Anti-pied-piping

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Abstract

Anti-pied-piping is a widespread but understudied phenomenon where a language targets a proper subpart of the logical focus for focus morphosyntax: for example, focus particle placement or focus movement. We show that anti-pied-piping is attested in over 60 languages from over 40 distinct language groups. We present a theory of focus particle syntax/semantics that involves severing the pronounced position of a focus particle and the logical position of its corresponding semantic contribution, which successfully accounts for both anti-pied-piping and pied-piping behavior. Constraints on attested anti-pied-piping behavior and its interaction with movement show that particle placement takes place at particular, punctuated points in the derivation, in a cyclic model of syntactic structure-building. We also discuss the relation of particle placement to other processes such as stress assignment.

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Keywords: focus particles, focus movement, focus association, anti-pied-piping, pied-piping, particle placement, cyclic Spell-Out, stress assignment

Contents

1 Introduction

In many languages, the presence of focus in a sentence triggers a characteristic morphosyntactic response, such as a marked word order via movement or the appearance of a focus particle. For example, in Hungarian (canonically SVO), exhaustive focus triggers movement to a dedicated, immediately preverbal position, as in (1):[1]

(1) **Focus-triggered movement in Hungarian:** (Horvath, 1981: 117)

A házigazda [Katinak]$_F$ mutatta be Jánost ____.
the host Cathy.DAT show VM John.ACC
'The host introduced John [to Cathy]$_F$.'

A language may likewise indicate the presence of focus and an associated semantics using a dedicated particle. For example, additive focus is indicated in Japanese with the particle *mo*, as in (2). Languages may also use particle placement and movement simultaneously, or use altogether different strategies, as we will discuss.

(2) **Focus-triggered particle placement in Japanese:**

Hanako-wa [hon]$_F$-**mo** kat-ta.
Hanako-TOP book-also buy-PST
'Hanako also bought [a book]$_F$.'

We will refer to such *morphosyntactic responses to focus* as "MSF" throughout. In both (1) and (2), the constituent targeted for MSF — movement in Hungarian and particle placement in Japanese — is the logically focused constituent, which we annotate with the subscript "F." But in some cases, there is a mismatch between the logical focus and the target of MSF, in which case we annotate both with separate subscripts.

Ross 1967 describes a famous type of mismatch termed *pied-piping*, where MSF targets a constituent *properly containing* the logical focus. Examples of pied-piping, again from Hungarian and

[1] The preverbal focus position is associated with exhaustive, identificational focus (Szabolcsi, 1981; É Kiss, 1998) and is often translated with English *it*-clefts. The so-called "verb modifier" (VM, *be* in (1)) prefixes to the verb when the preverbal focus position is unoccupied, for example resulting in *be-mutatta* for the verb in (1); see É Kiss 2002. The postverbal position of *be* in (1) therefore indicates that the immediately preverbal Cathy occupies this focus position. The verb modifier in example (7) below similarly indicates that a constituent has moved to the focus position.

Japanese, are given below. In (3), additional, non-focused material is moved together with the focused constituent. In (4), the focus particle attaches to a constituent that includes the logical focus, as well as additional, non-focused material.[2]

(3) **Pied-piping in Hungarian focus movement:** (Kenesei, 1998b: ex. 13b)

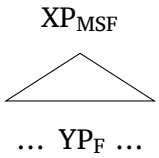
Anna [a [használt]$_F$ autót]$_{MSF}$ adta el ____.
Anna the used car.ACC sold VM
'It's the [used]$_F$ car that Anna sold (not the new one).'

(4) **Pied-piping in Japanese focus particle placement:**[3] (based on Kuroda, 1965: 78)

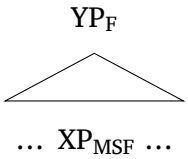
Hanako-wa [[hon]$_F$-o kai]$_{MSF}$-**mo** shi, [[zasshi]$_F$-o kai]$_{MSF}$-**mo** shi-ta.
Hanako-TOP book-ACC buy -also do magazine-ACC buy -also do-PST
'Hanako bought [books]$_F$ and also bought [magazines]$_F$.'

