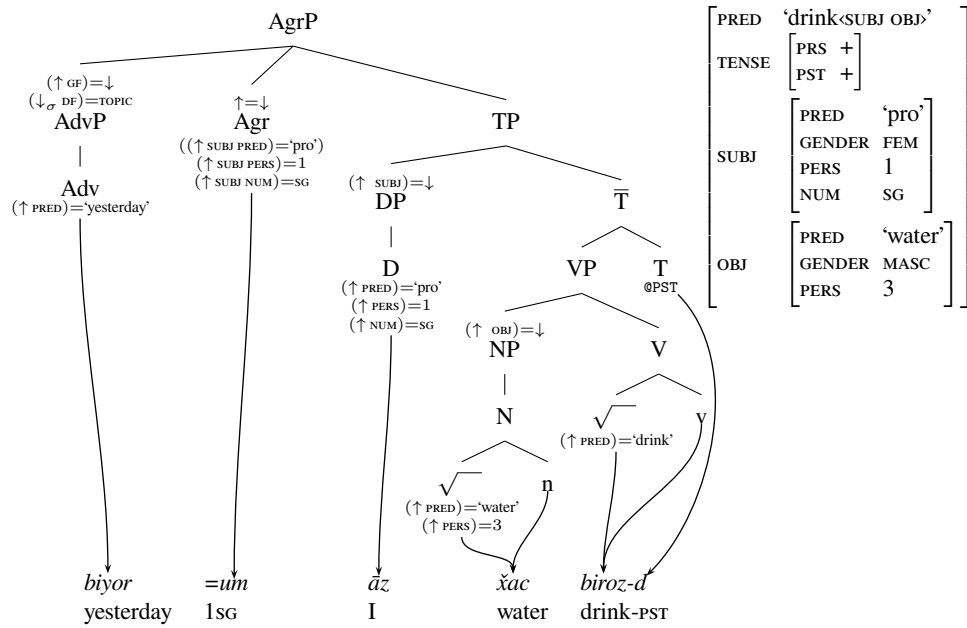


Figure 1: Clause structure with clitic person-number marker (Belyaev 2025a)

elements, traditionally viewed as subordinators or conjunctions, has remained outside the scope of the paper. Below, I will demonstrate that, contrary to what can be expected from an Iranian language, Bartangi has developed a full-fledged sentence-final area that requires postulating a separate clause-final position for particles or subordinators in addition to the clause-initial one.

3 The clause-peripheral area in Bartangi

3.1 “Initial” markers

According to traditional descriptions, Pamir languages, including Bartangi, have two types of subordination markers: clause-initial and clause-internal (preverbal). The most common clause-initial marker, under the traditional analysis, is the polyfunctional *di*, which in its range of meanings is akin to Tajik *ki* (= Persian *ke*), as will be discussed in Section 3.2 below. Other initial subordinators are mainly Tajik loanwords, of which two stand out in terms of frequency: *agar* ‘if’ and *to* ‘until, etc.’; a native word with the same linear distribution is *lāk* ‘let’, although it is perhaps better treated as a jussive rather than a subordinator. These latter markers seem to alternate between clause-initial, second, and preverbal positions (which is somewhat akin to Ossetic “floating” subordinators, see Belyaev 2014, Belyaev & Haug 2014); occasionally, even postverbal positions are encountered (cf. Windfuhr & Perry 2009: 519 on final *agar* in spoken Tajik):

- (2) a. initial
agar lap-dör yoc=af *ca* čũj, mun =um tamāš-ri mis
 if much-CMPR fire 3PL.TR SUBD do.PRF I.OBL=1SG you-DAT also
 vorj vũj
 horse bring.PRF
 ‘If you had made a bigger fire, I would have brought you a horse too.’
 (Sokolova 1960: 8)
- b. second
 yā *agar* ĵāl-dör *ca* tezd, pa rošorv nūr=aθ
 D3.SG.NOM if soon-CMPR SUBD go.PRS:3SG LOC.UP R. today=EXH
 firāp-t
 reach.PRS-3SG
 ‘If he goes out earlier, he will reach Roshorv today.’
 (Karamxudoev 1973: 273)
- c. preverbal
 az sabo tar-um *agar* *ca* vārδī-m, bašānd-dör
 from tomorrow LOC.EQ-DIST.LOC if SUBD be.able.PRS-1SG good-CMPR
 kin-um
 do.PRS-1SG
 ‘Starting from tomorrow, if I am able to, I will work better.’
 (Karamxudoev 1973: 208)
- d. postverbal
 ar mun qāp δīd *agar*, vār-um
 LOC.DOWN I.OBL handful fall.PRS:3SG if bring.textscprs-1sg
 tā-ri
 thou.OBL-DAT
 ‘If (it) falls into my hands, I will bring (it) to you.’
 (Karamxudoev 1973: 245)

Significantly, in all of these examples, *agar* occurs together with the native subordinator *ca*. Even though this is not strictly necessary (and not as frequent for *to* ‘until’), it underscores the peripheral status of such elements in the system. Nevertheless, when *agar* is clause-initial, it cannot host clitics (2a), which means that it has to be viewed as occupying a dedicated structural position. In other positions, *agar* and other elements of this class can be treated as a special kind of adverbial.

3.2 “Initial” *di*_{EX}

As stated above, traditional grammars treat *di* (var. *idi*) as the native clause-initial subordinator in Bartangi (*di*^l in Sokolova 1960: 101–102). In order to differentiate it from another, formally and historically identical but synchronically distinct clause-

internal subordinator *di* (*di*² in Sokolova 1960: 102),² I will label the clause-external marker as *di*_{EX} and the clause-internal marker as *di*_{IN}, following Belyaev (2025c,d).

As suggested in Belyaev (2025c,d), the analysis of *di*_{EX} as an initial conjunction is problematic from several points of view. Like Persian *ke*, prosodically it encliticizes to the linearly preceding constituent (which belongs to the “main” clause). It is said to encode a wide range of functions (3)–(6), but in all of these, it is optional, and the meaning is sometimes doubled by a separate marker, such as the jussive *lāk* in (4). There is no evidence to suggest that the second clause in these constructions is embedded in any sense: the two clauses cannot be swapped, the “subordinate” clause cannot be put inside the “main” one, etc. At best, these constructions are in a very loose dependency relationship.

(3) complement

yā fikri čūg *di*, asal pa diraxt
 D3.SG.NOM thought do.PST LNK honey LOC.SUPER tree
 ‘He thought that honey was on the tree.’

(4) purpose

āz=um az xu bajoy čūg *di* (lāk) az mun mā wīn-an
 I.NOM=1SG OBJ self hidden do.PST LNK JUS OBJ I.OBL PROH see.PRS-3PL
 ‘I hid so that they wouldn’t see me.’

(5) result

xil-ak=an pa wī nāst *di*, yā mis piḏo
 many-DIM=1PL LOC.UP D3.M.OBL sit.PST.PL LNK D3.SG.NOM ADD visible
 sut
 go.PST.M
 ‘We waited for a while, and he appeared.’ (Karamxudoev 1973: 276)

(6) manner

ik-dond azob az tā kin-um *idi*, tū mir-i
 EMPH-SO.much pain OBJ thou.OBL do.PRS-1SG LNK thou.NOM die.PRS-2SG
 ‘I will beat you up so much that you will die.’ (Sipanj, Sokolova 1960: 102)

There is a frequent class of examples where *di*_{EX} is even less amenable to interpretation as a subordinating conjunction. In such cases, illustrated by (7)–(8), *di*_{EX} introduces an unexpected turn of events in the discourse, with both clauses constituting new information and no backgrounding characteristic of subordinating constructions.

²In the closely related Shughni, the clause-external marker is *idi* while the clause-internal marker is *di* (Parker 2023: 428, 432, 435).

- (7) daδ az ĵingāl tūyĵ xu yoδ-d yi ĵoy *idi*,
 then ABL forest go_away.PRF.M and come.PRS-3SG one place LNK
 wī-ri paryend dučor saw-d
 D3.M.OBL-DAT ovring encountered go.PRS-3SG
 ‘He moved away from the forest, comes to a place, and he encounters an ovring
 (narrow mountain path).’ (Sokolova 1960: 59)

- (8) yā yač *idi*, wī šögbuc nist
 D3.SG.NOM come.M.PRF LNK D3.M.OBL lamb NEG.EXST
 ‘He came, and his lamb is not there.’ {brt_txt_tribrata}

In yet other examples, it is not even clear to what extent *di* can be assigned any particular interpretation:

- (9) a. δaw kud yi ĵondor inĵuvd *di*... (500ms)
 two dog one animal catch.PST LNK
 ‘Two dogs caught one animal (and)...’
 b. wī-tör=af vo wī nusk-tör=af wilčak
 D3.M.OBL-SUPER=3PL.TR again D3.M.OBL muzzle-SUPER=3PL.TR measure
 inĵuvd
 put.PST
 ‘...they put a measure on its muzzle.’ {jonali1_200623}
- (10) a. sarpiro=an di tar ĵīw rawon ca sad *di*... (1 s 130ms)
 before=3PL SUBD LOC.EQ hunt going SUBD go.PST.PL LNK
 b. e... yi daxo vud
 HES one prayer be.PST
 ‘When in the old times we went hunting... there was one prayer [before
 the hunt].’ {jonali1_200623}

Especially in the latter example, the first clause already has the subordinator *ca*; therefore, *di*_{EX} cannot be a clause-initial complementizer here, because technically it introduces the MAIN clause.

Quite often *di*_{EX} seems to behave merely as a hesitation marker, or perhaps a discourse deictic particle, without any obvious clause linkage functions (11). For this function, cf. the Ossetic hesitation marker *jed* (Digor *idi*), which possibly comes from the same demonstrative stem **aita* (Abaev 1958: 410, Rastorgueva & Edelman 2000: 132).

- (11) a yim *idi*... tupxona
 and D1.SG.NOM LNK fortress
 ‘And this is... a fortress.’ {fortress_180623}

Finally, *di*_{EX} can be used in exclamative clauses without any clause linking context whatsoever:

Table 1: Frequency of functions of di_{EX} in the texts

<i>Function</i>	<i>#</i>
Quotative	88 (49.4%)
Other complement	21 (11,8%)
“Consecutive”	21 (11,8%)
“Hesitation”	13 (7.3%)
Result	5 (2.8%)
Purpose	3 (1.7%)
Relative (‘such’), manner / degree (‘so... that’)	17 (9.6%)
Temporal (<i>waxto di...</i> etc.)	8 (4.5%)
Unclear interpretation	2 (1.1%)
<i>Total</i>	<i>178</i>

- (12) *yi lap naxčir umder di(dī)!*
 one many goat D3.LOC:IN LNK
 ‘There are so many mountain goats there!’ (Karamxudoev 1973: 277)

All of this appears to suggest that di_{EX} is not really a clause-initial subordinator in a large share of its functions. This claim appears controversial given that di_{EX} is generally assumed to be a universal subordinator akin to Persian *ke*, Tajik *ki* and similar markers in other Iranian languages. Therefore, in order to assess the degree to which the meanings listed above occur in natural discourse, I have annotated 178 examples of di_{EX} (and other clause linkage markers) in natural texts collected in 2023–2024 and published in Sokolova (1960). The results are displayed in Table 1. A very large share of these are sentences where di_{EX} is used to introduce direct speech. If these are excluded, consecutive and hesitation examples make up 38% of all observations, which demonstrates that such uses are by no means marginal.

Moreover, if only texts collected in 2023–2024 are considered, of the total 77 examples, 37 are quotative (mostly in fossilized form with the verb: *luvd-i* ‘s/he said’), 11 are consecutive and 13 are hesitation-like. This means that such “discourse-structuring” uses make up 60% of all uses of di_{EX} outside of direct speech marking. Perhaps the higher percentage of such uses can be explained by hesitations and other unclear uses having been removed from the texts in Sokolova (1960) during editing.

Such uses of ostensibly “subordinating” markers are widespread in neighbouring languages as well. For example, Wakhi has very similar uses of “clause-initial” *ki*, which Obrtelová (2019) describes as introducing post-nuclear temporal clauses. In such constructions, the subordinate clause is “highlighted (foregrounded) while the main clause is backgrounded” (Obrtelová 2019: 265). This also applies to Bartangi from a pragmatic point of view. However, it is unclear whether such examples can be treated as temporal clauses, as there is no evidence of syntactic embedding, and functionally, they form part of a consecutive narrative. Thus Bashir (2025: 255–256), in her analysis of Khowar (Dardic), which belongs to the same broader Hindu Kush-

Karakorum linguistic area as Bartangi and Wakhi (Liljegren 2020), treats sentences with similar uses of *ki* as instances of left-branching with final subordinators:

- (13) Khowar (Dardic, Bashir 2025: 256)
 [te-ɣár múɬi bakas-ó bil-ó ayh a-ré-r ki] tshap
 REM.SG-ABL below box-OBL lid-OBL up AUG-DO.PST.D-3SG when full.of
 ašrafí
 gold.coins
 ‘[When he lifted the lid of the box below that one], (he saw that) it was full of gold coins.’

While a fully left-branching analysis along these lines seems too strong for Bartangi, viewing *di*_{EX} as a kind of clause final marker at least in some contexts is more plausible than viewing it as a clause-initial subordinator, and I will adopt it here.

3.3 “Clause-internal” *ca* and *di*_{IN}

The second class of subordinators distinguished in traditional grammars includes two markers that generally appear within the dependent clause: the general subordinator *ca*, which is immediately preverbal, separable only by negation (14)–(15), and the temporal-conditional-causal *di*_{IN}, which fluctuates between second and preverbal positions (16).

- (14) wāð=an *ca* yat, āz=um az uf qīwd
 D3.PL.NOM=3PL SUBD come.PST I.NOM=1SG OBJ D3.PL.OBL call.PST
 ‘When they came, I called them.’
- (15) ibod dars ðod, tonac pulod *ca* na yač
 I. lesson give.PST while P. SUBD NEG come.PRF
 ‘Ibod was doing lessons until Pulod came.’
- (16) (**di*) tū=t (^{OK}*di*) māš-ri (**di*) bazaygarak (^{OK}*di*)
 SUBD thou.NOM=2SG SUBD we-DAT SUBD toy SUBD
 dāčūg, māš=ti xoš sān
 give.PST we=FUT happy go.PRS:1SG
 ‘When you give us toys, we are happy.’ (Belyaev 2025c: 35)

While *ca* or *di*_{IN} is preverbal, the verb to which it attaches can be freely positioned in the clause:

- (17) ibod dars ðod, tonac *ca* na yač pulod
 I. lesson give.PST while SUBD NEG come.PRF P.
 ‘Ibod was doing lessons until Pulod came.’

However, when *ca* is used in a clause that has no overt verb, it has to be final:

- (18) a. pul tā-yā ca, dī-qatī čöd viröxt vārδī
 money thou.OBL-POSS SUBD D2.M.OBL-INS house build.INF can.PRS[2SG]
 ‘With the money you have, you can build a house.’
 b. *pul ca tā-yā, dī-qatī čöd viröxt vārδī

This could be due to possessive constructions, or copular clauses in general, disallowing postverbal or post-predicate constituents. But possessive constructions can have an overt copula, and in this case, there can be postverbal constituents just like in clauses with verbal predicates:

- (19) yi nāw-δūs kitob yal yast mun-ā
 one nine-ten book still COP I.OBL-POSS
 ‘I still have around nine or ten books.’ (Karamxudoev 1973: 335)

Hence, this “freezing” of word order in the absence of an overt verb seems to be due to some inherent properties of *ca* rather than the copular construction itself. The most straightforward way to account for this behaviour is to assume that *ca* is fundamentally a clause-final subordinator, and its preverbal position is due to additional constraints on its position. An LrFG implementation of this positional variability will be proposed in the next section.

The preverbal *di*_{IN} is similar to *ca* in that it is also a proclitic to the verb. However, it does not show the behaviour characteristic of *ca* in copular constructions, i.e. it cannot terminate a clause on its own. Thus there is no evidence that it is fundamentally clause-final, unlike *ca*.

As noted above, *di*_{IN} can also appear in second position. In this case, it always follows the person-number clitics: *tū=t di yat* (thou.NOM=2SG SUBD come.PST), but not **tū di=t yat*. But there is an important difference: if the clause consists of only a single verb, PN clitics appear postverbally, but this position is not available for *di*_{IN}:

- (20) a. di yat =um, qīw-um az tā
 SUBD come.PST=1SG call.PRS-1SG OBJ thou.OBL
 ‘When I will come, I will call you.’
 b. *yat=um di, qīwum az tā

Hence, unlike *ca*, there is no evidence that any of the positions of *di*_{IN} is inherently postverbal. This will be important for the analysis below.

3.4 “Coordinators” *xu* and *at*

Bartangi is described as having two coordinating conjunctions: *xu*, which connects clauses forming a temporal sequence (21), and *at*, which is a more general coordinator that also conjoins NPs and other constituents; in the function of clausal coordination, it is mostly used in simultaneity contexts, but it is not limited to any particular temporal relation (22).

- (21) bād yač pa xu mallā =xu... (440ms) aynan
 then come.PRF.M LOC.UP REFL house =SEQ same
 k-az-um xu bobokalon-ā k-az wī piltā-yī
 EMPH-OBJ-D3.F.OBL REFL grandfather-POSS EMPH-OBJ D3.M.OBL fuse-ADJ
 can qadimā zoz-d =xu sawd
 gun old take.PRS-3SG =SEQ go.PRS:3SG
 ‘Then he came to his house and... nevertheless he takes his grandfather’s old
 matchlock rifle and goes.’ {moustache_man_260624}

- (22) ...podžo-duxtar tar toq-aθ xu kāl zuwosč-at, az
 king-daughter LOC.EQ window-EXH REFL head take.out.PST-CONJ OBJ
 wī čāst
 D3.M.OBL look.PST
 ‘...the princess took out her head and looked at him.’ (Sokolova 1960: 16)

Both markers are encliticized to preceding words and at least *xu* has syntactically left-branching properties. In (23), the clause with final *xu* is positioned after the other clause, but the temporal order of the basic configuration ($A=xu\ B \rightarrow A$ precedes B) is preserved (23); however, in other contexts of this type the temporal relation is not as clear, see (24).

- (23) zaxmī sad yā čabūd, žer-ac =um az um δod
 wounded go.PST.M D3.SG.NOM pigeon stone-TERM=1SG OBJ D3.F.OBL hit.PST
 =xu
 =SEQ
 ‘I hit the pigeon with a stone, and it became wounded.’
 (Karamxudoev 1973: 258)

- (24) wazīr-puc sud az um daraxt sont =at, yā yurč
 vizier-son go.PST.M OBJ D3.F.OBL tree raise.PST =CONJ D3.SG.NOM bear
 zibud, quloγ mis wī-r na luvd =xu
 run_away.PST.M thanks ADD D3.M.OBL-DAT NEG say.PST =SEQ
 ‘The vizier’s son lifted the tree and the bear ran away, and he didn’t even say
 thank you.’ (spoken text)

The conjunction *xu* has several other left-branching properties that demonstrate that it has drifted towards subordination, as detailed in Belyaev (n.d.). For example, it can be used without a second clause in answers to questions, or as a reaction to another speaker’s utterance:

- (25) mun puc yoδd =xu
 I.OBL son come.PRS:3SG =SEQ
 (‘Let’s go.’ —) ‘When my son comes.’ (‘My son comes and.’)

By itself, *at* has no such left-branching properties, apart from its prosody. However, when *at* appears with *to* ‘until’ in the first clause, the construction acquires the seman-

tics of immediate precedence (26a), as described in Belyaev (2025b). Importantly, this construction acquires subordinating properties, as seen in (26b) where the *to...at* clause is postposed.

- (26) a. šer to k-az wī um wayd-ow řud =at, az
 lion until EMPH-OBJ D3.M.OBL D3.F.OBL cry.INF-INF hear.PST=and from
 řoř zibud
 fear jump.PST.M
 ‘As soon as the lion heard her [the donkey’s] cry, he ran away in fear.’
 (Sokolova 1960: 32)
- b. šer az řoř zibud, um sado to řud =at
 lion from fear jump.PST.M D3.F.OBL sound until hear.PST=and
 ‘The lion ran away as soon as he heard her cry.’ (constructed example)

Thus in this case we are forced to recognize =at as a clause-final subordination marker. As for *to*, its position is variable, similarly to *agar* discussed above, but with more restrictions: in addition to the second position illustrated in (26a), it can also occupy initial (27) and preverbal (28) positions.

- (27) to wāδ =an yat =at, wī vo az wī vōst
 until D3.PL.NOM=3PL come.PST=and D3.M.OBL again OBJ D3.M.OBL bind.PST
 ‘As soon as they came back, he bound him again.’ (Sokolova 1960: 35)
- (28) yā potřo-razen pay newd sad, um yořk ar
 D3.SG.NOM king-daughter PROSP cry.INF go.PST.F D3.F.OBL tear LOC.SUB
 wī pec to čekt =at, yā agā sud
 D3.M.OBL face until drip.PST=and D3.SG.NOM awake go.PST.M
 ‘The princess started crying, and as soon as her tear fell on his face, he woke up.’
 (Sokolova 1960: 38)

Observe that in (27), the second-position agreement clitic does not attach to *to*, but to the following pronoun *wāδ* ‘those’, which means that it should be assigned to the same clause-initial position as *agar* and other Tajik loans.

3.5 Question particle =o

In addition to the elements identified above, Bartangi has one unambiguously clause-final marker, the question particle =o. This particle marks yes-no questions and normally occurs immediately after the verb when the usual SOV order is used (29a). However, if the clause is not verb-final, two position options are available: sentence-final (29b) and immediately postverbal (29c).

- (29) a. pulod az zarifā wīnt =o?
 P. OBJ Z. see.PST=Q
 ‘Did Pulod see Zarifa?’

Table 2: Positions of functional elements in the Bartangi clause

		initial	second	verb-adjacent	final
<i>di</i> _{EX}	general linker	? ⁱ	—	—	+
<i>di</i> _{IN}	temporal-conditional	—	+	+	—
<i>ca</i>	general subordinator	—	—	+	+ ⁱⁱ
<i>xu</i>	sequential	—	—	—	+
<i>at</i> ⁱⁱⁱ	temporal	—	—	—	+
<i>to</i>	temporal	+	+	+	—
<i>agar</i>	conditional	+	+	+	+
<i>=o</i>	question particle	—	—	+ ^{iv}	+

ⁱ Traditionally analyzed as initial, but see Section 3.2.

ⁱⁱ Only final when no verb is present in the clause, i.e. in present-tense copular clauses.

ⁱⁱⁱ In its function as a subordinator (together with *to*) only.

^{iv} Immediately postverbal rather than preverbal.

b. pulod wīnt az zarifā=*yo*?

c. pulod wīnt=*o* az zarifā?

This distribution is reminiscent of that of *ca* discussed above: the question particle is essentially sentence-final but may “hop” onto the verb. In the case of *ca*, this “hopping” is obligatory, while for *=o* it is optional.

3.6 Summary

A summary of the positions of the elements discussed above is provided in Table 2. The column “verb-adjacent” refers to the immediately postverbal position for *=o* and the immediately preverbal position for the other markers. The second position of *di*_{IN} and *to* is equivalent to that of clitic agreement markers; the subordinators always follow the agreement clitics.

These data demonstrate that in Bartangi we have to assume a rather large range of positions for conjunctions and particles: (i) *initial*: *to*, *agar* and other Persian/Tajik loans; (ii) *second*: *di*_{IN}, *to*; (iii) *preverbal*: *ca*, *di*_{IN}; (iv) *postverbal*: *=o*; (v) *final*: *xu*, *at* (with *to*...), *di*_{EX}, *ca* (without overt verb), *=o*. In the following section, I will discuss how this seeming complexity can be at least partially reduced in the analysis.

4 Analysis

4.1 General outline

Of the five descriptive types discussed in the preceding section, the preverbal and postverbal can be eliminated in the analysis, because both markers that appear in this position also have alternative positional options (final for *ca*, second for *di*_{IN}); moreover, the degree of their proximity to the verb is so high that they can be treated

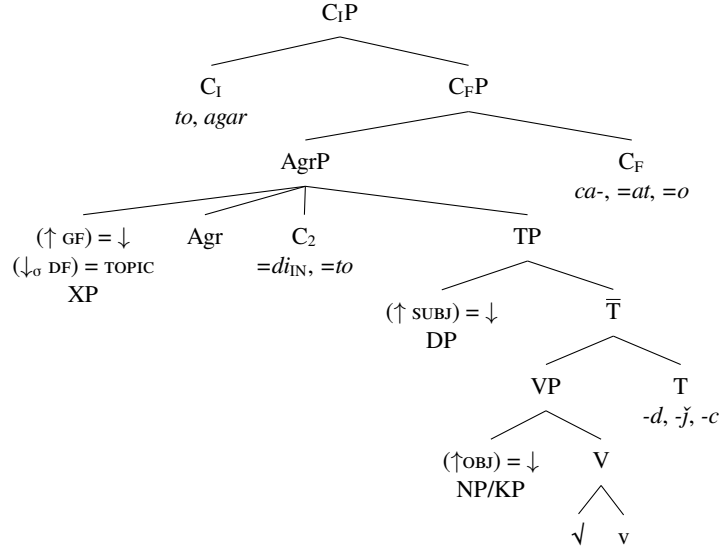


Figure 2: Bartangi clause structure with additional positions

as affixes rather than independent clitics (see formalization in Section 4.3 below). The other positions, however, are hardly reducible to one another, as their distributional properties are too distinct.

We can thus augment the structure in Figure 1 with additional structural positions as shown in Figure 2: C_I for clause-initial markers, C_F for clause-final and “preverbal” markers and C₂ for second-position markers. In what follows I will discuss each of these additional positions in more detail.

4.2 Clause-initial markers

Clause-initial markers are independent words that bear their own stress, thus their VIs are quite straightforward, as illustrated in (30) for *agar*. A VI in LrFG defines the relationship between terminal c-structure nodes providing syntactic and semantic information with their realizations. The left-hand side of a VI (before the right arrow) defines the *exponendum* – the information to be realized – which is a pair consisting of a list of c-structure categories (more than one category indicates a span) and a union of three types of information: f-structure constraints, Glue Semantics (Asudeh 2022) meaning constructors and information-structure-related definitions. In this specific case, I assume that markers such as *agar* ‘if’ are not associated with any f-structure features, thus the VI provided in (30) only realize the relevant semantic information, which is here represented by $\llbracket \text{if} \rrbracket$.³ As for the exponent in the right-hand side of the VI,

³Since this paper is concerned with the structural properties of these items rather than their semantics, I will not include the meanings in this analysis below. This does not affect the morphosyntactic discussion in any way.

here it is defined simply as the string *agar*, which is a shorthand for the corresponding phonological form of the word. We will see shortly that the exponent may be more complex.

$$(30) \quad \langle [C_I], [\text{if}] \rangle \xrightarrow{\nu} \text{agar}$$

4.3 Clause-final markers

The clause-final elements are less homogeneous. The conjunction *=at* in its subordinating function is a simple clitic in the sense of Zwicky & Pullum (1983): an element that does not form a separate prosodic word yet which syntactically behaves like a complete word occupying its respective position in the c-structure. In terms of LrFG, this amounts to the clitic having a DEP feature (in this case, LEFT as it is an enclitic) and a restricted prosodic frame, as in (31).

$$(31) \quad \langle [C_F], (\uparrow \text{CONJ}) = \text{AND} \rangle \xrightarrow{\nu} \begin{bmatrix} \text{PHON.REP} & /at/ \\ \text{PFRAME} & (\dots (\cdot)_{\sigma})_{\omega} \\ \text{DEP} & \text{LEFT} \end{bmatrix}$$

Note that *at* can only appear in its subordinating role in the presence of *to* in clause-initial or clause-internal position; since outside of this construction it is a general coordinating marker, I analyze it as having no semantics of its own in this context; its realization is instead linked to the f-structure feature CONJ, defining the specific conjunction used in this context.⁴

In (31), we can see a more complex exponent than in (30) above: the right-hand side of the VI is a feature structure (a *v-structure*) that includes not only the phonological form of the morpheme, but also additional information that determines a number of additional properties: prosodic status and context, linear position, inflectional class, constraints on the host etc.; see Asudeh et al. 2023 for an in-depth discussion of the handling of exponents in LrFG. In (31), PFRAME is intended to capture the fact that *at* is a clitic that appears at the end of the prosodic word. The value of the feature DEP similarly reflects its being hosted by the exponent to its left.

The status of *=o* is different: it can behave either as a “leaner”, like *=at*, or it can “hop” onto the verb. The latter process in LrFG is formalized via the notion of host identification: if a v-structure has the feature [HOST [IDENT +]], its host is determined not through c-structure-based adjacency but through c-command as the structurally *closest* realization. A complete definition of this notion is given in Asudeh et al. (2023). Informally, for a v-structure v_1 that realizes node n_1 , $\text{closest}(v_1)$ defines the v-structure v_2 that realizes node n_2 such that both n_1 and n_2 map to the same f-structure f , n_1 c-commands n_2 , and there is no intervening node n_3 that c-commands n_2 while also mapping to f . This is illustrated in Figure 3: in (a), v_2 can serve as the host for v_1 because there are no intervening c-commanding nodes; in (b), v_2 can only

⁴For a similar “semantically empty” treatment of a coordinating conjunction serving as a complementizer, see Belyaev (2015: 314). The difference between Ossetic and Bartangi is that in Ossetic, the conjunction still has the c-structure of a coordination marker, while in Bartangi, it has been reanalyzed as a final complementizer.

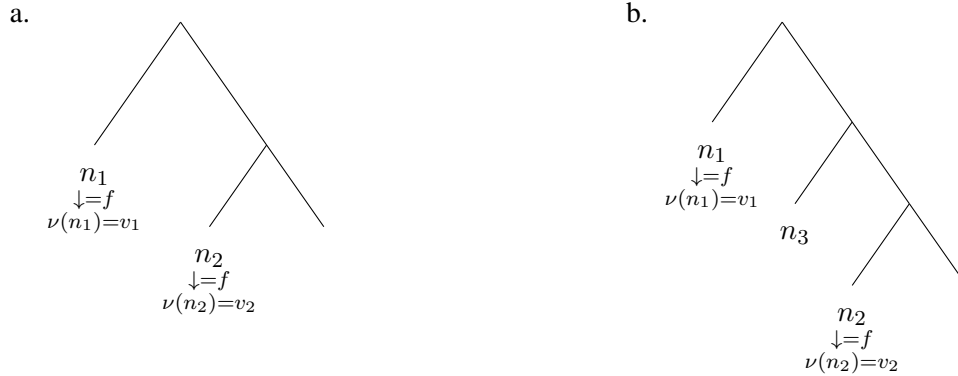


Figure 3: Illustrations for host identification in LrFG

be host to v_1 if the intervening n_3 does not map to the same f -structure f ; otherwise, *closest* is violated.

To avoid affixes attaching to clitics or other affixes with inverse direction of attachment (suffixes to prefixes, prefixes to suffixes), we can add an additional constraint that host identification as described above only applies to other affixes with the same directionality or to roots.⁵ Since this paper is not dedicated to formal issues of LrFG, I will leave a more developed definition of host identification for future work.

Given this definition, the VI for $=o$ is given in (32). The optionality of the [HOST [IDENT +]] specification means that it can attach either to the verb or to the element that appears immediately to its left according to c-structure-based linearization. When attaching to the verb, $=o$ can “skip” intervening nodes per the definition above if they do not map to the same f -structure; thus, in (29c), the question marker can attach to the verb while ignoring the postverbal direct object NP *az zarifā*.

$$(32) \quad \langle [C_F], [\text{yes-no-q}] \rangle \xrightarrow{\nu} \left[\begin{array}{l} \text{PHON.REP} \quad /o:/ \\ \text{PFRAME} \quad ((\cdot)_{\sigma} \dots)_{\omega} \\ \text{DEP} \quad \text{LEFT} \\ \left(\text{HOST} \quad [\text{IDENT} \quad +] \right) \end{array} \right]$$

The status of *ca* is similar, with the difference that when *ca* appears in final position, it is a fully stressed word, and it only does so when there is no valid host for it to attach to (i.e. no overt verb). I propose modeling this via the VI in (33), where not only host identity, but also the DEP and PFRAME features are optional. This means that here, the choice is not between an affix and a clitic, but between an independent word and an affix with a prosodic constraint.

⁵I am grateful to Ash Asudeh, Nadeem Siddiqi, Bronwyn Bjorkman and other participants of the LrFG lab for discussion of this issue and the proposed solution.

$$(33) \quad \langle [C_F], \llbracket ca \rrbracket \rangle \xrightarrow{\nu} \left[\begin{array}{l} \text{PHON.REP } /t^h a/ \\ \left(\begin{array}{l} \text{PFRAME } ((\cdot)_{\sigma} \dots)_{\omega} \\ \text{DEP } \text{RIGHT} \\ \text{HOST } [\text{IDENT } +] \end{array} \right) \end{array} \right]$$

Note that in both cases, LrFG’s MostSpecific constraint (Asudeh et al. 2023: 32–33) should ensure that the more constrained realization is chosen, i.e. the affix. This is the right prediction in the case of *ca*, because in Bartangi it cannot occur clause-finally if there is an overt verb for it to attach to. But for *=o*, both options are available, so we must assume that there is either a significant prosodic difference between two variants, such that one v-structure does not subsume the other, or an information-structure difference (such that the clitic variant is associated with higher emphasis, for example, like English *will* vs. *’ll*), or both.⁶ This is an empirical question raised by the analysis that has to be investigated during further research. If it turns out that no such differences are to be found, then postulating two different c-structure positions for the realization of *=o* seems unavoidable within the current framework.

4.4 Second position

All particles and conjunction that appear in second position are always adjacent to the agreement clitics and follow it. Since there is currently no evidence in favour of the second-position conjunctions forming a constituent with any adjacent nodes, the slot for such conjunctions can be located immediately after Agr and can be labeled as *C*₂. Since these markers are not roots or affixes, they do not interfere with agreement suffix placement in any way. A VI for the second-position variant of *to* is given in (34).⁷

$$(34) \quad \langle [C_2], \llbracket \text{until} \rrbracket \rangle \xrightarrow{\nu} to$$

Since *di*_{IN} has a prefixal variant in addition to the second-position one, we can treat it similarly to *ca*, as in (35); the curly braces stand for disjunction between two options. In this case free variation between second and preverbal positions for *di*_{IN} is predicted by neither of the VI being more specific than the other, as they are associated with different prosodic constraints.

⁶Note that in Wakhi, another Pamir language with a system of conjunctions and particles very similar to that of Bartangi, the counterpart to *ca*, *cə*, has a stressed variant *cəy* that usually appears sentence-finally when there is no overt verb, as in Bartangi. But, unlike Bartangi, it can also appear together with a verb (Grjunberg & Steblin-Kamenskij 1976: 654). However, according to Jaroslava Obrtelová (p. c.), in the latter case *cəy* “usually emphasises a relation that would normally be expressed with just *cə*”. Presumably a similar explanation can be provided for Bartangi sentence-final vs. postverbal *=o*.

⁷An alternative to postulating two positions for *to* is to use a prosodic inversion rule (Halpern 1995), such that *to* is optionally a clitic that moves after the first prosodic word if it ends up in clause-initial position, see Bögel (2015) for an LFG implementation. However, there is no evidence that the placement of *to* obeys prosodic rules or that it is an enclitic; in fact, /o/ in Bartangi is phonologically a long vowel, and no known clitics in Bartangi end in long vowels. Furthermore, a dedicated second position for conjunctions seems necessary to account for *di*_{IN}, which has no clause-final or clause-initial variants.

$$(35) \quad \langle [C_2], [\text{di}] \rangle \xrightarrow{\nu} \left[\begin{array}{c} \text{PHON.REP } /di/ \\ \left(\left[\begin{array}{cc} \text{PFRAME} & (\dots (\cdot)_{\sigma})_{\omega} \\ \text{DEP} & \text{LEFT} \end{array} \right] \vee \left[\begin{array}{cc} \text{PFRAME} & ((\cdot)_{\sigma} \dots)_{\omega} \\ \text{DEP} & \text{RIGHT} \\ \text{HOST} & [\text{IDENT } +] \end{array} \right] \right) \end{array} \right]$$

4.5 Worked examples

In Figures 4 and 5, I provide examples of a subordinate clause with the initial and final subordinators *to...at* ‘as soon as’ and a clause with preverbal placement of *ca*, respectively. The implementational details of the f-structure features need not concern us here; semantic labels are supposed to stand for the corresponding meaning constructors. In Figure 4, I treat the postposition *xīz* as a relational noun, which corresponds to the descriptive tradition (Karamxudoev 1973: 263) and its morphosyntactic properties – fully stressed, governs NP in oblique case, etc. – although a more careful study of the properties of Bartangi adpositions is yet to be undertaken. The analysis of verbal morphology follows Belyaev (2025a); specifically, the possibility of vocabulary spanning of the nodes Agr, T, v and $\sqrt{}$, which are adjacent in this example (*sawd* ‘goes’ being an intransitive verb), but which are non-adjacent if the direct object, an adverbial phrase or another element appears between Agr and the verb. An open question is how the collocation of *to...at* is to be established; for the time being, I assume that the syntactic lexical entry⁸ for the meaning ‘as soon as’ in C_I contains a constraint requiring a specific value for the feature *CONJ*, which can only be supplied by the conjunction *=at*. When *to* realizes the meaning ‘until’ or ‘while’, it will not be associated with this constraint.⁹

In Figure 5, the subordinator *ca* realizes the final position C_F but appears preverbally due to the more specific variant in (33) being chosen; in LrFG terms, it is a prefix. Were the clause to lack a verb, as it does in nonverbal predication (18), it would be an independent word, i.e. the features that appear in parentheses in (33) would not be used. I omit a more explicit discussion of such examples in this paper, as they would require a proper analysis of Bartangi nonverbal predication. Presumably, examples without an overt verb ‘to be’ have a different c-structure configuration that lacks T and V nodes, because LrFG does not allow zero root realizations. The important point is that in such a structure, the subordinator will be located at the very end of its clause, predicting that no clausal constituents may appear to its right.

⁸In LrFG, there is a distinction between the syntactic lexicon – which can be called the *syntacticon* – which supplies the annotations that appear on terminal nodes in the c-structure; and the morphological lexicon, or vocabulary, i.e. the list of VIs that serve to realize the information supplied by the syntacticon.

⁹Is is unclear whether the two words for *to* are to be treated as the same VI, or are even etymologically related. In the meaning ‘while, until’ it is clearly a Tajik loanword, but the meaning ‘as soon as’ is not attested in Tajik.

5 Conclusions

In this paper, I have described aspects of the particle and conjunction system of Bartangi in terms of LrFG. I have shown that this language has three developed functional areas: clause-initial, second-position and clause-final. Preverbal subordinators, while being a prominent feature of the Pamir languages, can be described as essentially clause-final (*ca*) or second-position (*di*_{IN}) due to their distributional properties. Thus, while the initial, second and final positions are independently motivated, the preverbal placement of these subordinators is a consequence of them having affixal allomorphs. In standard LFG, the same data would have to be accounted for by either postulating a preverbal clausal position, or by including the *ca*- or *di*- prefixed verbs into the verbal paradigm, which is a different, lexicalist way of capturing the same competition between morphology and syntax.

This result is typologically significant. While sentence-final particles of various kinds seem to be very widespread cross-linguistically (cf. the papers in Hancil et al. 2015), the degree of their obligatoriness and integration into the grammatical system, as well as the range of functions they may encode, widely varies for different linguistic areas. In particular, Panov (2020) identifies an areal type of final particles typical of East and Southeast Asia, but not of Central or South Asia.¹⁰ Iranian languages specifically are not generally described as having a developed inventory of clause-final markers. For instance, all Iranian languages in the sample of Dryer (2013) are described as having clause-initial adverbial subordinators, with the exception of Wakhi (clause-internal type) and Ossetic (mixed type, i.e. clause-initial and clause-internal, see Erschler 2012, Belyaev 2014).

From this perspective, Bartangi comes across as mixed to an extreme, having three distinct structural positions under this analysis and as many as four (initial, final, second, preverbal) from a descriptive point of view. This diversity can potentially be explained by the Pamir languages being located between two linguistic areas as a kind of buffer zone (Stilo 2005): the tendency towards clause-initial markers follows the common Iranian pattern as exemplified by Tajik, while the clause-final positioning corresponds to the pattern found in neighbouring Dardic (described in Bashir 2003: 907 as mostly having left-branching subordinating structures) and Nuristani.

The LrFG analysis provided herein is compatible with this view of the development of phrase structure in Bartangi as a language-specific development rather than a reflection of any universal underlying principles of clausal organization. More broadly, LFG's conception of phrase structure and configurationality (Snijders 2015) does not seem to warrant any *theoretical* notion of "clause-final particle" or "conjunction"; such categories are more akin to cross-linguistic comparative concepts (Haspelmath 2010) along the lines of the types identified in works like Panov (2020). Despite being a formal generative framework, in this respect LFG aligns more with

¹⁰It is telling that no Iranian language in the sample of Panov (2020) has a final polar question particle, except Bukharan Tajik, which borrowed the question particle *mi* from Uzbek (Ido 2007: 7).

functional-typological approaches to language than with the universalist Chomskyan tradition.