We schematize the syntactic configuration referred to as pied-piping in (5) below. In this paper, we document and investigate the phenomenon of *anti-pied-piping*, schematized in (6), where a constituent *properly contained within* the logical focus is marked with a focus particle or targeted for focus movement. Anti-pied-piping can thus be thought of as the inverse of the very well-studied pied-piping pattern.

(5) **Pied-piping**



(6) **Anti-pied-piping**



Anti-pied-piping is attested in both Hungarian and Japanese. In the Hungarian example (7), predicate focus results in movement of the object out of the focused verb phrase to the preverbal

[2] Ross (1967: sec. 4.3) introduced the term "pied-piping" (attributed to Robin Lakoff; see his p. 263 note 23) to describe instances of movement that appear to displace more than their logical target. The ability of focus particles to be sensitive to the position of focus within their sister is more often discussed under the banner of "association with focus" since Jackendoff 1972: sec. 6.5 and Rooth 1985. Here we use the term pied-piping for this pattern of particle placement as well.

[3] The additive particle *mo* naturally appears in each conjunct (see Kobuchi-Phillips, 2009; Brasoveanu & Szabolcsi, 2013) in example (4) and also (8) below, but we give the English additives *also* and *too* only once in their translations.

focus position (see footnote 1 above). Similarly, in the Japanese example (8), two whole propositions contrast and license the additive focus particle *mo*, but the particle appears on the subject within each focus. In both cases, MSF targets a proper subconstituent of the logically focused constituent. It is this type of mismatch that we concern ourselves with in this paper.

(7) **Anti-pied-piping in Hungarian focus movement:** (Kenesei, 1998a: 77)

Péter [a Hamletet]$_{MSF}$ [olvasta fel ____ a kertben]$_F$, nem pedig [úszott]$_F$.
Peter the Hamlet.ACC read VM the garden.INE not rather swim
'Peter [read out Hamlet in the garden]$_F$, rather than [swim]$_F$.'

(8) **Anti-pied-piping in Japanese focus particle placement:** (Nagano, 1951: 210)

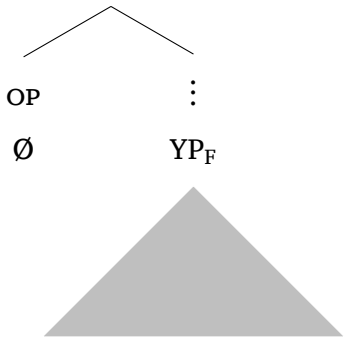
[[Ame]$_{MSF}$-**mo** furu]$_F$-shi, [[kaze]$_{MSF}$-**mo** fuku]$_F$.
rain -also falls -CONJ wind -also blows
'[It's raining]$_F$ and [the wind is blowing]$_F$, too.'

We begin in section 2 with a brief introduction to focus semantics which will establish a methodology for identifying the logically focused constituent and, therefore, mismatches between the target of MSF and the logical focus. Section 3 presents our cross-linguistic survey of anti-pied-piping. We show that anti-pied-piping mismatches of the form in (7) and (8) are attested in over 60 different languages from over 40 distinct language groups, as classified by major subfamily or genus (Dryer, 1989); a list of all languages discussed here as exhibiting anti-pied-piping is given at the end of the paper. In addition, we show that the process of anti-pied-piping in many languages must make reference to the linear order of constituents.