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The non-standard German response item *sowieso*

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 221–235



Keywords: response particle, irrelevance, cause, reason, semantics, pragmatics, use conditions, non-at-issue meaning

Frühauf, Felix & Berry Claus. 2025. The non-standard German response item *sowieso*. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 221–235. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.11.  CC-BY 4.0

Abstract

In this paper, we examine the German non-standard response item *sowieso*, which, we argue, is used to indicate that a positive response to a question or agreement with an assertion is obvious. In its primary usage, *sowieso* occurs as an adverb indicating that the host clause is true for a reason not inferable from the immediate discourse context. We explore how the meaning of *sowieso* as a response item is connected to its adverbial use. We propose that the different uses of *sowieso* are connected via the notion of comparative causal efficacy. In the standard adverbial case, *sowieso* compares possible reasons for its host clause. As a response item, however, it compares possible reasons for its host clause with possible reasons for relevant alternatives, yielding the result that the host clause proposition emerges as the most compelling among its competitors.

1 Introduction

Research on response items has mainly focused on the standard particles *yes* and *no* and their counterparts across languages. Non-standard response items like *probably* or *absolutely* have received less attention.¹ It is a common theme that sentence adverbs are used as response items (Cambridge University Press 2016).² Often, they will signal a heightened (1b) or lessened degree of certainty (1c) concerning the picked up proposition, compared to the standard particle response.

- (1) Are you coming to the party?
a. Yes.
b. Absolutely/Definitely.
c. Probably/Maybe.

In this paper, we focus on a particular German non-standard response item, *sowieso*, as used in (2). *Sowieso* is standardly used as an adverb expressing that the embedded proposition holds independently of some otherwise mentioned proposition (roughly $\approx$ *anyway* in (3)).

- (2) A: Freust du dich auf den Urlaub? B: Sowieso.
A: are.happy you yourself on the holiday B: SOWIESO
'A: Are you looking forward to the holiday? B: Of course.'

[†]We thank the audience at the Minor Sentence Types workshop and the 32nd HPSG conference in Lisbon as well as the reviewers for the workshop and the proceedings for valuable comments.

¹Some exceptions being Krifka (2013) on *okay* and *right*, Greenberg & Wolf (2019) on Hebrew *legamrey* 'absolutely'.

²<https://dictionary.cambridge.org/grammar/british-grammar/adverbs-as-short-responses-definitely-certainly>

- (3) Ich kann dein Buch zurückgeben. Ich muss sowieso in die
 I can your book return I must SOWIESO in the
 Bibliothek.
 library
 ‘I can return your book. I have to go to the library anyway.’

The aim of this paper is to reconcile the standard adverbial *sowieso* with its use as a response item. To do this, we first sketch analyses for the adverbial uses of *sowieso* in section 2, before we extend one of the analyses to the responsive use in section 3. We argue that what connects all uses of *sowieso* is a comparison over reasons for the host proposition. Section 4 concludes the paper.

2 An account of adverbial *sowieso*

The German word *sowieso* originally derives from a compound form consisting of three elements: *so wie so*, literally ‘so as so’, i.e., this way the same as that way.³ There are two cases to consider here: what we call the standard case (3), which has been the main focus of the literature so far, and the parallel structure case (4). We assume that, in the standard case, *sowieso* conveys that there is a reason for the host clause proposition that was not inferable from the discourse context. The parallel case typically involves the same predicate both in the antecedent clause and in the *sowieso* host clause. The interpretation is scalar in that the speaker expresses greater confidence in asserting the host clause of *sowieso* than the antecedent. Section 2.1 presents the analysis for the standard case and section 2.2 extends it to the parallel case.

- (3) Ich kann dein Buch zurückgeben. Ich muss sowieso in die
 I can your book return I must SOWIESO in the
 Bibliothek.
 library
 ‘I can return your book. I have to go to the library anyway.’
- (4) Ich danke dir für die Kritik, und für das Lob danke ich dir
 I thank you for the criticism and for the praise thank I you
 sowieso.
 SOWIESO

³*Sowieso* has at least two reported synonyms: *ohnehin* and *eh* (Weydt 1983). Federal German *eh* is not to be confused with Austrian German *eh*, see Zobel (2017). Breindl (2014) reports that *ohnehin* and Federal German *eh* are not attested in a response item fashion, but this has not been studied further and we don’t comment on these reported synonyms in the rest of the paper. The meaning and distribution of *sowieso* are slightly different in Dutch, where it exists as a loanword (Claus et al. 2025).

‘I thank you for the criticism and all the more so for the praise/and it is even clearer that I thank you for the praise.’

2.1 The standard case

We follow Weydt (1983), Helbig (1988) and Claus et al. (2025) in assuming that *sowieso* has a causal component. Its meaning contribution is split into a use-conditional part and its at-issue meaning. (5) gives a representation of the meaning of *sowieso_{st}*(*q*), i.e., the standard case. The use of *sowieso_{st}* requires that there be a proposition (*p_a*, subscript *a* for antecedent) mentioned in, or directly inferable from, the preceding discourse context that counts as a potential cause or reason ($\rightsquigarrow_c$) for the host proposition of *sowieso_{st}*(*q*). If this use condition is fulfilled, the speaker of *sowieso_{st}*(*q*) asserts that there is a proposition (*r*) different from every potentially causing proposition *p_a* inferable from the context, which counts as a better cause or reason for *q*, where ‘better’ is to be understood as a higher causation potential.⁴ Given that *r* counts as a reason for *q* on its own, the use of *sowieso_{st}*(*q*) states the causal decisiveness of a proposition different from any contextually given one, effectively rendering every other potential reason ineffective or irrelevant in the given situation.

$$(5) \quad \llbracket \textit{sowieso}_{st}(q) \rrbracket = \exists p_a [p_a \rightsquigarrow_c q] \text{ (use condition)} \\ q \wedge \exists r \forall p_a [(p_a \rightsquigarrow_c q) \rightarrow (r \neq p_a \wedge (r, q) >_c (p_a, q))]$$

Looking at the example in (3), we get the following interpretation: returning the book for the addressee counts as a potential reason for the speaker to go to the library ($\exists p_a [p_a \rightsquigarrow_c q]$), but there exists another proposition ($\exists r [r \neq p_a]$), which has a higher causal potential for the speaker’s going to the library ($(r, q) >_c (p_a, q)$). This actual reason does not have to be mentioned. In the case at hand, the speaker might have plans to meet a friend in the library. Usually, there is one potential reason mentioned or inferable from the context, as in (3), but we can imagine a speaker listing several different reasons why the addressee should be doing something, to which the addressee can respond by using *sowieso_{st}*(*q*): none of the listed reasons is as good as the one they already have for doing *q*. Therefore, universal quantification over possible reasons is included in (5).⁵

⁴We use *cause* and *reason* interchangeably here. Sometimes it is more natural to speak of a cause (a house being destroyed by either a flood or a fire), and sometimes of a reason (why some agent acts). What is important is that *p_a* and *r* are (potentially) causally efficacious in some way.

⁵There is a second case that can be considered standard but which differs from what we have presented here. In this case, the antecedent still conveys a possible cause for a consequence, but the host clause of *sowieso_{st}* does not denote that consequence, but it denotes the competing cause itself: not being offered anything to eat and not being hungry are both reasons why one would not eat anything. The general semantics for *sowieso_{st}* is the same, but now the host clause is a better reason than the antecedent.

That ‘ $(r, q) >_c (p_a, q)$ ’ is part of the at-issue meaning can, for example, be observed in questions ((6), example from Bruijnen & Sudhoff (2013)). A potential reason for going to the coffee machine (p_a) is to be determined from the context: A’s question implicates the proposition that A is bringing B a coffee. This could be such a reason ($p_a \rightsquigarrow_c q$). B asks whether there is a reason r , different from bringing B a coffee (p_a), such that A would go to the coffee machine because of r rather than because of p_a ($\exists r \forall p_a [(p_a \rightsquigarrow_c q) \rightarrow (r \neq p_a \wedge (r, q) >_c (p_a, q))]$?).⁶

- (6) A: Möchtest du einen Kaffee? B: Kommst du sowieso am
 A want you a coffee B come you sowieso at.the
 Kaffeeautomaten vorbei?
 coffee-machine by
 ‘A: Would you like a coffee? B: Are you passing by the coffee machine anyway?’

2.2 The parallel structure case

A special use of *sowieso* is what we refer to as the “parallel structure” case (4). The antecedent and the host clause of *sowieso* in (4) have the same predicate but differ only in the prepositional phrase. Often, the predicate is elided, as can be seen in (7).

- (7) Erwachsene mögen Süßigkeiten. Und Kinder sowieso.
 Adults like sweets and children SOWIESO
 ‘Adults like sweets and children all the more so/for children it’s even clearer.’

The case is different from the standard case discussed above since one does not get the interpretation that some (implied) antecedent proposition is irrelevant to the realization of the host clause proposition. Instead, the interpretation appears to be scalar in the sense reflected in the two possible translations, see (7). We propose that *sowieso* in parallel structure cases such as (7) has slightly different truth conditions from the standard case, but that both uses are connected via the comparison of causal efficacy. Rather than comparing a potential reason from the context with an unmentioned one, both with respect to the host proposition, potential reasons for the antecedent proposition(s) are compared with reasons for the host clause proposition.

-
- (1) A: Ich kann dir nichts zu essen anbieten. B: Ich hab sowieso keinen Hunger.
 A I can you nothing to eat offer B I have SOWIESO no hunger
 ‘A: I can’t offer you anything to eat. B: I am not hungry anyway.’

⁶For the at-issue status, see also the discussion around the examples in (13).

To obtain the scalar interpretation of (7) or (4), a specific configuration is needed: the antecedent proposition has to be part of the focus alternatives of the host proposition. Consider the full clause variant in (8). In general, we can obtain both the scalar and the standard interpretation. The actual interpretation will depend on the preceding discourse context and the focus structure.

- (8) Und Kinder mögen Süßigkeiten sowieso.
 and children like sweets SOWIESO
 ‘And for children it’s even clearer that they like sweets.’ or ‘And there is a different reason why children like sweets.’

Given the most natural focus placement on *Kinder*, the scalar interpretation is accessible, but only if the preceding context contains a focus alternative of the host clause, i.e., a clause where the host clause’s focused constituent is replaced by a contextually relevant alternative (e.g., *adults like sweets* or *middle-aged men like sweets*). Without such an antecedent proposition, only the standard interpretation is available. (9) illustrates such a case. As a context for (9), assume that it is uttered by a product marketing manager talking about a new sweets packaging design. The host clause prosody is the same as in the parallel structure case, but since no relevant focus alternative antecedent is present, the usual scalar interpretation of (7) is missing.⁷

- (9) Wir müssen die Packung nicht cooler machen. Es geht nicht
 we must the packaging not cooler make it goes not
 um Erwachsene, sondern um Kinder. Und [Kinder]_F mögen
 about adults but about children and children like
 Süßigkeiten sowieso.
 sweets SOWIESO
 ‘We don’t have to make a cooler packaging. We are dealing with children, not adults. And children like sweets anyway [for reasons independent of the packaging].’

Taking seriously the focus sensitivity of *sowieso_{ps}*, we propose the lexical entry in (10) (preliminary).

- (10) $\llbracket \text{sowieso}_{ps}(q) \rrbracket = \exists p_a [p_a \in \text{FOC-ALT}(q) \wedge p_a = 1]$ (use condition)
 $q \wedge \exists r \forall p_a \forall p_r [(p_a \in \text{FOC-ALT}(q) \wedge p_r \rightsquigarrow_c p_a) \rightarrow ((r, q) >_c (p_r, p_a))]$

Applying (10) to the *sweets*-example (7) results in the following interpretation: First, the utterance of *sowieso_{ps}(q)* is felicitous because there is a true antecedent proposition (p_a) that is part of the focus alternatives

⁷Note that *Es geht nicht um Erwachsene* is not a focus alternative of *[Kinder]_F mögen Süßigkeiten* as the former is not a structurally identical variation of the latter clause (with the focused expression replaced).

of the host proposition (q): adults like sweets. Against this backdrop, it is asserted that q is the case (children like sweets) and that there exists a proposition r whose causal efficacy for q exceeds that of any reason p_r for the antecedent proposition p_a ($(r, q) >_c (p_r, p_a)$), using the same notion of comparative causal efficacy from the standard case. Whatever counts as a reason why adults like sweets, there is a better or stronger reason why children like sweets. Note again that there could well be multiple antecedent propositions with possible causes against which r is compared (*Old men like sweets, young women like sweets, and children like sweets* SOWIESO), which motivates the universal quantification over antecedent focus alternatives.

This account arguably lacks an element. In the standard case example and in (4), we were concerned with examples in which the speaker invokes reasons for acting that have not been considered in the context. However, consider (11) (from the DeReKo corpus (IDS 2020)). One possible interpretation of (11) is that the speaker does not claim that there is a more compelling reason why these chemical elements are found outside Earth. In fact, the speaker might not be aware of why these elements occur where they occur. Instead, what seems to be the case is that the speaker has more compelling reasons to *believe* or to *assert* that they are found outside Earth, e.g., because the occurrence is more frequently observed or better documented. That is to say that the causal component of *sowieso*_{ps} in this case appears to operate on some level above the propositional level.

- (11) Promethium und Technetium kommen auf der Erde vor [...].
 Promethium and Technetium come on the Earth PRTCL
 Und außerhalb der Erde sowieso.
 and outside the Earth SOWIESO
 ‘Promethium and Technetium are found on Earth. And certainly outside Earth.’

A possible route to go would be to assume that *sowieso* in this construction acts on the assertion level rather than the propositional level. Under this assumption, *sowieso*_{ps} acts similarly to the degree modifier *absolutely* that has an at-issue contribution on the propositional level when modifying adjectival degrees (12a) and that has been argued to modify the degree of credence on the speech act level in examples like (12b) (Greenberg & Wolf 2018). As a consequence, the meaning contribution in (12a) is at issue, while the contribution in (12b) is not. This can be witnessed by the felicitous continuation *No, it is almost full* for (12a) and the infelicitous continuation *No, #you’re not that certain* for (12b).

- (12) a. A: The glass is absolutely full.
 b. A: John is absolutely coming to the party.

If *sowieso* in parallel constructions acts on the speech act rather than the propositional level, we would expect the whole meaning contribution of *sowieso_{ps}* to be non-at-issue in these cases. This should be reflected in rejection behaviour. Consider first the rejections in (13), exhibiting two standard *sowieso* examples. Both answers of B can be interpreted as rejecting the existence of an independent reason for the host proposition of *sowieso*, even if the host proposition itself is not doubted.⁸

- (13) a. A: Das war bestimmt kein Stress für Hans. Er war sowieso
 A that was certainly no stress for Hans he was SOWIESO
 in Berlin. B: Das stimmt nicht!
 in Berlin B that is.right not
 ‘A: Certainly, that wasn’t stressful for Hans. He was in Berlin
 anyway. B: That’s not true.’
 b. A: Warum bist du denn hier? B: Ich war sowieso gerade in
 A why are you PART here B I was SOWIESO just in
 der Gegend. B: Das glaube ich dir nicht.
 the area B that believe I you not
 ‘A: Why are you here? B: I was just in the area anyway. B: I
 don’t believe that.’

By contrast, consider the parallel construction case in (14). To us, the rejection by A is harder to understand as challenging the meaning contribution of *sowieso*, i.e., the rejection is less compatible with A believing the host proposition of *sowieso*. The relevant interpretation would be one under which A in (14) accepts both the fact that adults like sweets and that children like sweets, but rejects the contribution of *sowieso*. The case is not clear-cut though and judgments are mixed.

- (14) A: Erwachsene mögen Süßigkeiten. B: Und Kinder sowieso. A:
 A adults like sweets B and children SOWIESO A
 Das stimmt nicht!
 that is.right not
 ‘A: Adults like sweets. B: And children even more obviously. A:
 That’s not right!’

However, even if we manage to get a successful interpretation for *sowieso* denial in (14), it is always possible to challenge the meaning contribution of illocutionary modifiers as well: in response to (12b), one could say *No, I also believe that he’s coming, but I wouldn’t say he’s “absolutely” coming*. In the

⁸Note that the rejection can also target the host proposition of *sowieso* or the conjunction of the two sentences uttered by A in (13a). We only claim that the contribution of *sowieso* can be rejected, while its host proposition is accepted. We make no claim about which antecedent is more salient for rejection.

same way, A could respond in (14) by saying *No, they might like them but I wouldn't say "sowieso"*. Additionally, that the contribution of *sowieso_{ps}* is not as easily targetable by denial and negation in general might be due to the fact that to occur it requires a specific focus structure, which also acts to background *sowieso*'s meaning contribution. At this point, more research is needed to settle the question of what the (non-)at-issue status of the *sowieso* contribution in parallel structure cases is. For now, we are considering two possibilities to capture the meaning impact on the epistemic or speech act level that *sowieso_{ps}* seems to have, but we leave the decision between them for future research. One way would be to claim that *sowieso_{ps}* does not operate on a proposition, but on a speech act. This is what Greenberg & Wolf (2018) propose for *absolutely* in cases like (12b). The entry for the parallel structure case in (10) would then need a little update and instead of taking propositions, it would operate on assertions. Alternatively, *sowieso_{ps}* still combines with propositions, but compares reasons to assert one proposition over the other, an alternative that is sketched in (15).

$$(15) \quad \llbracket \text{sowieso}_{ps}(q) \rrbracket = \exists p_a [p_a \in \text{FOC-ALT}(q) \wedge p_a = 1] \text{ (use condition)} \\ q \wedge \exists r \forall p_a \forall p_r [(p_a \in \text{FOC-ALT}(q) \wedge p_r \rightsquigarrow_c \text{ASSERT}(p_a)) \rightarrow \\ ((r, \text{ASSERT}(q)) >_c (p_r, \text{ASSERT}(p_a)))]$$

Finally, two more notes on the current formalization. First, compared to the standard case, we have dropped the requirement that $r \neq p/p_r$. The rationale behind this move is that the value of any given cause or reason is not fixed but variable. For instance, the same upcoming deadline may be a stronger reason for person A to feel stressed than for person B, even though both are affected by it. This difference in affectedness can be attributed to different background assumptions about A and B that factor into the causal network. Second, the way we have formalized the meaning in (10)/(15), there is one reason/cause that trumps the other reasons/causes. This captures one intuitive reading of the cases at hand, but there is also a reading according to which there is an additional reason for the host clause proposition compared to the antecedent clause proposition, but it is not a strong reason on its own. This is not yet captured by the formulas given (without further information about the causal calculation). A possible improvement would be to compare the union of reasons for p_a with the union of reasons for q , but we leave this for future work. Overall, the notion of comparative causal efficacy deserves more fleshing-out in the future, but the exact implementation of this notion is orthogonal to the goal of this paper, which is to prove the connection between different uses of *sowieso* and which we believe can be achieved by appealing to a rather intuitive notion of causal comparison.

3 Response item *sowieso*

After having established a possible way of capturing the meaning of standard adverbial *sowieso* and its extension to the parallel case, we now turn to *sowieso* used as a response item. Section 3.1 serves to establish the environments in which *sowieso* is used as a response item. In section 3.2, we extend our analysis of adverbial *sowieso* to the responsive use.

3.1 Data

In this section, we will cover what could be called two subtypes of responsive *sowieso*. The first subtype is often found in monologues, answering questions introduced for expository reasons. (16) attempts to answer the larger question of who the likely candidates to win a sports championship are. However, we can imagine the same example where the questioner and the answerer are two different people. (Examples (16)-(20) all from the DeReKo corpus.)

- (16) Italien? Klar. Deutschland? Sowieso. Frankreich? Immer ein
Italy clearly Germany SOWIESO France always a
Kandidat.
candidate
'Italy? Clearly. Germany? Obviously. France? Always a candidate.'

This type of example resembles the parallel structure case discussed above; it is characterized by parallel antecedents. The example in (16) would read out as: *Italy is clearly a candidate, and Germany SOWIESO*. We also find examples with negation as in (17). If the antecedent contains negation, *sowieso* cannot occur bare. This first 'subtype' of response item *sowieso* is just an elliptical version of the parallel construction discussed in section 2.2, and as such it does not offer any new challenges, as whatever holds for the parallel structure case laid out in section 2.2 also holds here.

- (17) Die letzte Heimpartie verliert man nicht [...] Und das letzte
the last home.game loses one not and the last
Auswärtsspiel? Sowieso nicht!
away.game SOWIESO not
'You don't lose the last home game, and the last away game? Certainly not.'

The second subtype does not have a parallel antecedent and behaves more like a genuine response item. It occurs with positive polar questions (18), rising declaratives (19) and assertions (20).

- (18) A: Das klingt nach einem strengen Elternhaus. Haben Sie
A that sounds after a strict parental.home have you

Ihrem Vater inzwischen verziehen? B: Sowieso. Eltern machen
 your father in.between forgiven B SOWIESO parents make
 doch immer das, was sie [...] für das Beste halten.
 DOCH always that what they for the best hold
 ‘A: That sounds like a strict parental home. Have you forgiven your
 father in the meantime?
 B: Obviously. Parents always do what they think is the best.’

- (19) A: Einen angenehmen Tag, Tom. Wir telefonieren? B: Sowieso.
 A a pleasant day Tom we telephone B SOWIESO
 ‘A: Have a nice day, Tom. Shall we talk on the phone? B: Certainly!’
- (20) A: Ich denke, das Thema ist [...] kompetent [...] genug
 A I think the topic is competently enough
 dargestellt, um hier als lesenswerter Artikel prämiert zu
 presented in.order here as read.worthy article awarded to
 werden. B: Sowieso.
 be B SOWIESO
 ‘A: I think the topic is presented competently enough to be awarded
 as an article worth reading here. B: Certainly.’

Sowieso can only be used to express agreement, i.e., it can only pick up the proposition that was asserted or made salient by the polar question, and it cannot switch polarity. As before, if the antecedent proposition contains negation, *sowieso* has to co-occur with negation as well (21). If the question contains ‘high negation’, i.e., if it is biased towards the positive polarity answer, *sowieso* behaves like the standard polar response particles in that it does not require negation and asserts the positive proposition (22).

- (21) A: Bist du noch nicht eingeschrieben? B: Sowieso #(nicht).
 A are you yet not enrolled B SOWIESO not
 ‘A: Are you not yet registered? B: Obviously (not).’
- (22) A: Bist du nicht schon eingeschrieben? B: Sowieso (#nicht).
 A Are you not already enrolled B SOWIESO not
 ‘A: Aren’t you already enrolled? B: Obviously (not).’

This second subtype of responsive *sowieso* behaves differently from the first type because it does not appear to be elliptical in the same way. Unlike in the first type, a non-elliptical answer cannot be used instead while maintaining the same meaning, as illustrated in (23) as a variant of (18) and (24) as a variant of (2).

- (23) A: Das klingt nach einem strengen Elternhaus. Haben Sie
 A that sounds after a strict parental.home have you

Ihrem Vater inzwischen verziehen? B: Ich habe meinem Vater
 your father in.between forgiven B I have my father
 sowieso verziehen.
 SOWIESO forgiven

‘A: That sounds like a strict parental home. Have you forgiven your
 father in the meantime?’

B: I have forgiven my father for some reason not mentioned in the
 context before’

- (24) A: Freust du dich auf den Urlaub? B: Ich freue
 A are.happy you yourself on the holiday B I am.happy
 mich sowieso auf den Urlaub.
 myself SOWIESO on the holiday

‘A: Are you looking forward to the holiday? B: I am looking forward
 to the holiday for a reason different from what has been mentioned.’

The full replies in (23) and (24) are not equivalent to the bare *sowieso* answer. While acceptable on their own, they are infelicitous to use in the given context, because they answer a different question: Is q true because of p ? Answer: q is true, but because of r (we have indicated that answer in the translations). That is, as the use conditions for $\text{textit{sowieso}}_{ps}$ are not fulfilled, the interpretation of the answers in (23) and (24) is that of the standard case, and hence a different interpretation than response item *sowieso*.

The closest translational equivalents of the second subtype of responsive *sowieso* in English seem to be *of course* or *obviously*. The speaker expresses a strong affirmation towards the positive answer and conveys that a positive answer was to be expected and that the question need not have been asked in the first place.⁹

3.2 Analysis

Responsive *sowieso* is one of a series of expressions that originate as an adverb and develop into response items. These response items are mainly used to intensify or weaken the assertion. Other examples in German and English include *absolut/absolutely*, *definitiv/definitely*, and *wahrscheinlich/probably* (25).

- (25) Is the vase expensive? Absolutely! Definitely! Probably!

⁹A reviewer suggested that sowieso_{resp} could pick up the motive of the question in the sense of Ginzburg et al. (2022). While the pragmatic effect might be explained in terms of questioning the motive of the question (*why do you even ask?*), our semantic analysis goes a different route, see section 3.2.

Greenberg & Wolf (2019) have proposed an analysis of the Hebrew intensifying response item *legamrey* ‘absolutely’ (26) in terms of degree modification of the ASSERT operator (27). It picks up a contextually given antecedent proposition and asserts it with a maximal degree of credence. The analysis is thus an extension of the sentence-adverb-as-speech-act-modifier analysis discussed in section 2.2.

- (26) A: ha-argartal yakar. B: legamrey!
 A the-vase expensive B legamrey
 ‘A: The vase is expensive. B: Absolutely!’
- (27) A: ASSERT(the vase is expensive)
 B: legamrey ASSERT(the vase is expensive_c)

While *sowieso* cannot be analyzed as a degree modifier, we nevertheless get the effect of a strengthened assertion: the answer is obviously true. Let us now consider how our meaning proposal for *sowieso* can be reconciled with its use as a response item. In this section, we propose a tentative solution: responsive *sowieso* has developed into a generalized parallel structure case without an overt parallel antecedent. The taken-for-grantedness that is conveyed by using *sowieso* as a standalone response is similar to what is conveyed in the parallel structure case. The parallel structure case brings about a comparison of reasons for asserting the *sowieso* host clause with reasons for asserting the antecedent proposition with the result that there are more or better reasons to assert the *sowieso* host clause. In the responsive case, an appropriate antecedent clause is lacking. However, the general feeling of obviousness remains: the speaker of responsive *sowieso* has stronger reasons to assert the positive answer than they have for any alternative proposition. (28) represents the general schema we have in mind.

- (28) $q?$ $[[p, \text{and}]]$ SOWIESO $[q]$.

Applying the general schema to (18) gives us (29). *Sowieso_{resp}* picks up the salient proposition from the polar question and asserts it. Furthermore, it compares reasons for forgiving the father with reasons for alternative propositions and asserts that there are better reasons for forgiving the father than for relevant alternatives.

- (29) (18) = Have you forgiven your father?
 $[[\text{I have done all kinds of things, and}]]$ I have forgiven my father]
 SOWIESO

Focus marking also seems to play a role, comparable to the parallel structure case. If instead of a broad focus, there is narrow focus on *forgiven* in the question, the use of *sowieso* expresses that the forgiven-relation holds, more clearly than any relevant alternative relation (30).

- (30) Have you [forgiven]_F your father?
 [[I stand in some alternative relation to my father, and] I have
 [forgiven]_F my father] SOWIESO

We can assign *sowieso*_{resp} virtually the same meaning as the parallel structure case, except that it does not require a previously mentioned focus alternative antecedent, as shown in (31). The same reasoning regarding the impact on the assertion level applies as in section 2.2 for the parallel structure entry (15). (31) might need to be updated with reference to the assertion level. Whatever turns out to be the viable approach for the parallel structure case should also apply here.¹⁰

- (31) $\llbracket \text{sowieso}_{resp}(q) \rrbracket =$
 $q \wedge \exists r \forall p \forall p_r [(p \in \text{FOC-ALT}(q) \wedge p_r \rightsquigarrow_c p) \rightarrow ((r, q) >_c (p_r, p))]$

4 Conclusion

This paper has examined the non-standard response item *sowieso*, which marks an obvious positive response to questions and assertions. We argued that the meaning contribution of *sowieso* as a response item can be traced back to its adverbial core. We proposed that while different uses of *sowieso* have different concrete semantics, they are connected via a common core of comparative causal efficacy. Responsive *sowieso* makes the initial question or statement appear superfluous, as it conveys that an affirmative response is obvious; if there are reasons for anything at all, there are even stronger reasons for the contextually given antecedent proposition. Further research is needed to spell out the exact semantic formalization of causal comparison, proposed in an informal manner here. A further topic for future studies is the diachronic development of the different uses of *sowieso*. According to our analysis, we should expect that the response-item use emerged only after the proper parallel structure use. Beyond the specific topic of *sowieso*, it would be valuable to further explore the realm of non-standard response items in German and other languages more generally, particularly with respect to which adverbs or particles can develop into response items, and why.

¹⁰Eggs (2003) also notices a relationship between the parallel structure case and the response item. She remarks that both cases indicate that the overt question (in the responsive case) or a covert question (in the parallel case) need not be answered, as the answer is obvious. Bruijnen & Sudhoff (2013) mention the responsive use of *sowieso* in passing and they mention in a footnote that the responsive use can be explained in the same way as the standard adverbial one. They do not propose a concrete analysis and they do not consider the parallel structure case in their paper.

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Exclamative sluices in Tunisian Arabic

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 236–258



Keywords: Ellipsis, Sluicing, Exclamatives, Tunisian Arabic, HPSG

Hassen, Amal, Jonathan Ginzburg & Anne Abeillé. 2025. Exclamative sluices in Tunisian Arabic. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 236–258. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.12.  CC-BY 4.0

Abstract

This paper studies the syntax and semantics of exclamative sluices (*What a pity!*) in Tunisian Arabic. Based on corpus data and two acceptability judgment experiments, the study investigates exclamative sluices formed with *shnowa* ‘what’, *qadesh* ‘how much’, and the exclamative word *mallā*. The corpus results show that *mallā*-sluices are frequent (82.1% in written data), while other exclamative sluices are rare. Semantically, *mallā*-sluices often allow exophoric interpretations, whereas *qadesh*-sluices mainly allow recent reference readings. Experimentally, *mallā* and *qadesh* sluices were rated as acceptable as their verbal non-elliptical counterparts, indicating no ellipsis advantage nor penalty. Embedded sluices occurred under both factive and non-factive predicates, suggesting that exclamatives denote propositions (Marandin 2018) rather than facts. Following Ginzburg and Kim (2023), we analyze exclamative sluices as non-sentential utterances with propositional content modeled via a ScaleUp predication over contextually salient entities.

1 Introduction

Wh-exclamatives can be either verbal, as in (1a) or non-verbal. Non-verbal exclamatives lack either the verb, as in (1b), or both the verb and the subject, as in the sluice in (1c).

- (1) a. What a nice face she has!
- b. How fresh and green the grass!
- c. What a beautiful day!

Exclamative sluices have received little attention in the literature compared to interrogative sluices. One reason for this is that exclamative clauses are often not recognized as an independent clause type. They are often assumed to share the same *wh*-words (and syntax) as interrogatives but to denote facts (Ginzburg & Sag 2000) rather than propositions, unlike declaratives. Ginzburg and Sag (2000), Zanuttini and Portner (2003), Siemund (2015), among others, suggest a clause-type for exclamatives in English. Ginzburg and Sag (2000) suggest that exclamatives differ from both declaratives and interrogatives in their semantic type. While interrogatives are associated with questions, exclamatives denote facts. For French, Marandin (2008) and Abeillé and Godard (2021) suggest that exclamative clauses are a specific clause type with a propositional content: example (2) shows that exclamatives

[†]This work has received support from the investment programme “France 2030” as part of the IdEx programme (ANR-18-IDEX-0001) implemented by Université Paris Cité, under which the inIdEx project EFL is conducted.

can be embedded under non-factive verbs, indicating that their content is not necessarily factive.¹

- (2) Marie nous a raconté [comme Paul avait souffert pendant sa jeunesse].
 Mary us has told how Paul has suffered during his youth
 ‘Marie told us how Paul had suffered in his youth.’ (Marandin 2018: 23)

For English, Ginzburg and Kim (2023) argue that exclamatives both introduce a novel propositional content and update the speaker’s MOOD, which is their public emotional stance. Exclamatives pattern with interrogatives in some respects, yet they seem to differ crucially in others, such as in their distribution, embeddability, and interpretation. For example, as interrogatives, exclamatives allow sluices, and while interrogative sluices can typically embed, Ginzburg (2012) and Ginzburg and Kim (2023) argue that exclamative sluices in English cannot (see (3)).

- (3) a. What a shot!
 b. *It’s amazing what a shot.
 c. It’s amazing what a shot she made.

This point has been used to argue that sententialist analyses to ellipsis, which consider exclamative sluices as verbal covert clauses, face significant challenges. Ginzburg (2012) suggests instead that exclamative sluices are non-sentential utterances (NSUs) that share only semantic properties with their non-elliptical counterparts.

Ginzburg and Kim (2023) argue against a structural approach to ellipsis and in favor of a direct interpretation approach, analyzing exclamative sluices as non-sentential utterances (NSUs) whose meaning is recoverable from context. In a corpus study of English exclamatives (*what a* + N, *how* + Adj) across the BNC, London Lund, and COCA, they found that exclamative sluices occur more frequently than their non-elliptical counterparts, echoing results by Siemund (2017).

They identified three types of readings, which can be diagnosed based on what the exclamative refers to in context: (i) Recent Question Under Discussion (RQUD), where the recent proposition in the antecedent is used to resolve the sluice, as in (4), (ii) Recent Reference (RRef), where only a specific individual or entity mentioned in the antecedent is used, as in (5), and (iii) Exophoric or inferred interpretation (ExInf), relying on a non-linguistic antecedent or on a conclusion drawn from a prior utterance, as in (6).

¹This relates to the wider theoretical debate on whether exclamatives are fundamentally assertive/propositional or non-assertive (see e.g., Chernilovskaya 2014, Driemel 2017).

- (4) A: Look, leaving Nick all the way down there all on his own! What a shame! (BNC) (→ What a shame that (they were) leaving Nick all the way down there all on his own!) (Ginzburg & Kim, 2023: 6).
- (5) Tim: Here’s my cracker! Dorothy: Oh what a lovely cracker! (BNC) (→ what a lovely cracker this cracker is) (Ginzburg & Kim 2023: 7).
- (6) (Context: New Conversation) Madge: What a lovely garden! Anon 4: Hello Jean! Anon 1: Isn’t it? That’s what I was saying (Ginzburg & Kim 2023: 7).

Their analysis shows that exophoric readings are predominant, suggesting that the meaning of most exclamative sluices does not rely on linguistic antecedents. Furthermore, exclamative sluices cannot be embedded, unlike sentential exclamatives or interrogative sluices, though exclamative clauses can embed under a variety of matrix verbs (3c), including non-factive verbs (see (7) for an example of NF use), supporting Marandin’s (2008) claim that they denote propositions rather than facts.

- (7) Jo tried to convince me what a fine, virtuous leader Nero had been. (Ginzburg & Kim 2023: 19)

1.1 Tunisian Arabic exclamatives

Wh-exclamatives in Tunisian Arabic (TA) are formed using *shnowa* ‘what’ (see (8a)), *qadesh* ‘how much’, or the exclamative-only word *malla*².

The word *qadesh* can introduce adjectives (8b) or nouns (8c), while *malla* can precede either a noun, as in (8d), or an adjective, as in (8e).

- (8) a. *shnowa ha-l zin!*
 what this-the beauty
 ‘What a beauty!’
- b. *qadesh mezyena!*
 how.much beautiful.SG.F
 ‘How beautiful!’
- c. *qadesh dkhama!*
 how.much elegance
 lit. ‘How much elegance!’

²*Malla* does not have an exact equivalent in English. Depending on the context, it can be translated to ‘what a’, as in (i), or the exclamative ‘how’, as in 8e. Therefore, in the glosses, we will refer to *malla* as EXCL.

- (i) *malla jaw*
 what vibe
 ‘What a vibe!’

- d. malla dkhama!
EXCL elegance
lit. ‘What elegance!’
- e. malla bhim!
EXCL donkey
‘How stupid!’

TA allows non-elliptical verbless exclamatives, which include a subject but lack a verb, as in (9). These differ from sluices, which are fully elliptical and lack both a subject and a verb.

- (9) qadesh mezyen-a ha tofla!
how.much beautiful-F.SG DEM girl
‘lit. How beautiful this girl!’

To the best of our knowledge, exclamatives in TA, and particularly exclamative sluices, have not been previously studied. The following sections present a corpus study and two acceptability judgment experiments that study the syntactic and semantic properties of exclamative sluices in TA.

2 Corpus study of Tunisian Arabic exclamatives

We conducted a corpus study of exclamatives in TA, based on both written and spoken data. The goal is to study their syntactic properties, focusing on the frequency of elliptical versus non-elliptical forms, the ability of sluices to be embedded and the types of predicates that allow their embedding, and their semantic interpretations.

2.1 Extraction

We searched for exclamatives with three words *shnowa* ‘what’, *qadesh* ‘how much’ and *malla* in two corpora: The Tunisian Arabic Corpus (TAC) (Karen & Faiza 2010, Younes et al. 2015) includes both spoken and written data in different genres (blogs, TV/movies/plays, fiction, non-fiction, newspapers, web posts, forums, and SMS/Facebook), and the Spoken Tunisian Arabic Corpus (STAC)³ (Zribi et al. 2015) includes radio recordings.

2.1.1 Written corpus

We extracted 1485 tokens, 645 with *shnowa* ‘what’, 675 with *qadesh* ‘how much’, and 165 with *malla*. We then filtered out duplicates, interrogatives and declaratives, as well as examples that are rather indefinites (as in (10a)),

³We thank Prof. Lamia Hadrich Belguith and Dr. Inès Zribi for allowing access to STAC, and Dr. Asma Mekki for providing additional annotations.

and when *qadesh* is used to mean *so long* (as in (10b)) and when it is used with the preposition *men* ‘from’ (10c), to indicate a number of times.

- (10) a. e-nahda tnaseb fi nafsha ka hami le-din w
the-Nahdha is.positioning in herself as protector of-religion and
ma naaraf shnowa.
NEG know what
‘The Nahdha is positioning itself as the protector of religion and I
don’t know what.’
- b. aand-i qadesh n-heb n-estadaa-k
PREP-1SG how.much 1SG-love 1SG-invite-2SG
‘I’ve been wanting to invite you for a long time.’
- c. qadesh men mara qal-i n-heb-ek
how.much from time he.told-me 1SG-love-you
‘How many time he told me that he loved me.’

After filtering, the written data consisted of 442 exclamatives, 14 with *shnowa*, 277 with *qadesh*, and 151 with *malla*.

2.1.2 Spoken corpora

The spoken data were collected from the spoken part of TAC and from STAC. We extracted a total of 162 tokens: 135 with *shnowa*, 27 with *qadesh* and none with *malla*. After filtering out interrogatives and indefinite uses (e.g. *dra shnowa* ‘I don’t know what’), only 3 exclamatives with *shnowa* + N remained. Among the *qadesh* verbal tokens, 2 were exclamatives. In total, 5 exclamatives were found in the spoken corpora.

2.2 Annotation

We annotated the following factors: whether the construction is a sluice, if not, whether it is verbal or verbless, whether it appears in a root (matrix, coordinated or reported speech) or embedded context. When embedded, we annotated the factivity of the embedding predicate, following Hooper’s (1975) distinction between true factive (TF), semi-factive (SF), and non-factive (NF) predicates. While TF predicates (psychological/emotive) presuppose the truth of their complement (*She’s happy [that you came]*), NF ones (epistemic and communication verbs) do not (*She thinks [that you came]*), and with SF (knowledge and perception verbs), the presupposition is weaker than that TFs (*She knows [that you came]*) (see Bîlbîie et al. 2022 for the relevance of this tripartition for embedded gapping). For SF perception verbs like *see*, the complement is generally taken to be true, but the presupposition can be suspended if the perception is partial, uncertain or reported under negation (*She didn’t notice [that he left]* does not presuppose that he left).

We also annotated the semantic interpretation of sluices, following the taxonomy suggested by Ginzburg and Kim (2023).

2.3 Results

In the corpus, exclamatives were mainly formed with *malla*, *qadesh*, and *shnowa*. *Malla* typically combines with nouns, *qadesh* with adjectives or nouns, and *shnowa* occurs in nominal and verbal exclamatives expressing intensification (e.g., *shnowa eejbetni!* ‘I liked her so much!’).

2.3.1 Sluice rate

The written corpus study resulted in 141/442 sluices, with a general sluice rate of 31.9%, distributed as follows: 6/14 (42.9%) sluices with *shnowa*, 11/277 (4%) sluices with *qadesh*, and 124/151 (82.1%) sluices with *malla*. The spoken corpora did not include any sluices.

The written data included a total of 80 non-elliptical verbless exclamatives, as in (11), and 226 verbal exclamatives, as in (12). All 5 exclamatives in the spoken corpora are verbal (3 with *shnowa* and 2 with *qadesh*).

- (11) a. *shnowa hetha ya ghzala*
 what DEM VOC deer
 ‘What a beauty this is!’
 b. *rit qadesh-ha dhamra ya dorsaf*
 see how.much-3SG.F funny.SG.F VOC dorsaf
 (Addressing Dorsaf) ‘See how funny she is!’
 c. *malla jaw elli asami-na kifkif*
 EXCL situation that names-ours same
 ‘Such a mood, our names match!’
- (12) a. *shnowa hal-enjez el-aadim eli aamaltou*
 what DEM-accomplishment DEF-huge that you.did
 ‘What a huge accomplishment you pulled off!’
 b. *meskin qadesh msakhafni*
 poor.3SG.M how.much made.me.feel.sorry
 ‘Poor guy, he made me feel sorry for him!’
 c. *malla moshkla besh taamel-he-l-na*
 EXCL problem FUT do.2SG-it-to-us
 ‘What a problem you will cause us!’

Table 1 presents a summary of the results from both the written and spoken corpora combined. Exclamative sluices in TA are not predominant, unlike in English⁴.

⁴TAC and English corpora such as COCA are comparable in covering a range of

Table 1: Exclamatives in TA: Written and spoken corpora.

Construction	Sluice	Non-elliptical verbless	Sentential verbal	Total
<i>shnowa</i>	6 (35.3%)	3 (17.6%)	8 (47.1%)	17
<i>qadesh</i>	11 (3.9%)	61 (21.9%)	207 (74.2%)	279
<i>malla</i>	124 (82.1%)	16 (10.6%)	11 (7.3%)	151
Total	141 (31.5%)	80 (17.9%)	226 (50.6%)	447

2.3.2 Semantic interpretation of exclamative sluices

Similarly to English, the ExInf interpretation, which lacks a verbal antecedent and a clear verbal paraphrase (as shown in (13)), is possible in TA and is majoritarian with *malla* (50/124). *Malla blassa* ‘What a place!’ and *shnowa ha zin* ‘lit. What this beauty!’ are used to express admiration for two visual stimuli: the first for the place the girl saw, and the second for Dorra’s beauty. RRef readings, as in (14), are the most frequent, while RQUD interpretations, exemplified in (15), are less common. Sluices with *qadesh* allowed only for RRef readings, as in (14b), where *finou* ‘elegant’ refers back to the girl’s outfit.

- ExInf

- (13) a. t-tetlafet hawl-ha [-] ya mimt-i malla blassa
3SG.F.look around-her VOC mom.1SG.POSS EXCL place
‘She looked around her. - What a place!’
b. ezouz meshin l-ers Rihab w Ines fi el-baladia [.]
both going to-wedding Rihab and Ines in the-city.hall
Amel tuqabel Dorra [-] shnowa ha zin
Amel kisses Dorra what this beauty
‘Both are going to Rihab and Ines’s wedding at the city hall.
Amel kisses Dorra and says, ‘How beautiful!’

- RRef

- (14) a. [-] Enti ghates fi el-asal - Rehab: [...] shnowa assal [...]
you soaking in DEF-honey - Rehab: what honey
‘- You’re soaking in honey! - (ironically) What honey!’

written and spoken genres and in containing relatively little free, spontaneous dialogue. Nevertheless, exclamative sluices are frequent in COCA (Ginzburg & Kim 2023) but not in TA. This suggests that genre composition alone does not account for the observed discrepancy, though further corpus work can be useful to firm up this conclusion.

In the spoken corpora, only matrix exclamatives with *shnowa* were found: 1 verbless and 2 verbal. With *qadesh*, there is 1 embedded and 1 matrix, both verbal. Table 3 summarizes the distribution of the exclamatives in both the written and spoken corpora combined.

Table 3: Distribution of exclamatives with *malla*, *shnowa*, and *qadesh* in TA written and spoken corpora.

	Sluice		Non-elliptical verbless		Sentential verbal		Total
	Embed.	Matrix	Embed.	Matrix	Embed.	Matrix	
<i>shnowa</i>	0	6	0	3	0	8	17
<i>qadesh</i>	4	7	16	45	50	157	279
<i>malla</i>	1	123	0	16	0	11	151
Totals	5 (3.5%)	136 (96.5%)	16 (16.7%)	64 (83.3%)	50 (17.6%)	176 (82.4%)	447
	141 (31.5%)		80 (17.9%)		226 (50.6%)		

The embedding rate for exclamatives overall is 15.9% (71 tokens), with only 5 embedded sluices, as in (16).

- (16) a. idhaken ma hke-sh aal-ina el eelem mosh lazem nahki-w
if NEG talk-NEG on-us the media NEG must talk-1PL
aal-ihom. shouf malla eelem aad (TAC)
on-them see EXCL media PTCL
lit. ‘If the media didn’t talk about us, then no need to talk about them. Look what media, seriously!’
- b. t-asmaa fi-el pianiste qadesh mhaf-a
2SG-listen in-the pianist how.much brilliant-1SG.F
‘Are you listening to how brilliant the pianist is?’ (TAC)

Furthermore, the embedding predicates in the analyzed dataset were mainly verbs⁵. Table 4 summarizes the results based on the factivity of the embedding verb and the construction of the exclamation.

The majority of the embedding verbs are SF as the perception verbs in (16), followed by NF (17) and TF (18).

⁵In TA, it is possible to embed an exclamation in a prepositional phrase. In the analyzed corpora, there are two examples as in i.

- (i) ma aand-ek-sh fekra qadesh khoft
NEG PREP-2SG-NEG idea how.much scared.1SG
‘You have no idea how much I got scared.’

Table 4: Factivity of the embedding verbs in (written and spoken) TA exclamatives with *malla* and *qadesh*.

Construction	SF	NF	TF	Total
Sluice	4	1	0	5
Non-elliptical	48	16	1	65
Total	52 (74.3%)	17 (24.3%)	1 (1.4%)	70

- (17) ma-tnjamsh tetsawar qadesh hasit b-dhanb
NEG-can.2SG-NEG imagine.2SG how.much felt guilty
‘You can’t imagine how guilty I felt!’
- (18) t-arjaa t-exeth drous-ek [...] nsit om-ek qadesh
2SG-get.back 2SG-take classes-2SG forgot.2SG mom-2SG how.much
wassat-ek
advise-2SG
‘You have to get back to your classes, apparently you forgot how much
your mom advised you to do so.’

2.4 Discussion of the corpus study

The corpus study shows four main findings: (i) exclamative sluices are not majoritarian in TA, contrary to English, (ii) exclamative sluices can be resolved without reference to a linguistic antecedent, and this reading predominates with *malla*, (iii) as in English, exclamative sluices in TA tend to resist embedding and sluices with *shnowa* do not embed similarly to the English *what a* exclamatives⁶, and (iv) 21.4% of the embedding verbs are non-factives, which suggests that exclamatives are propositional, as proposed by Marandin (2008).

3 Two acceptability judgment experiments

We conducted two experiments to study exclamatives in TA, focusing on native speakers’ preferences for sluiced versus verbal exclamatives with *qadesh* and *malla*, the two most frequent forms of exclamatives found in the corpus. These experiments will adress the following questions: (i) whether there is a preference for elliptical over non-elliptical exclamatives in TA, and (ii) whether this preference is affected by the construction of the exclamative, namely embedded vs. matrix.

⁶See Michaelis (2001) for cross-linguistic variation in embedding conditions for *wh*-exclamatives, showing that languages differ in which *wh*-words can occur in matrix versus embedded exclamatives.

3.1 Methods

3.1.1 Experimental items

Since *qadesh* and *malla* introduce either adjectives or nouns, in order to ensure a balanced set of stimuli, we controlled the materials such that 12 items featured adjectives (see Table 5) and 12 featured nouns (see Table 6). The non-elliptical items were verbal as they were more frequent than the verbless exclamatives in the corpus. The embedding verbs were balanced, with 8 NF (*tsawer* ‘imagine’), 8 SF (*shoft* ‘you saw’) and 8 TF (*nsit* ‘I forgot’) verbs. Each experiment included 24 items, followed by yes or no comprehension questions, and 24 fillers. The fillers were items of another experiment on interrogative sluices. These fillers included an ungrammatical control condition, as in Speaker B’s utterance in (19).

Table 5: Example of stimuli: exclamative *qadesh/malla* + adjective

Condition	Example
–Embed+Sluice	<i>qadesh/malla moosab</i> ‘How hot-tempered!’
–Embed–Sluice	<i>qadesh/malla moosab khouk tlaa</i> ‘How hot-tempered your brother turned out to be!’
+Embed+Sluice	<i>staghrabt qadesh/malla moosab</i> ‘I’m surprised how hot-tempered!’
+Embed–Sluice	<i>staghrabt qadesh/malla moosab khouk tlaa</i> ‘I’m surprised how hot-tempered your brother turned out to be!’

- (19) Speaker A: beedt men aabed fi-el khedma ‘I got away from some people at work’
Speaker B: shkoun beedt? lit. ‘Who did you get away?’

3.1.2 Procedure

A total of 44 and 47 students at the Institut Supérieur des Langues de Tunis, respectively, participated in the *malla* and *qadesh* experiments.⁷ Participants were recruited in person. Both experiments were online using Ibex Farm (Drummond 2011). Participants were instructed to rate each item on a scale from 1 (completely unnatural) to 5 (perfectly natural), and to answer the

⁷Originally, 52 students participated in each experiment. However, data from 8 participants in the *malla* experiment and 5 in the *qadesh* experiment were excluded for scoring below 75% on the comprehension questions following each experimental item.

Table 6: Example of stimuli: exclamative *qadesh/malla* + Noun

Condition	Example
-Embed+Sluice	<i>qadesh/malla miziria</i> 'What a misery!'
-Embed-Sluice	<i>qadesh/malla miziria aayshin fi-ha</i> 'What a misery you're living in!'
+Embed+Sluice	<i>n-etkhayel qadesh/malla miziria</i> 'I imagine what a misery!'
+Embed-Sluice	<i>n-etkhayel qadesh/malla miziria aayshin fi-ha</i> 'I imagine what a misery you're living in!'

comprehension questions following each item. They were compensated with 10 Tunisian dinars, corresponding to an approximate rate of £9 per hour.

3.2 Predictions

Building on the findings of the corpus study, matrix sluices with *malla* are expected to receive higher ratings than their embedded counterparts. *Qadesh* sluices are expected to receive lower ratings overall. In addition, embedding sluices under NF verbs is expected to be acceptable, with a preference for embedding under SF verbs.

3.3 Results of experiment 1: *malla* exclamatives

The acceptability results show similar mean ratings across conditions: matrix sluices (M = 3.88, SD = 1.39), matrix verbal exclamatives (M = 3.98, SD = 1.26), embedded sluices (M = 3.79, SD = 1.39), and embedded verbal exclamatives (M = 4.02, SD = 1.26). The ungrammatical controls were rated lower (M = 2.28, SD = 1.37). The means of matrix sluice and matrix verbal are comparable, similarly to the corpus study results (96.5% matrix sluice and 82.4% matrix verbal exclamatives).

A Bayesian cumulative logit model with fixed effects for CONSTRUCTION (Embedded vs. Matrix) and FORM (Elliptical vs. Verbal), their interaction, and maximal random effects (subjects, items) found no reliable effects: all posterior probabilities < 0.8 and all 95% CrIs included zero. Specifically, Construction ($\hat{\beta} = -0.13$, 95% CrI = [-0.65, 0.38], $P(\hat{\beta} < 0) = 0.70$), Form ($\hat{\beta} = -0.17$, 95% CrI = [-0.70, 0.38], $P(\hat{\beta} < 0) = 0.74$), and their interaction ($\hat{\beta} = -0.18$, 95% CrI = [-0.83, 0.47], $P(\hat{\beta} < 0) = 0.71$).

Because half the items were *malla*+Adj and half *malla*+N, we compared their mean ratings: *malla*+Adj ($m = 3.90$, $SD = 1.33$) and *malla*+N ($m = 3.93$, $SD = 1.32$), they are essentially identical, suggesting no overall excl-phrase category effect. A follow-up Bayesian regression with REMNANT, FORM, and DISTRIBUTION (reference: *malla*+N, sluice, embedded) gives weak evidence that *malla*+Adj is preferred ($\hat{\beta} = 0.42$, 95% CrI = $[-0.49, 1.33]$, $P(\hat{\beta} > 0) = 0.82$) and weak evidence for a distribution effect ($\hat{\beta} = -0.37$, 95% CrI = $[-1.04, 0.29]$, $P(\hat{\beta} < 0) = 0.86$). The REMNANT:FORM interaction ($\hat{\beta} = -0.89$, 95% CrI = $[-1.93, 0.12]$, $P(\hat{\beta} < 0) = 0.96$) suggests *malla* sluices may be relatively more acceptable with adjectives, but evidence is weak. Other interactions (REMNANT:DISTRIBUTION $\hat{\beta} = 0.55$, 95% CrI = $[-0.41, 1.55]$, $P = 0.87$; three-way: $\hat{\beta} = -0.59$, 95% CrI = $[-1.91, 0.71]$, $P = 0.81$) are likewise weak. Overall, remnant type did not affect acceptability in this experiment.

3.3.1 Embedded *malla* exclamatives

The results in Table 7 show that embedded exclamatives are more acceptable under SF verbs, and the means for NF and TF are comparable.

Table 7: Mean ratings for embedded sluices and embedded verbal exclamatives across different factivity levels: *malla* exclamatives

Condition	Factivity	Mean	SD
Embedded sluice	NF	3.56	1.47
	SF	4.04	1.24
	TF	3.80	1.39
Embedded verbal	NF	3.79	1.43
	SF	4.26	1.20
	TF	3.98	1.12

The data were analyzed using a Bayesian ordinal regression model with a cumulative logit link, including random intercepts for participants and items. Predictors were FACTIVITY (baseline: NF) and FORM (baseline: verbal). Results provide weak evidence that exclamatives embedded under SF verbs are preferred over those under NF ($\hat{\beta} = 1.21$, 95% CrI = $[-0.34, 2.81]$, $P(\hat{\beta} > 0) = 0.94$). The TF-NF comparison shows no clear difference ($\hat{\beta} = 0.35$, 95% CrI = $[-1.10, 1.77]$, $P(\hat{\beta} > 0) = 0.70$). A directional hypothesis test (Bürkner 2018) comparing SF and TF yields weak evidence for higher ratings with SF ($\hat{\beta} = 0.86$, Est.Error = 0.8, Evid.Ratio = 6.65, 95% CrI = $[-0.43, 2.17]$, $P(\hat{\beta} > 0) = 0.87$), suggesting graded acceptability across factivity levels.

3.4 Results of experiment 2: *qadesh* exclamatives

Experiment 2 shows that mean acceptability ratings were similar across the four conditions: +matrix+ellipsis ($m = 3.84$, $SD = 1.27$), +matrix-ellipsis ($m = 3.97$, $SD = 1.25$), -matrix+ellipsis ($m = 3.71$, $SD = 1.38$), and -matrix-ellipsis ($m = 3.83$, $SD = 1.25$). The ungrammatical control averaged $m = 3.08$ ($SD = 1.36$). Thus, embedded sluices were rated as acceptable as other constructions. Although matrix sluices with *qadesh* were rated comparably to their verbal counterparts, they were rare in the corpus.

A Bayesian regression model with CONSTRUCTION (Embedded vs. Matrix) and FORM (Sluice vs. Verbal) dummy-coded (Matrix, Verbal = reference) showed no effects. Posterior probabilities were all below 0.8, and 95% credible intervals included 0. Specifically: Construction ($\hat{\beta} = -0.08$, 95% CrI $[-0.46, 0.31]$, $P(\hat{\beta} < 0) = 0.66$), Form ($\hat{\beta} = -0.11$, 95% CrI $[-0.64, 0.41]$, $P(\hat{\beta} < 0) = 0.67$), and their interaction ($\hat{\beta} = -0.18$, 95% CrI $[-0.81, 0.45]$, $P(\hat{\beta} < 0) = 0.70$). These findings contrast with the corpus study, where embedded sluices with *qadesh* were relatively frequent (36.4%, Table 3).

Items with *qadesh* were constructed with either adjectives or nouns. The former were rated higher overall ($m = 4.00$, $SD = 1.27$ for sluices; $m = 4.15$, $SD = 1.14$ for verbals) than the latter ($m = 3.55$, $SD = 1.34$ for sluices; $m = 3.65$, $SD = 1.31$ for verbals), with a consistent pattern across conditions.

A second Bayesian model with predictors REMNANT, FORM, and DISTRIBUTION (reference levels: *qadesh*+N, Sluice, Embedded) revealed a simple effect of remnant type: *qadesh*+Adj was preferred over *qadesh*+N ($\hat{\beta} = -1.18$, 95% CrI $[-2.04, -0.35]$, $P(\hat{\beta} < 0) = 1$). Thus, *qadesh* exclamatives with adjectives are consistently rated higher than those with nouns, independent of ellipsis. This suggests that the corpus bias toward sluices+Adj reflects a lexical preference rather than a structural difference.

3.4.1 Embedded *qadesh* exclamatives

The results reported in Table 8 show that embedding *qadesh* exclamatives under NF verbs is as acceptable as under SF and TF verbs. TF verbs seem to be more acceptable when embedding verbal exclamatives compared to sluices.

The data were fitted to a model similar to that used for *malla*. Results indicate that exclamatives embedded under SF verbs tend to receive higher ratings than those under NF verbs, with a possible preference for TF over NF embedding. The SF vs. NF comparison ($\hat{\beta} = 0.47$, 95% CrI $[-0.64, 1.57]$, $P(\hat{\beta} > 0) = 0.81$) provides weak evidence, while TF vs. NF ($\hat{\beta} = 0.78$, 95% CrI $[-0.33, 1.91]$, $P(\hat{\beta} > 0) = 0.92$) shows slightly stronger evidence. No reliable effects were found for Ellipsis ($\hat{\beta} = -0.28$, 95% CrI $[-1.15, 0.57]$, $P(\hat{\beta} < 0) = 0.75$) or for the interactions (SF:Ellipsis: $\hat{\beta} = 0.58$, 95% CrI $[-0.87, 2.03]$, $P(\hat{\beta} > 0) = 0.80$; TF:Ellipsis: $\hat{\beta} = -0.55$, 95% CrI $[-2.07, 0.94]$, $P(\hat{\beta} <$

Table 8: Mean ratings for embedded sluices and embedded verbal exclamatives across different factivity levels: *qadesh* exclamatives

Condition	Factivity	Mean	SD
Embedded sluice	NF	3.54	1.45
	SF	3.95	1.31
	TF	3.67	1.36
Embedded verbal	NF	3.63	1.33
	SF	3.84	1.22
	TF	4.02	1.19

0) = 0.77). A direct comparison between SF and TF (Bürkner 2018) yielded no preference for TF ($\hat{\beta} = -0.31$, Est. Error = 0.63, 95% CrI [-1.34, 0.72], Evid. Ratio = 2.3, $P(\hat{\beta} > 0) = 0.7$).

3.5 Discussion

Two acceptability judgment experiments tested preferences for sluiced and verbal exclamatives, testing whether embedded exclamative sluices are as acceptable as their verbal counterparts. Results show that sluices with *malla* and *qadesh* were rated similarly to verbal exclamatives, indicating no penalty for ellipsis or preference for verbal exclamative clauses, unlike in the corpus study. In both experiments, matrix and embedded sluices received similar ratings, despite embedded sluices being rare in the corpus. Both experiments also revealed a general preference for embedding under SF verbs, while NF and TF embeddings were rated similarly. This challenges prior claims that exclamatives are felicitous only under factive predicates. Taken together with the corpus results, these findings support the view that exclamatives denote propositions, and that exclamative sluices have exophoric potential, more than interrogative sluices, which often require a recoverable linguistic antecedent (Hassen 2025). Overall, TA exclamative sluices and verbal exclamatives appear equally acceptable, providing no evidence that ellipsis incurs a penalty, nor an advantage, unlike English sluices.

4 Formal analysis of exclamative sluices

We analyze exclamative sluices as non-sentential utterances with a fully propositional meaning specified by the context, and that they function as scaled-up predications over contextually salient entities or situations, whether

linguistically or non-linguistically provided. We showed that exclamative sluices and exclamative clauses can both embed in TA, although the former rarely do. We showed that *qadesh* ‘how much’ sluices can only be interpreted by reference to an entity presented in the antecedent clause, contrarily to exclamative clauses who have a wider range of interpretations.

We provide a formal analysis of exclamative sluices, using Type Theory with Records version of HPSG. We use the ScaleUp predication, following Ginzburg and Kim (2023). The content of the predicate is a property P of an exclaimable entity x that was provided in the context, the degree of which increases on a scale s thanks to the ScaleUp predication, as explained in (20).

- (20) $\text{ScaleUp}(P)(x)$ iff for some δ : degree, s : scale: $P(x, \delta)$ and $\text{Hold}(\delta, s)$ hold (Ginzburg & Kim 2023: 20).

We analyze *shnowa*⁸, *malla* and *qadesh* as determiners when they occur with a noun phrase (NP), and as adverbs when modifying an adjective (see 21). The lexical entries below are based on Ginzburg and Kim (2023: 20), who keep the syntactic analysis from (Ginzburg & Sag 2000: 234) and add the ScaleUp function to the semantics. We follow Ginzburg and Kim (2023) in using I(ntransitive)V(erb) to label the output property following ScaleUp.⁹

- (21) Lexical entry for the exclamative words *malla/shnowa/qadesh*

$$\left[\begin{array}{l} \text{PHON } malla/shnowa/qadesh \\ \text{SYN } \left[\begin{array}{l} \text{CAT} = \text{DET} : \text{PoS} \\ \text{SELECT} = \left[\begin{array}{l} \text{CAT} = \text{N/ADJ} : \text{PoS} \\ \text{CONT} = \text{P} : \text{Intrans-V} \end{array} \right] \\ \text{WH} = \{\text{CONT}\} : \text{Set}(\text{SEMObj}) \end{array} \right] \\ \text{CONT } \lambda x \text{ ScaleUp}(P)(x) : \text{Intrans-V} \end{array} \right]$$

Shnowa and *qadesh* can modify a verb as in (22), hence the lexical entry in (23).

- (22) a. *shnowa eejbetni!* (TAC)
 what she.pleased.me
 ‘I liked her a lot!’

⁸*shnowa* can appear with the determiner *el* ‘the’, in which case, it is analyzed as one unit as Ginzburg and Kim (2023) suggested for *what a* in English.

⁹An anonymous reviewer questions how the exclamative uses of the discussed words differ from their interrogative counterparts and how this ambiguity is managed in the lexicon. *Wh*-words can have multiple functions (e.g., Hebrew has two determiners that have clearly distinctive quantificational, interrogative, exclamative uses) without requiring a derivational relationship between them (Ginzburg & Kim 2023). In TA, we treat these as cases of lexical polysemy with different lexical entries for each use, rather than positing a single mother entry. Each entry specifies its own syntactic and semantic properties independently. The WH feature regulates their distribution.

- b. qadesh hyet-i kenet fergha bla bik
 how.much life-1SG.POSS PST empty without you
 ‘How much my life was empty without you!’

(23) Lexical entry for adverbs *shnowa/qadesh*

$$\left[\begin{array}{l} \text{PHON : } shnowa/qadesh \\ \text{SYN : } \left[\begin{array}{l} \text{CAT = ADV : PoS} \\ \text{MOD : } \left[\begin{array}{l} \text{CAT = ADJ/V : PoS} \\ \text{CONT = P : Intrans-V} \end{array} \right] \\ \text{WH = } \{ \text{CONT} \} : \text{Set}(\text{semObj}) \end{array} \right] \\ \text{CONT = } \lambda x \text{ SCALEUP (P)(X): Intrans-V} \end{array} \right]$$

The *Wh* feature is a non-empty set. Ginzburg and Sag (2000) introduced this feature to mark the presence of *wh*-phrases and to track their distribution across larger structures. When a *wh*-word is present, its non-empty *wh* value marks the larger structure in which it occurs, such as a *wh*-exclamative (or any *wh*-structure). This allows the grammar to detect *wh*-elements even when they appear inside more complex structures. By contrast, non-*wh* exclamatives (e.g. those built with intensifiers such as *such* or the TA particle *ma* with an adjective, as in *ma-hleha* ‘EXCL-beautiful.3SG.F!’) receive an empty *WH* value and so are incompatible with *wh*-dependent constructions like sluices or fillergap dependencies. The subtypes of exclamative clauses (*excl-cl*, see Figure 1) are sluices (*excl-slu*), subject clauses (*excl-subj-cl*) and filler clauses (*excl-filler-cl*).

This is different from interrogative sluices which inherit from a head-fragment-phrase (Ginzburg & Sag 2000, Nykiel & Kim 2021) and rely on a parallelism constraint between a *wh*-remnant and a correlate in the antecedent clause. We analyze *excl-slu* as a non-verbal predicate (an NP or AdjP) that lacks an overt subject. It inherits from the *excl-cl* and *hd-only-ph* types. Its ARG-ST contains a single argument, *pro*. This argument is provided by the context and can be either the recent QUD, the recent referent or exophoric. The content is a proposition containing the scaled-up property from the ScaleUp output, as proposed in Ginzburg and Kim (2023). The rule of this type is in (24).

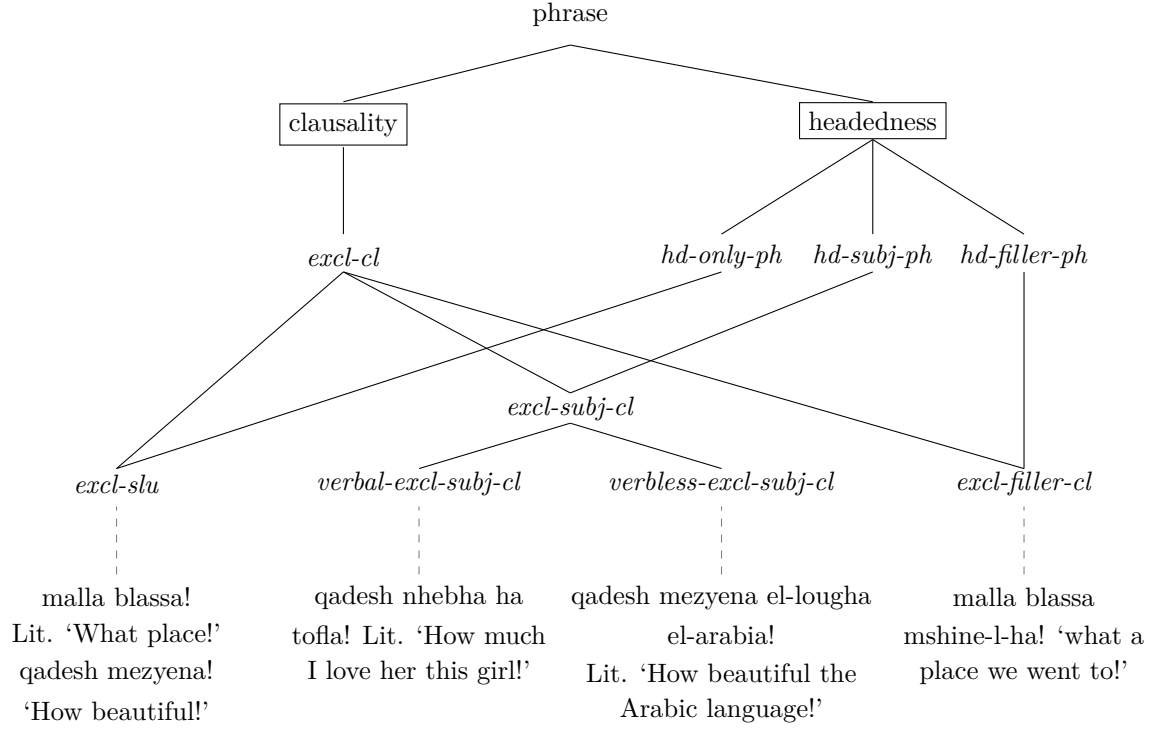


Figure 1: Clause type hierarchy for exclamatives

(24) Sluice rule: *excl-slu*

$$\begin{array}{c}
 \left[\begin{array}{l}
 \text{SYN} : \left[\begin{array}{l} \text{CAT} : \text{PoS} \\ \text{WH} = \{ \} : \text{set}(\text{SemObj}) \end{array} \right] \\
 \text{DGB-PARAMS} : \left[\begin{array}{l} z : \text{Ind} \\ \text{c1} : \text{exclaimable}(z) \end{array} \right] \\
 \text{CONT} = \text{hd-dtr.cont}(z) : \text{Prop}
 \end{array} \right] \\
 | \\
 \text{hd-dtr} : \left[\begin{array}{l}
 \text{SYN} : \left[\begin{array}{l} \text{CAT.HEAD} = \text{N/ADJ} \\ \text{subj} = \langle \rangle \\ \text{arg-st} = \langle \text{NP}_{\text{pro}} \rangle \\ \text{WH} = \{ \text{ScaleUp} \} : \text{set}(\text{SemObj}) \end{array} \right] \\
 \text{CONT} = \lambda x. \text{ScaleUp}(\text{P})(x) : \text{Intrans-V}
 \end{array} \right]
 \end{array}$$

(25) is an example of an exclamative sluice (see (26) for a detailed analysis of a *wh*-exclamative phrase). A verbal fragment (Head *v*) with an NP head daughter. This NP is composed of the determiner *mallā* selecting for the noun *blāssa* ‘a place’, the content of which is retrieved from the context (DGB).

(25) *excl-slu* example

$$\begin{array}{c}
 \left[\begin{array}{l}
 \text{SYN} : \left[\text{CAT} = v : \text{PoS} \right] \\
 \text{DGB-PARAMS} : \left[\begin{array}{l} z : \text{Ind} \\ c1 : \text{exclaimable}(z) \end{array} \right] \\
 \text{CONT} = \left[c2 : \text{ScaleUp}(\text{blāssa})(z) \right] : \text{Prop}
 \end{array} \right] \\
 | \\
 \text{hd-dtr} : \left[\begin{array}{l}
 \text{PHON} : \text{mallā blāssa} \\
 \text{SYN} : \left[\begin{array}{l} \text{CAT} = \text{NP} \\ \text{subj} = \langle \rangle \\ \text{arg-st} = \langle \text{NP}_{\text{pro}} \rangle \end{array} \right] \\
 \text{CONT} = \lambda x \left[c2 : \text{ScaleUp}(\text{blāssa})(x) \right] : \text{Intrans-V}
 \end{array} \right]
 \end{array}$$

(26) *wh-exclP* example

$$\begin{array}{c}
 \left[\begin{array}{l}
 \text{PHON} : \text{mallā blāssa} \\
 \text{SYN} : \left[\begin{array}{l} \text{CAT} = n : \text{PoS} \\ \text{WH} = \{\text{ScaleUp}\} : \text{set}(\text{SemObj}) \end{array} \right] \\
 \text{CONT} = \text{ScaleUp}(\text{blāssa}) : \text{IV}
 \end{array} \right] \\
 \swarrow \quad \searrow \\
 \begin{array}{cc}
 \text{det-dtr:} \left[\begin{array}{l}
 \text{PHON} : \text{mallā} \\
 \text{SYN} : \left[\begin{array}{l} \text{CAT.HEAD} = \text{det} : \text{PoS} \\ \text{SELECT} : \left[\begin{array}{l} \text{CAT} : \text{N} \\ \text{CONT} : \text{IV} \end{array} \right] \\ \text{WH} = \{\text{cont}\} : \text{set}(\text{SemObj}) \end{array} \right] \\
 \text{CONT} = \text{ScaleUp}(\text{blāssa})\text{IV}
 \end{array} \right] &
 \text{hd-dtr:} \left[\begin{array}{l}
 \text{PHON} : \text{blāssa} \\
 \text{SYN} : \text{cat} = \text{N} : \text{PoS} \\
 \text{CONT} = \text{blāssa} : \text{IV}
 \end{array} \right]
 \end{array}
 \end{array}$$

5 Conclusion

We investigated the syntactic and semantic properties of exclamative sluices in TA, combining corpus data and two acceptability judgment experiments. We found that exclamative sluices in TA, while less frequent than in English (Ginzburg & Kim 2023) or French (Hassen 2025) for instance, occur more often than interrogative sluices and show distinctive patterns compared to both non-elliptical exclamatives and interrogative sluices. Corpus data indicate that *malla*-sluices frequently allow exophoric interpretations, whereas *qadesh*-sluices are rare and require reference to explicit discourse entities. Exclamative sluices with *shnowa* ‘what’ do not seem to be embeddable, similar to English *what a*-exclamatives (Ginzburg & Kim 2023), while sentential exclamatives with *shnowa* are embeddable. Approximately 21.4% of embedded cases occur under non-factive verbs, supporting the view that exclamatives denote propositions rather than facts.

Experimental results show that exclamative sluices are rated as acceptable as their non-elliptical counterparts, with embedding acceptable under both semi-factive and non-factive verbs. These findings challenge deletion-based analyses that treat sluices as derived solely from their non-elliptical counterparts and support a view of ellipsis resolution that integrates discourse and processing constraints, highlighting the distinct grammatical and pragmatic status of exclamative sluices in TA.

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Multicategorical multiple right dislocation in Chinese: A cross-framework study

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Proceedings of the 32nd International Conference on
Head-Driven Phrase Structure Grammar

Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal

Stefan Müller, Shûichi Yatabe (Editors)

2025

Berlin: Berlin Universities Publishing

pages 259–280



Keywords: Right Dislocation, Dongying Mandarin, Minimalism, Lexical-Functional Grammar, Dynamic Syntax, Session Calculus

Song, Chenchen. 2025. Multicategorical multiple right dislocation in Chinese: A cross-framework study. In Stefan Müller & Shûichi Yatabe (eds.), *Proceedings of the 32nd International Conference on Head-Driven Phrase Structure Grammar, Centro de Linguística da Universidade de Lisboa, Lisbon, Portugal*, 259–280. Berlin: Berlin Universities Publishing. DOI: 10.83067/hpsg.2025.13. 
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Abstract

This paper studies multicategorical multiple right dislocation (MMRD) in Dongying Mandarin Chinese. This pattern of right dislocation differs from the more familiar patterns in European languages in that it is not restricted by syntactic category or constituency and typically involves a very incomplete main clause. I review previous approaches to right dislocation in three theoretical frameworks—Minimalism, Lexical-Functional Grammar, and Dynamic Syntax—and conclude that MMRD is a challenge for all of them. Then, building on useful ideas from previous studies, I develop a new minimalist analysis using multiworkspace derivation, which explains the flexible word order and disorganized interpretive effect of MMRD. I also give the workspace-level information integration in my analysis a formal protocol borrowing tools from process calculi, especially the session calculus.

1 Introduction

The colloquial register of many languages has a construction as illustrated in (1).

- (1) a. He’s really smart, John (is). (Kayne 1994)
b. *Il a mangé la soupe, Jean.* (French, Lambrecht 1981)
he has eaten the soup Jean
c. *Lo porto domani, il dolce.* (Italian, Benincà 1988)
it bring.1SG tomorrow the dessert
‘I’ll bring it tomorrow, the dessert.’

This construction is called *right dislocation* (RD), at least pretheoretically, since part of the sentence, usually an argument, is apparently dislocated to the right edge. There is usually a coreferential pronoun in the main body of the sentence too. A subtype of RD that has received relatively little attention is RD that involves multiple RD-ed units—call it *multiple RD* (MRD). When examples are given, such as those in (2), they are usually mentioned in passing, probably because MRD in familiar European languages is a straightforward extension of *single RD* (SRD) as in (1).

- (2) a. He gave them to his sister, Peter, the keys. (Averintseva-Klisch 2009)
b. *Maria gli lo ha portato, il dolce, a Gianni.*
Maria to.him it has brought the dessert to Gianni
‘Maria brought it to him, the dessert, to Gianni.’ (Italian, Sun 2022)

[†]I thank Felix Bildhauer, Patrick Brandt, Francisco Ferreira, Timothy Osborne, Matthew Reeve, and Chen Xie for their direct or indirect help during my research for this study. And many thanks to the audience at the Minor Sentence Types Workshop of the HPSG 2025 Conference (Lisbon) as well as the conference and proceedings reviewers for valuable feedback. I also thank the proceedings editors Stefan Müller and Shuichi Yatabe for their editorial help. All remaining errors are my own.

As shown in (1)–(2), in familiar European languages the RD-ed units in both SRD and MRD are mostly argument or adjunct phrases. By contrast, a wider range of elements can be RD-ed in Chinese, including nonconstituents, as in (3).¹

- (3) a. *Shang feiji le, wo kuai.* (Standard Mandarin, Sun 2022)
 get.on plane SFP I soon
 ‘Get on the plane, I soon.’ ≈ ‘I’ll get on the plane soon.’
- b. *Gaa ce lo, bei.* (Cantonese, Cheung 1997)
 CLF car SFP PASS
 ‘A car, by!’ ≈ ‘It was a car that hit him.’

The RD-ed units in (3a/b) are a subject-adverb string (i.e., a nonconstituent) and a passive auxiliary, respectively. In addition, these sentences do not involve coreferential pronouns. Thus, RD as a syntactic phenomenon is more flexible in Chinese. Also note that the Chinese RD-ed units are consistently to the right of the so-called sentence-final particles (SFPs), which are generally taken to mark the right boundary of the sentence (see, e.g., Cheung 2009).

Against the above background, in this paper I investigate a special case of RD in Chinese, which I call *multicategorical multiple right dislocation* (MMRD). It involves multiple RD-ed units of miscellaneous categories. MMRD is not that common in Standard Mandarin but naturally occurs in some regional dialects. The data in this paper are taken from Dongying Mandarin (of which I am a native speaker), a minor subvariety of Northern Mandarin spoken in the Yellow River Delta area. See (4).

- (4) a. *Gae-buliao liae, shv ye, zhe yi mer.* (Dongying Mandarin)
 do-cannot SFP anything also this one period
 ‘Can no longer do, anything, this period of time.’
 ≈ ‘One can’t do anything anymore these days (due to COVID-19).’
- b. *Bu niaehur ae, zhe sie diaefen, yi daer ye.*
 not sticky SFP this CLF starch one bit even
 ‘Not sticky, this starch, even a bit.’
 ≈ ‘The starch isn’t sticky at all (i.e., is of poor quality).’
- c. *Lie-du-ren li, ngen laoye kae, dai jiv-liu.*
 hunt-drug-person SFP your grandpa watch be.at home-in
 ‘The Drug Hunter, your grandpa is watching, at home.’
 ≈ ‘Your grandpa is watching The Drug Hunter at home. (surprised tone)’
- d. *Chao caihuar chi ae, wo ji ni, jin shangwu.*
 stir.fry cauliflower eat SFP I give you this noon
 ‘Stir-fry cauliflower, I for you, this noon.’
 ≈ ‘I will stir-fry cauliflower for you for lunch today.’

¹Grammatical labels not included in the Leipzig abbreviation list: DISP = disposal, SFP = sentence-final particle, STA = stative.

- e. *Zaezae-zhou ae, dei, mae yunqi lai, haoshi-zhou.*
 save.up-STA SFP must DISP luck DISP carefully-STA
 ‘Save up, must, (good) luck, carefully.’
 ≈ ‘We must carefully save up our good luck.’

As we can see, the RD-ed units in MMRD are highly versatile. In particular, (4a/b) involve RD-ed negative polarity items (NPIs) marked by the particle *ye* ‘also, even’; (4c/d) involve RD-ed nonconstituent strings made up of a subject plus another element (i.e., *kae* ‘watch’ and *ji ni* ‘for you’); and (4e) RD-s a modal auxiliary *dei* ‘must’ as well as the first half of a so-called disposal construction [*mae* NP *lai* V] (= Standard Mandarin [*ba* NP V]), which promotes an affected object to the preverbal position. Prosodically, there is a clear pause before each RD-ed unit in sentences like the above, and there is no pause within any individual RD-ed unit. This is evidence that the RD-ed units in such sentences have been RD-ed in their entirety, despite not being syntactic constituents.²

Sentences like these naturally occur in casual, relaxed speech. Intuitively, this happens because Dongying Mandarin speakers habitually deliver the most crucial information of a sentence first and append less crucial information afterward. People would avoid speaking in this manner when they need to sound more organized (e.g., when talking to people of higher social status or discussing heavier topics). In less casual situations, RD is still common, but not MMRD. Two additional observations concerning MMRD in Dongying Mandarin are: *i*) it is not tied to any particular illocutionary force, and *ii*) the multiple RD-ed units can usually be freely reordered. I illustrate these in (5)–(6) below.

- (5) a. *Bu niaehur man, zhe sie diaefen, yi daer ye?* (interrogative)
 not sticky SFP this CLF starch one bit also
 ‘Not sticky, this starch, even a bit?’ ≈ ‘The starch isn’t sticky at all?’
- b. *Chao caihuar chi bae, ngen ji ngae, jin shangwu!*
 stir.fry cauliflower eat SFP you give me this noon
 ‘Stir-fry cauliflower, you for me, this noon!’
 ≈ ‘Stir-fry cauliflower for me for lunch today, please!’ (imperative)
- c. *Zaezae-zhou ninhuae, rengen dai, mae yunqi lai, yizuer!*
 save.up-STA SFP others will DISP luck DISP altogether
 ‘Save up, she/he will, (good) luck, altogether!’
 ≈ ‘She/he is going to save up all her/his good luck!’ (exclamative)
- (6) a. *Zaezae-zhou ae, dei, haoshi-zhou, mae yunqi lai.*
 save.up-STA SFP must carefully-STA DISP luck DISP
 ‘Save up, must, carefully, (good) luck.’

²I thank an anonymous reviewer for reminding me to clarify this.

- b. *Zaezae-zhou ae, mae yunqi lai, dei, haoshi-zhou.*
 save.up-STA SFP DISP luck DISP must carefully-STA
 ‘Save up, (good) luck, must, carefully.’

As in (5), MMRD may occur in nondeclarative sentences as well. And as in (6), the multiple RD-ed units in an MMRD sentence may be freely reordered (here I only show two out of the six possibilities for reasons of space).

There is no previous study on MMRD to the best of my knowledge, and RD itself also poses a challenge to syntactic theory considering dislocation in natural language is primarily to the left edge of the sentence. Given this state of affairs, in the rest of this paper I will first review how RD is treated across syntactic theories (§2). More specifically, I will examine previous approaches to RD in three theoretical frameworks—Minimalism, Lexical-Functional Grammar (LFG), and Dynamic Syntax (DS)—and conclude that MMRD is a challenge for all of them. Next, I will propose a derivational approach to MMRD combining ideas from Minimalism and DS (§3), deriving each RD-ed unit in a separate workspace with just enough structure and letting each RD-workspace be loosely connected to the main workspace by Pair Merge. Finally, I will further propose a formal protocol for cross-workspace communication borrowing tools from the subarea of computer science known as process calculi (§4). Section 5 concludes.

2 Previous approaches to right dislocation

In this section, I review previous approaches to (simple) RD in three syntactic frameworks: Minimalism (§2.1), Lexical-Functional Grammar (§2.2), and Dynamic Syntax (§2.3). I will conclude that MMRD is a challenge for all of them.

2.1 Minimalism

In Minimalism, RD is usually analyzed in one of two ways: *i*) in a single clause, by stranding the RD-ed unit after leftward movement of the rest of the clause (the monoclausal approach); *ii*) by coordinating two (mostly) identical clauses plus ellipsis in the second clause, following leftward movement of the RD-ed unit (the biclausal approach). Both approaches have been applied to Chinese. Thus, Sun (2022) applies them to inversion-like RD (7a) and argument-RD (7b), respectively.

- (7) a. *Shang feiji le, wo kuai.* (Standard Mandarin, = 3a)
 get.on plane SFP I soon
 ‘Get on the plane, I soon.’ ≈ ‘I’ll get on the plane soon.’
- b. *Mali mai le ba, baozhi.*
 Mary buy SFP SFP newspaper
 ‘Probably Mary bought (it), the newspaper.’

We have seen both RD patterns in Section 1. Inversion-like RD is the multicategorical pattern common in Chinese (see, e.g., 3), while argument-RD is the coreferentiality-based pattern common in European languages (see, e.g., 1), though the latter pattern often involves null pronouns in Chinese, as in (7b), since Chinese is a so-called radical pro-drop language (Neeleman & Szendrői 2007). See (8) for Sun’s analysis of the two RD patterns.

- (8) a. $[_{FocP} [_{leP} t_i \textit{shang feiji le}]_j [_{Foc'} Foc [_{IP} wo_i [_{I'} I [_{AspP} \textit{kuai} [_{Asp'} Asp t_j]]]]]]]$
 b. $[_{IP} [_{CP_1} \textit{mali mai pro}_i \textit{le ba}] [_{'} : [_{CP_2} \textit{baozhi}_i [_{IP_2} \textit{mali mai t}_i \textit{le}]]]]]$

In (8a), the verb phrase plus the low SFP³ *le* (marking a currently relevant state), together labeled *leP*, is base-generated as the complement of *Asp*. From there, the subject *wo* ‘I’ first moves to Spec-IP, and the remnant *leP* subsequently moves to Spec-FocP. Since the latter movement is for focusing purposes, Sun calls this RD pattern *focus fronting*. By contrast, in (8b) two almost identical CPs are coordinated by a special coordinator denoted by a colon (i.e., Koster’s 2000 specifying coordination). Next, the argument *baozhi* ‘newspaper’ is raised to the CP-level for discourse reasons, and the remnant IP₂ is elided.⁴ Crucially, focus fronting does not require the RD-ed unit to be a constituent, for it is not really moved but merely stranded. Meanwhile, coordination-plus-ellipsis not only requires the RD-ed unit to be a constituent but furthermore requires it to be a phrasal constituent of a suitable type—the type that can be targeted by discourse-driven A’-movement. Therefore, focus fronting as an RD-deriving mechanism is more flexible than coordination-plus-ellipsis. Its only limitation is that each clause only allows one round of focus fronting, which makes it hard to extend the mechanism to MMRD.

Sun borrows the colon coordinator-based derivation in (8b) from Ott & de Vries (2016), whose main proposal is schematized in (9).

- (9) $[_{CP_1} \dots \textit{correlate}_i \dots] (:) [_{CP_2} dXP_i [\dots t_i \dots]]$

In (9), two (mostly) identical clauses are put together either via the colon coordinator or simply by juxtaposition. The “dislocated” unit *dXP* is generated in CP₂ and moves to its left edge for discourse reasons; the remainder of CP₂ is then elided. CP₁ contains a coindexed “correlate” of *dXP*, usually a pronoun.

Ott & de Vries distinguish two types of RD: *backgrounding* (via colon coordination) and *afterthought* (via juxtaposition). I will abbreviate these as BRD and ARD, respectively. Their key difference lies in the discourse status of *dXP*: the *dXP* in BRD encodes old information (i.e., is topic-like), while that in ARD encodes new information (i.e., is focus-like). Ott & de Vries further distinguish two subtypes of ARD: the specificational subtype and the predicative subtype. See (10).

³See Paul (2014) for the different hierarchical positions of Chinese SFPs.

⁴The exact discourse reason is topicalization (Ott & de Vries 2016) or defocusing (Lee 2017). Yip (2024) replaces ellipsis by multidominance, assuming that CP₁ and CP₂ directly share structure. However, the theoretical status of multidominance in Minimalism is in dispute (Chomsky 2013).

- (10) a. *Ich habe heute einen Star getroffen: den John Travolta!*
 I have today a.ACC star met the.ACC John Travolta
 ‘I met a star today: John Travolta!’ (specificational ARD)
- b. *Ich habe heute den J.T. getroffen: ein berühmter Star!*
 I have today the.ACC J.T. met a.NOM famous star
 ‘I met John Travolta today, a famous star!’ (predicative ARD)
 (German, Ott & de Vries 2016)

In (10a), the *dXP* *den John Travolta* is a direct further specification of its correlate *einen Star*, hence their case agreement (both accusative). This can be directly derived from the colonless version of (9), as in (11a). By contrast, in (10b) the *dXP* *ein berühmter Star* is a separate predicate about its correlate *den John Travolta*, which Ott & de Vries analyze using a copular construction within CP₂, as in (11b); hence the case mismatch. For completeness, I also illustrate Ott & de Vries’s analysis of BRD in (11c), using the English example from (1a).

- (11) a. [CP₁ *ich habe heute einen Star getroffen*] (specificational ARD)
 [CP₂ [*den John Travolta*].ACC_i [~~*habe ich t_i getroffen*~~]]
- b. [CP₁ *ich habe heute den John Travolta getroffen*] (predicative ARD)
 [CP₂ [*ein berühmter Star*].NOM_i [~~*ist er t_i*~~]]
- c. [P [CP₁ *he_i’s really smart*] [’ : [CP₂ *John_i [~~*t_i is really smart*~~]]]] (BRD)*

As mentioned in Section 1, previous studies on RD are mostly dedicated to SRD, while MRD only gets mentioned in passing. Thus, Sun (2022) proposes a multi-:P account of MRD in familiar European languages, as in (12). Sun illustrates this with the Italian example from (2b), repeated in (13a). Its derivation is given in (13b).

- (12) [CP₁ : [CP₂ : CP₃]]

- (13) a. *Maria gli lo ha portato, il dolce, a Gianni.* (= 2c)
 Maria to.him it has brought the dessert to Gianni
 ‘Maria brought it to him, the dessert, to Gianni.’
- b. [P₁ [CP₁ *Maria gli_i lo_j ha portato*] :₁ [P₂ [*il dolce_j* [~~*Maria gli ha portato t_j*~~]] :₂ [CP₃ *a Gianni_i* [~~*Maria lo ha portato t_i*~~]]]]

However, this account cannot be easily extended to MMRD. First, it is essentially designed for BRD of the familiar European type, where the main body of the sentence is relatively complete and the RD-ed units are argument or adjunct phrases that can be targeted by discourse-driven A’-movement. MMRD sentences in Chinese usually do not meet these standards. To illustrate, consider (14).

- (14) [CP₁ *Mu jiae-hang ni mae*], [CP₂ *bu*] (Dongying Mandarin)
 not.have see-get.to you SFP not
shi], [CP₃ *shang yi huishe*], [CP₄ *yinwei*]?!
 is last one round time because
 ‘Did not get to see you, isn’t it, last time, because?!’
 ≈ ‘Isn’t it because (I) didn’t get to see you last time?! (So here I am again.)’

In this sentence, CP₁ is highly incomplete, lacking substantive content that cannot be recovered by coreferentiality. And among its three RD-ed units—a nonconstituent string, a time adverbial, and a subordinating conjunction—only the time adverbial can be targeted by discourse-driven A’-movement.

Second, the missing parts in the RD-ed units of an MMRD sentence are often semantically nonequivalent, which makes a repetition-based ellipsis mechanism technically infeasible. This is clearly reflected in CP₂ and CP₄ from (14). See (15).

- (15) a. *bu shi [mu-jiae-hang-ni-mae]* (CP₂)
 not is not.have see-get.to you SFP
 ‘Isn’t it ~~that (I) didn’t get to see you?~~’
 b. *yinwei [shang-yi-huishe-mu-jiae-hang-ni]* (CP₄)
 because last.time not.have see-get.to you
 ‘because ~~last time (I) didn’t get to see you?~~’

Here CP₂ must contain the yes/no SFP *mae*, without which the meaning completely changes: ‘isn’t it that I didn’t get to see you?’ (with *mae*) → ‘it’s not that I didn’t get to see you’ (without *mae*). Meanwhile, CP₄ cannot contain the yes/no SFP but must contain the time adverbial, without which the reason introduced by ‘because’ is no longer that intended by the speaker.

Third, the repetition-plus-ellipsis approach to MRD in (12) employs underlyingly full-fledged CP-conjuncts by design, but having to manipulate $n + 1$ CPs when there are n RD-ed units is resource-demanding. While the ellipsis takes place at PF, both the syntax and LF must deal with nonelided multiclausal structures, which greatly adds to processing burden. Last but not least, as mentioned in Section 1, the multiple RD-ed units in an MMRD sentence can be freely reordered. Thus, there is no empirical motivation for the hard-coded asymmetric structural relation in (12).

2.2 Lexical-Functional Grammar

While most existing studies on RD are done in Minimalism, there are also occasional studies in other frameworks. I examine an LFG-based study, Kalbertodt (2019), in this section and will further review some studies in Dynamic Syntax in Section 2.3. The empirical focus of Kalbertodt (2019) is on German, so it only considers the familiar coreferential pattern in European languages. Nevertheless, it shows us how RD can be handled by a monostratal syntactic theory like LFG.

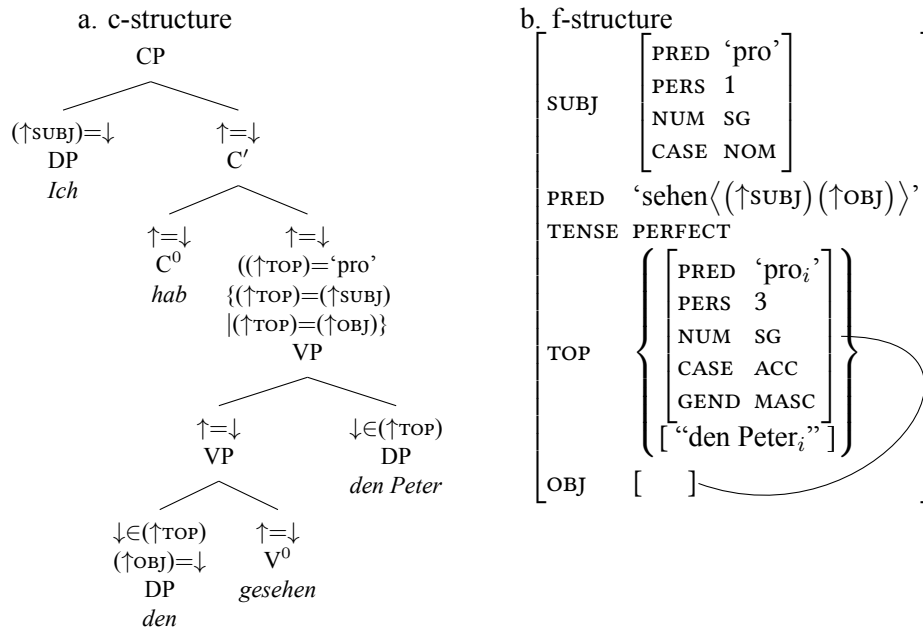
Kalbertodt also distinguishes true RD and afterthought, reserving the term “RD” for the former. However, while her basic criterion is the same as that in the minimalist literature—with true RD being topic-like and afterthought focus-like—what she identifies as afterthought often closely resembles RD, as in (16).

- (16) a. *Ich hab ihn gesehen, den Peter.* (RD) (German)
 b. *Ich hab ihn gesehen. Den Peter.* (afterthought)
 I have him seen the.ACC Peter

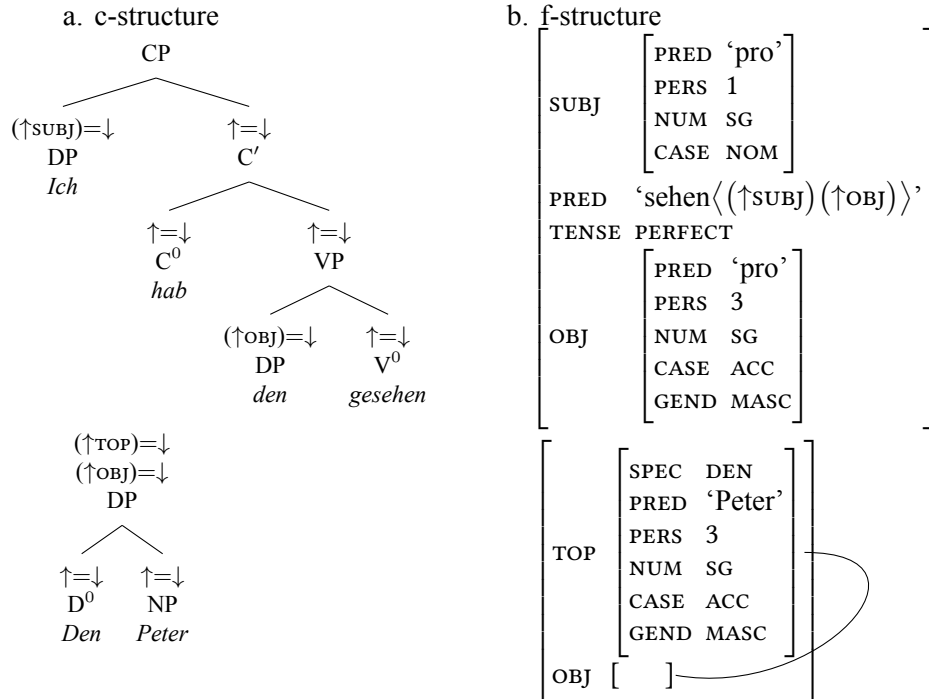
These two sentences minimally differ in punctuation and prosody. According to Kalbertodt (2019: 78), true RD-ed units are deaccented and have compressed pitch, while afterthoughts receive nuclear accent and have a full pitch inventory.

Overall, Kalbertodt’s position is that true RD-ed units are syntactically integrated into the main clause, while afterthoughts are only pragmatically bound to it. Adopting the LFG framework, Kalbertodt then analyzes true RD-ed units as VP-adjuncts, and afterthoughts, as “syntactic orphans” (following Averintseva-Klisch 2009). See (17)–(18) below for the details of her analysis.

- (17) *Ich hab ihn gesehen, den Peter.* ‘I have seen him, Peter.’ (RD)



- (18) *Ich hab ihn gesehen. Den Peter.* ‘I have seen him. Peter.’ (afterthought)



(adapted from Kalbertodt 2019: 149, 155–156)

The phrase *den Peter* in (19), identified as a true RD-ed unit, is analyzed as a VP-adjunct of the main clause in the c-structure and as a topic in the f-structure (on a par with its correlate *den* ‘him’). By contrast, the same phrase *den Peter* in (20) is identified as an afterthought and analyzed as part of a separate, elided sentence (c-structure), as both its object and topic (f-structure). In short, Kalbertodt (2019) proposes a monoclausal structure for BRD and a biclausal structure for ARD. The latter is similar in spirit to Ott & de Vries’s (2016) structure for ARD (see §2.1).

While Kalbertodt’s analysis is not directly useful for our task (Chinese MMRD) due to its limited scope (i.e., only for the coreferential pattern in familiar European languages), we can nonetheless draw inspiration from it. In particular, both the use of adjunction to connect the RD-ed unit to the main clause in (19) and the “lite” biclausal syntax in (20) may be useful. In Section 3, I will propose an analysis that integrates these ideas, but before doing that I will first examine how RD is treated in a third theoretical framework, Dynamic Syntax, which provides another useful idea.

2.3 Dynamic Syntax

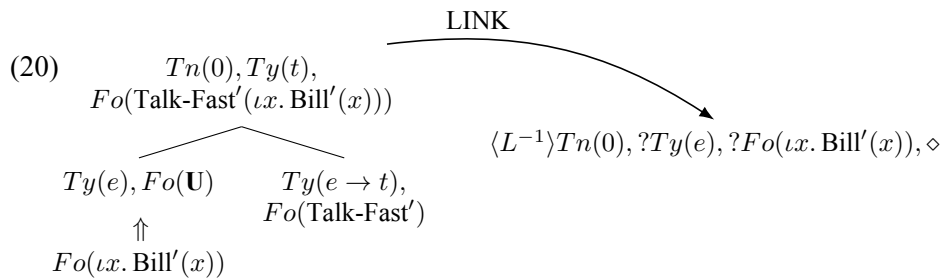
Dynamic Syntax is a grammar formalism that “directly reflects the time-linearity and context-dependent growth of information governing natural language parsing” (Cann et al. 2005: 3). Thus, it is resource-sensitive by design, and that is well reflected in its treatment of RD. In a nutshell, in DS the RD-ed unit may directly adjoin to the main clause as is, without being embedded in any elided clausal structure. Hence, the DS

approach to RD is truly lite. In this section, I review two DS-based accounts of RD, one for BRD (Cann et al. 2005, Wu 2005) and the other for ARD (Chatzikiyriakidis 2016). Note that both accounts are designed for RD of the familiar European pattern (i.e., the coreferential pattern). Thus, they cannot be directly applied to Chinese MMRD. However, we may still draw inspiration from them.

Let us begin with Cann et al.’s (2005) account of BRD, which is more exactly only meant for the pronoun doubling construction, as in (19a). Wu (2005) directly applies this account to Chinese data that fall in the same pattern, as in (19b).

- (19) a. He talks too fast, the new secretary. (Cann et al. 2005)
 b. *Jianghua hao kuai ya, Lisi.* (Standard Mandarin, Wu 2005)
 talk so fast SFP Lisi
 ‘(He) talks so fast, Lisi.’

Cann et al. recognize the RD-ed unit in this pattern as a background topic with a recapitulation effect, which “re-identifies the same element identified in the main clause by the pronoun” (p. 189). They model the pattern using a pair of DS-trees connected by a LINK arrow, as in (20) (adapted from *ibid.*, p. 191).



Tree nodes in DS are decorated by “declarative units” (DUs) in the *Label(Value)* format. The first tree in (20) parses the main clause *he talks too fast* from (19a). Its root has treenode address (*Tn*) 0, type (*Ty*) *t*, and a formula (*Fo*) that reads ‘Bill talks (too) fast’, where Bill is a contextual referent of *he* substituted ($\Uparrow$) for a “metavariable” *U*. After parsing the main clause, the parser ($\diamond$) moves on to the RD-ed unit *the new secretary* by creating a LINK from the first tree to a second tree requiring type *e*.⁵ At this stage, this second tree only has a root node. Requirements for information (marked by *?*) are a standard part of the DS machinery. The LINK not only connects the two trees but also carries over the formula value of a subterm of the main tree (here, *he*) as a formula requirement on the LINKed tree. Due to this requirement, the second tree will only be well-formed if the RD-ed unit also refers to Bill. This LINK mechanism is like cross-tree adjunction, and it is indeed called “adjunction” in Wu (2005). Crucially, the adjunct-tree is just a standalone chunk of type *e* (i.e., a DP), with no elided CP-structure at all.

⁵The prefixed treenode address $\langle L^{-1} \rangle Tn(0)$ in the second tree indicates that it is reversely LINKed to the node *Tn*(0)—the root node of the first tree.

While Cann et al. (2005) and Wu (2005) only consider BRD, Chatzikiyriakidis (2016) considers both BRD and ARD. He further distinguishes two subtypes of ARD: identificational and specificational. See (21) (adapted from pp. 300, 317). The double comma indicates period intonation. I skip Chatzikiyriakidis's modeling of BRD since it is the same as that in Cann et al. (2005) and Wu (2005).

- (21) a. *Ton htipise o Giorgos,, ton Giani.* (Greek)
 him.ACC hit the George the.ACC John.ACC
 'George hit him,, John.' (identificational ARD)
- b. *Gnorisa enan thrilo,, ton Miki Theodoraki.*
 met.1SG a.ACC legend.ACC the.ACC Mikis.ACC Theodorakis.ACC
 'I met a legend,, Mikis Theodorakis.' (specificational ARD)

In both sentences in (21), the RD-ed unit is a proper name; the two sentences mainly differ in the correlate part, which is a pronoun in (21a) but an indefinite noun phrase in (21b). Chatzikiyriakidis's key idea is to model afterthoughts (of both subtypes) as preemptively provided "clarification answers to implicit questions" (p. 299). Specifically, he assumes that when an afterthought is parsed, the context includes an implicit question that is minimally different from the main clause in the correlate part, which is replaced by a *wh*-metavariable. The afterthought's value is then substituted for that metavariable, effectively answering the question. The type of this *wh*-metavariable is determined by the nature of the correlate. Thus, the *wh*-metavariable in (21a) is a bare one (i.e., *what*), while that in (21b) is a restricted one (i.e., *which*). Due to space constraints, I only present Chatzikiyriakidis's parse trees for (21a) below (adapted from p. 301).

- (22) a. Implicit question
 'Who_{MALE} did George hit?'
- $$\begin{array}{c}
 Ty(t), \\
 Fo(Hit'(Wh_{MALE})(George')) \\
 \swarrow \quad \searrow \\
 \begin{array}{cc}
 Ty(e), & Ty(e \rightarrow t), \\
 Fo(George') & Fo(Hit'(Wh_{MALE}))
 \end{array} \\
 \swarrow \quad \searrow \\
 \boxed{Ty(e),} \quad Ty(e \rightarrow (e \rightarrow t)), \\
 Fo(Wh_{MALE}) \quad Fo(Hit')
 \end{array}$$
- b. Substitution
 'George hit John.'
- $$\begin{array}{c}
 Ty(t), \\
 Fo(Hit'(John')(George')) \\
 \swarrow \quad \searrow \\
 \begin{array}{cc}
 Ty(e), & Ty(e \rightarrow t), \\
 Fo(George') & Fo(Hit'(John'))
 \end{array} \\
 \swarrow \quad \searrow \\
 \boxed{Ty(e),} \quad Ty(e \rightarrow (e \rightarrow t)), \\
 Fo(John') \quad Fo(Hit')
 \end{array}$$

Under this analysis, the more pedantic reading of (21a) is:

- (23) 'George hit him. You want to ask who George hit? George hit John.'

Thus, the clarification or repair function of ARD is clearly brought out. Here, too, the RD-ed unit is treated as is, without being embedded in any larger structure.

The above DS approach to ARD may also be extended to MRD. Chatzikiyriakidis (2016: 310) gives the following example.

- (24) *Ton ida,, ton Giorgio,, xtes.* (Greek)
 him.ACC saw.1SG the.ACC George.ACC yesterday
 ‘I saw him,, George,, yesterday.’ (MRD)

There are two RD-ed units here: an argument and a time adverbial. Chatzikyriakidis assumes that the latter serves to update a time metavariable under a situation/event node in the main clause. The parsing procedure is the same as above, just involving two implicit questions. The interpretive effect is as follows:

- (25) ‘I saw him. You want to ask who I saw? I saw George. You also want to ask when I saw George? I saw George yesterday.’

As hinted above, a major advantage of DS is its built-in resource-sensitivity. That said, two design limitations make the DS approaches above inapplicable to Chinese MMRD: First, they only work for RD-ed units with relatively complete syntactic and semantic status, as each DS parse tree must have a well-defined semantic type (mainly *t* or *e*). Thus, it is unclear how the miscellaneous nonconstituent RD-ed strings in MMRD can be handled.⁶ Second, due to the fundamental status of left-to-right parsing in DS, the accounts above rely on relatively complete main clauses, because without sufficient lexical content it is impossible to construct a suitably shaped parse tree to begin with. Left-to-right parsing is hard to unfold in the case of MMRD, where too much substantive information has been RD-ed.

2.4 Interim summary

In this section, I have reviewed how RD is treated in three theoretical frameworks, which has led me to conclude that MMRD is a challenge for all of them. Table 1 summarizes the key ideas and problems of the cross-framework treatments of RD.

Table 1: Useful ideas from previous studies and their problems

Idea	Framework	Advantage	Problem
Focus fronting	Minimalism	can derive nonconstituent RD	limited to SRD
Coordination + ellipsis	Minimalism	can derive MRD	constituent-only, resource-demanding
Lite multitree syntax	DS (LFG)	can derive MRD, resource-sensitive	constituent-only, needing a complete main clause

To recapitulate, focus fronting is the only mechanism that can handle nonconstituent RD, but it is limited to SRD. Coordination-plus-ellipsis and lite multitree

⁶That is, unless we allow arbitrarily complex function types like those in Categorical Grammar for DS parse trees. Thanks to Hans-Martin Gärtner for pointing this out to me.

syntax are not limited to SRD but cannot handle nonconstituent RD. Between the latter two mechanisms, lite multitree syntax, especially its incarnation in DS, is resource-sensitive, though it depends on a relatively complete main clause. In the next section, I will present a new analysis of MMRD that integrates useful ideas from previous studies and bypasses their problems.

3 Deriving multicategorical multiple right dislocation

To combine the advantages of previous ideas, I propose to inherit the basic settings of the minimalist studies—so that focus fronting can normally proceed—but simultaneously adopt a multiworkspace derivational mechanism, which can help us implement the lite multitree syntax idea in Minimalism. The reason why the coordination-plus-ellipsis approach is resource-demanding is because it manipulates full-fledged CP-structures. There is no such requirement in multiworkspace derivation. Workspace-level theorizing is increasingly prominent in current Minimalism. Indeed, it has become part of the latest definition of Merge (Chomsky et al. 2023). But multiple workspaces have long been used in practice too, and the assumption that syntactic derivation proceeds in multiple parallel workspaces or layers is essentially uncontroversial (see, e.g., Zwart 2011, Fowlie 2013). To illustrate, consider (26).

(26) The man kicked the ball. (Zwart 2011)

To derive this sentence, the subject *the man* must be merged onto the clausal tree as a unit (in Spec-TP). But for that to happen, *the man* must be prederived in a separate layer or workspace. Since this derivational scenario is very common, we must conclude that multilayered or multiworkspace derivation is the de facto norm in generative syntax, though it is not often explicitly stated.

As the above simple example shows, the content of a parallel derivational layer/workspace may well be a nonclausal object. This gives us a way to implement lite multitree syntax in Minimalism. That is, we can replace the CPs in the coordination-plus-ellipsis approach to RD by smaller and more flexibly sized structures now, which is a significant improvement in terms of resource-sensitivity. That said, in the case of RD I do not let the contents of the multiple workspaces combine into a normal tree, but just let them be loosely grouped by workspace-level coordination. This is similar to Ott & de Vries's (2016) juxtaposition in discourse, though I do not adopt juxtaposition because its operands are sentences (i.e., the basic units of the discourse), and that would lead us back to the resource-demanding multi-CP situation. Moreover, since the workspace is still a narrow-syntactic notion in Minimalism, the outputs of the multiple workspaces still need to be combined in syntax and shipped to the interface together. To illustrate, consider the Dongying Mandarin MMRD sentence from (1c) repeated below.

- (27) *Zaezae-zhou ae, dei, mae yunqi lai, haoshi-zhou.*
 save.up-STA SFP must DISP luck DISP carefully-STA
 ‘Save up, must, (good) luck, carefully.’

We can now derive this sentence in the following way, using three workspaces.⁷

- (28) a. WS_1 (main clause + RD_1) (à la Sun 2022):
 $[_{ForceP} [_{FocP} [_{VP} \text{zaezae-zhou } pro_o]_k [_{Foc'} Foc t_j]_i [_{Force} ae]$
 $[_{GroundP} [_{IP} pro_s [_{I'} [I \text{ dei}] t_k]_j [_{Ground'} Ground t_i]]]]$
- b. WS_2 (RD_2):
 $[_{VP} pro_s [_{v'} [v \text{ mae}] [_{ApplP} yunqi_o [_{Appl'} [_{Appl} lai] [_{VP} \text{zaezae-zhou } t_o]]]]]]$
- c. WS_3 (RD_3):
 $[_{vP} [_{AdvP} \text{haoshi-zhou}] [_{vP} pro_s [_{v'} v [_{VP} \text{zaezae-zhou } pro_o]]]]$

The main workspace WS_1 has a full-fledged clausal structure, where the first RD-ed unit *dei* ‘must’ is derived by focus fronting.⁸ Meanwhile, the two RD-workspaces WS_2 and WS_3 only have just enough structure, and the two further RD-ed units are derived by in-situ VP-ellipsis, without invoking any CP-level operation.

The three workspaces in (28) do not combine into a single tree but are coordinated as workspaces. This is possible because workspaces are technically sets. I further posit that the main workspace has some structural prominence over the two RD-workspaces (by c-commanding them both) and that the two RD-workspaces themselves are structurally symmetric (neither c-commanding the other). See (29).

$$(29) \{ \langle WS_1, WS_2 \rangle, \langle WS_1, WS_3 \rangle \} \equiv \langle WS_1, \{ WS_2, WS_3 \} \rangle$$

Adopting a method in Song (2024),⁹ I let WS_1 separately pair-merge with WS_2 and WS_3 , each on a different plane. This yields the multidimensional syntactic object on the left in (29), which is order-theoretically equivalent to the partially ordered set on the right, where WS_1 is ranked above the set $\{ WS_2, WS_3 \}$. That is, both sides of $\equiv$ in (29) describe the same partial order as represented by the Hasse diagram in (30).

$$(30) \begin{array}{c} WS_1 \\ \swarrow \quad \searrow \\ WS_2 \quad WS_3 \end{array} \quad (WS_1 \geq WS_2, WS_1 \geq WS_3)$$

⁷I analyze *mae* in (28b) as a *v* head in the spirit of Li (2017) and, for convenience, treat *lai* ‘lit. come’ as an applicative head (Appl), leaving a more detailed analysis of it for future study.

⁸Here I place RD_1 in WS_1 mainly to illustrate focus fronting, but it may also occupy a separate workspace. Such flexibility is generally available for MMRD, unless independent factors dictate that one of the RD-ed units be part of the main clause in the underlying structure. See Footnote 10 below.

⁹Song’s (2024) multidimensional Pair Merge operation is developed based on the conception of Pair Merge in Chomsky (2004) and the coordination-as-adjunction idea in Chomsky (2019).

This gives us a way to account for the flexible word order of MMRD. Recall from Section 1 that the multiple RD-ed units in MMRD can usually assume any order. Such word order flexibility can be explained as follows: First, the main clause always comes first due to the structural prominence of WS_1 . Second, usually any of the RD-ed units may be derived via focus fronting in WS_1 .¹⁰ Third, the remaining RD-ed units can assume any order due to their symmetric structural relation.

As hinted above, multiworkspace derivation may proceed in two different ways: *i*) tightly, with the separately derived syntactic objects assembled into a single tree; *ii*) loosely, with the workspaces themselves being “coordinated” (via Pair Merge). The first way is what happens in the derivation of non-RD sentences, such as the simple sentence in (26). The second way is what happens in MMRD. Admittedly, this is not a normal derivational scenario, because the syntactic information in it is shipped to the interfaces in a disorganized way (which is very palpable in interpretation). It only occurs when the speaker is too lazy or relaxed to assemble the various pieces of information into a single syntactic object. Therefore, when the speaker does make an effort to organize their language, MMRD does not occur.

Semantically, I assume that the loosely coordinated workspaces are interpreted by a generic coproduct or disjointed union operation $\oplus$, as in (31). Note that the normal boolean conjunction $\wedge$ does not work here because the multiple workspaces do not all have *type- t* content.

$$(31) \quad \llbracket (27) \rrbracket = \llbracket WS_1 \rrbracket \oplus \llbracket WS_2 \rrbracket \oplus \llbracket WS_3 \rrbracket$$

This yields the following interpretive effect:

$$(32) \quad \text{‘Save it up, we must; save up the good luck; save it up carefully.’}$$

4 A formal protocol for cross-workspace communication

In the preceding section, I presented a minimalist approach to MMRD that combines the advantages of the cross-framework approaches to right dislocation reviewed in Section 2. A main feature of my approach is its use of multiworkspace derivation. As mentioned above, workspace-level theorizing is increasingly prominent in current Minimalism. Meanwhile, it should be noted that workspace-level derivation may

¹⁰However, there are also cases where one of the RD-ed units must be derived in WS_1 due to independent factors. Consider the Dongying Mandarin sentence from (4c) repeated below:

- (i) *Lie-du-ren* *li, ηen laoye kae, dai jiv-liu.*
 hunt-drug-person SFP your grandpa watch be.at home-in
 ‘The Drug Hunter, your grandpa is watching, at home.’

In this example, the main clause only has an argument plus an SFP, so a verb must be provided in the first RD-ed unit for WS_1 to be well-formed.

require different formal methods from those typically used in ordinary derivation. In particular, as alluded to above, multiworkspace derivation may proceed either at the level of tree-building—call it the *tree level*—or at a more abstract level beyond the assembling of syntactic trees, where individual trees, together with the workspaces containing them, become atomic operands; for want of a better term, we may call the latter the *forest level*. At the tree level, the contents of the multiple workspaces are ultimately assembled into a single tree (i.e., a single syntactic object) in a single workspace. By contrast, at the forest level, which is the level MMRD resides in, the contents of the multiple workspaces remain separate and are not integrated into a single object; it is the workspaces themselves that are (loosely) joined together. As a caveat, forest-level multiworkspace derivation is not the same as the derivation of multiple sentences (e.g., to form a paragraph); in the latter scenario, the workspaces for the multiple sentences are not joined in syntax, and the sentences are merely juxtaposed in discourse.

The two levels above require different modes of derivation and have different interpretive effects. Derivation-wise, tree-level derivation is mainly based on normal Set Merge (and occasional, tree-internal Pair Merge); it is just that the output of one workspace may be used as input to another workspace. In other words, we have a workspace-containment relation. By contrast, forest-level derivation, under the conception in Section 3, involves workspace-level Pair Merge, which renders a workspace-coordination relation. Moreover, this difference in derivation mode corresponds to a difference in the mode of semantic composition, which is normal composition (mainly based on functional application) at the tree level but coproduct formation at the forest level. Interpretation-wise, tree-level derivation gives rise to grammatically tightly organized (i.e., normal) sentences, whereas forest-level derivation gives rise to the kind of disorganized utterance observed in MMRD, though MMRD is presumably not the only such scenario in human language.

Considering the derivational, compositional, and interpretive differences between tree-level and forest-level multiworkspace derivation, we must formally distinguish them in workspace-level theorizing. However, such a distinction is hard to precisely formulate using existing tools of Minimalism (e.g., Merge, Move, Agree), which is unsurprising since those tools are all designed for the derivation of well-formed normal sentences. Forest-level derivation requires us to go beyond that design, both in technicalities and in mindset. In particular, we must both keep the multiple workspaces relatively independent—without letting the output of one workspace directly feed the derivation of another—and allow them to be eventually unified and shipped to the C-I interface as a whole. In a sense, we need a formal method or routine to model the high-level communication or information integration across multiple workspaces conceived as separate subsystems. As it turns out, there is a well-established tool for this purpose in the computer science subarea known as *process calculi*. Such calculi are formal languages used by computer scientists to describe concurrent processes and distributed systems. Simply put, process calculi are to concurrency what λ -calculi are to functions (Milner 1990). In fact, the Dynamic Syntax machinery we have seen in Section 2.3—especially its

information-requesting expressions like $?Ty(e)$ —is already partly similar to how information exchange is modeled in process calculi. In this section, I will go a step further and present a tentative formal protocol for forest-level cross-workspace information integration. While the specific implementation here is only an initial exploration, it nonetheless demonstrates the kinds of high-level issues that need to be taken into account in a serious attempt to formalize workspace-level theorizing. This, I believe, is the *raison d'être* of this section.¹¹

Well-known process calculi include CCS (Calculus of Communicating Systems), CSP (Communicating Sequential Processes), the π -calculus, and the session calculus (see, e.g., Sangiorgi & Walker 2001, Wadler 2014, Yoshida & Gheri 2020). Below I use a simplified version of the *synchronous multiparty session calculus* in Yoshida & Gheri (2020)¹² to illustrate how cross-workspace information exchange can be protocolized. The original session calculus can describe a wide range of inter-system communication scenarios, but for current purposes we only need to consider two:

- (33) a. Sending message m via channel c : $!c\langle m \rangle$
- b. Receiving any message via channel c and store it in variable x : $?c(x)$

In session-based modeling of concurrency, a communication session between participants or (sub)systems consists of a structured sequence of message-passing interactions like the above, and each participant p in a session is associated with their own process P , written $p \triangleleft P$. The sequencing of interactions is denoted by the dot operator, and termination, by $\mathbf{0}$. See (34), for example.

$$(34) \quad p \triangleleft !c\langle m \rangle. ?d(x). \mathbf{0}$$

In this process, p sends message m via channel c , receives a message via channel d and stores it in x , and terminates.

In our scenario of cross-workspace communication, the derivation of an MMRD sentence can be viewed as a session, with each workspace viewed as a participant. In the structure in (29), we can assume that each step of Pair Merge establishes a communication channel. Thus, the main workspace is connected to each RD-workspace via a unique channel, but the RD-workspaces themselves are not connected. Still taking the sentence in (27) as an example, we can represent the cross-workspace information integration as a session as in (35). In addition to the three workspaces, I also posit a participant C-I to represent the ultimate destination of the flow of integrated semantic information (i.e., the conceptual-intentional system).

¹¹I thank an anonymous reviewer for reminding me to clarify this important issue.

¹²Specifically, I have simplified its notation, so (33) in fact looks more like the π -calculus. However, I still adopt the notion of session since it suits the scenario of cross-workspace communication very well. I thank Francisco Ferreira for introducing me to this area of study.

- (35) a. $WS_2 \triangleleft P_{WS_2} = !a\langle \llbracket WS_2 \rrbracket \rangle. \mathbf{0}$
 (WS_2 sends its own content as a message via channel a and terminates.)
 b. $WS_3 \triangleleft P_{WS_3} = !b\langle \llbracket WS_3 \rrbracket \rangle. \mathbf{0}$
 (WS_3 sends its own content as a message via channel b and terminates.)
 c. $WS_1 \triangleleft P_{WS_1} = ?a(x).?b(y).!s\langle \llbracket WS_1 \rrbracket \oplus x \oplus y \rangle. \mathbf{0}$
 (WS_1 receives two messages via channels a and b and stores them in x and y , loosely conjoins the received messages with its own content, sends the coproduct via channel s , and terminates.)
 d. $C-I \triangleleft P_{C-I} = ?s(z). \mathbf{0}$
 ($C-I$ receives a message via channel s , stores it in z , and terminates.)

The processes in (35) run in parallel (i.e., are concurrent), which is represented in the session calculus as in (36a). The ultimate information received by $C-I$ is (36b).

- (36) a. $\mathcal{M}_{(27)} = P_{WS_1} \mid P_{WS_2} \mid P_{WS_3} \mid P_{C-I}$
 ($\mathcal{M}_{(27)}$ is the name of this multiparty session)
 b. $z = \llbracket WS_1 \rrbracket \oplus \llbracket WS_2 \rrbracket \oplus \llbracket WS_3 \rrbracket = (32)$

Finally, the session-based modeling of concurrency has a well-established type system—the system of *session types* (Honda et al. 2008, Yoshida & Gheri 2020). Thus, the cross-workspace communication session above can be given the *global type* in (37), which describes the entire session from a bird’s-eye perspective.

- (37) $WS_2 \rightarrow WS_1 : a(\text{sem}).$
 $WS_3 \rightarrow WS_1 : b(\text{sem}).$
 $WS_1 \rightarrow C-I : s(\text{sem}).\text{end}$

This declares that the session has four steps, including three message-passing steps (sem is the type for semantic values) and a termination step (end is the type for $\mathbf{0}$).

5 Conclusion

In this paper, I presented a cross-framework study of multicategorical multiple right dislocation (MMRD) in Dongying Mandarin Chinese. While single right dislocation (SRD) is common in the world’s languages, MMRD is a more peculiar phenomenon. It has three distinctive traits: First, it involves multiple RD-ed units of miscellaneous syntactic categories, including both heads and phrases. Second, its RD-ed units need not all be constituents. Third, it typically involves a very incomplete main clause. These traits sharply distinguish MMRD from RD in familiar European languages.

Since there is no previous study on MMRD, I reviewed previous approaches to simple RD in three theoretical frameworks: Minimalism, Lexical-Functional Grammar (LFG), and Dynamic Syntax (DS). MMRD is a challenge for all of them.

The two main minimalist mechanisms that have been used to derive RD are focus fronting and coordination-plus-ellipsis. However, the former is limited to SRD, while the latter is limited to constituent RD and furthermore resource-demanding. Meanwhile, previous approaches to RD in LFG and DS are all tailor-made for familiar European languages and cannot be easily extended to Chinese MMRD.

Despite these challenges, previous studies provide useful ideas for an adequate analysis of MMRD. I developed a new analysis based on two previous ideas: focus fronting from Minimalism and lite multitree syntax from DS (and LFG to a lesser extent). I integrated these ideas in a minimalist model that utilizes multiworkspace derivation, where each RD-ed unit (optionally excluding the first one) is derived with just enough structure in a separate derivational workspace. The multiple workspaces are loosely conjoined in syntax via Pair Merge, which explains the flexible word order and the disorganized interpretive effect of MMRD. Finally, I further gave the cross-workspace information integration in MMRD a formal protocol using the session calculus, a typed process calculus from computer science that has been used to model concurrent processes and distributed systems. Considering the increasing prominence of workspace-level theorizing in current Minimalism, the application of process calculi to linguistics may be an interesting direction of future research.

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