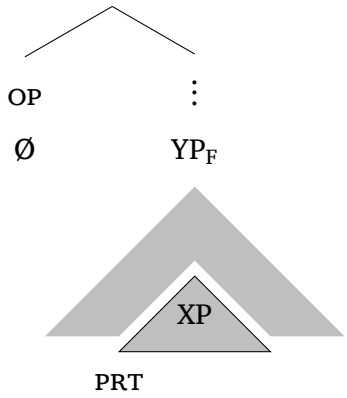
In section 4, we introduce a new theory for the syntax/semantics of focus particles which allows for anti-pied-piping mismatches. In brief, we propose that many focus particles do not introduce their associated semantics directly, but instead serve as morphosyntactic flags that signal the presence of corresponding abstract operators. In (9a) below, the entire focus (YP, in gray) is within the sister of the unpronounced operator (OP) which associates with focus in a compositional manner. We propose that the particle (PRT) may be adjoined to a proper subpart of the focus (XP), as schematized in (9b).[4]

[4] We use the term "particle" as a descriptive cover term for the small closed class of lexical items whose apparent contribution to the meaning of the sentence involves the consideration of logical alternatives; that is, "focus particles,"

(9) a.



b.



If the particle (PRT) is pronounced, we derive particle anti-pied-piping as in (8). Alternatively, once the particle has been inserted in an anti-pied-piping configuration as in (9b), the resulting particle phrase (the particle, possibly unpronounced, and its sister) could move, resulting in what we describe as movement anti-pied-piping as in (7). We will show that this theory also naturally extends to cases of pied-piping, and captures a number of parallels between the two.

We propose that this particle placement takes place at certain designated, punctuated points during the derivation, in a *cyclic Spell-Out* model of grammar (Uriagereka, 1999; Chomsky, 2000, 2001, a.o.). This allows particle placement to make reference to some phonological information such as linear order and prosodic information, and to then feed further syntactic operations. Although we concentrate on focus here, our proposal is intended to also extend to the morphosyntactic reflexes of other information-structural notions as well.

After we have presented our core proposal, we discuss some potential alternative analyses in section 5. Finally, we discuss the question of which constituent is targeted in anti-pied-piping in further detail, and relate this behavior to processes of stress assignment as well as pied-piping, in section 6. We conclude in section 7 with implications of the analysis and a further outlook.

2 Focus as the locus of alternatives

Before diving into the empirical landscape of anti-pied-piping, we first briefly discuss the function of focus in grammar. This section serves an important methodological purpose for our study of anti-pied-piping, as we establish how the interpretation of focus particles and question-answer

and similar expressions encoding other information-structural features. Other items have also been called "particles" in prior literature, such as in verb–particle constructions, which our discussion does not bear on.

congruence can be used as diagnostics for the position of focus.

The core function of focus is to highlight a portion of the sentence as standing in contrast to other values in a set of contextually salient *alternatives* (see e.g. Rooth, 1992; Krifka, 2008).[5] Focus-sensitive expressions such as focus particles then quantify over these alternatives. For example, consider the contrast between (10a) and (10b). These examples differ only in the placement of focus — realized in English with a pitch accent — but make very different claims about the world.[6] In example (10a), the theme *sandwiches* is focused; this claim entails that Alex did not make anything else for Brie. In example (10b), *Brie* is focused instead, contrasting against other potential beneficiaries; this claim entails that Alex didn't make sandwiches for anyone else. This difference in meaning is reflected in the different felicity patterns of the continuations i and ii in (10a,b).

(10) a. Alex **only** made [sandwiches]$_F$ for Brie.
   i. ✓She didn't make [soup]$_F$ for her. ii. #She didn't make sandwiches for [Cara]$_F$.
   b. Alex **only** made sandwiches for [Brie]$_F$.
   i. #She didn't make [soup]$_F$ for her. ii. ✓She didn't make sandwiches for [Cara]$_F$.

In common parlance, focus-sensitive expressions *associate* with the focused phrase. For example, we may say that the focus particle *only* associates with *sandwiches* in (10a) and with *Brie* in (10b).

We indicate the position of logical focus in example sentences with the subscript F, commonly referred to as *F-marking*. However, the position of logical focus is not unambiguously and directly reflected in the linguistic signal. For example, the phonetic realization of example (10a) is the same as the first sentence of (11), in that both of these choices of focus result in the most prominent accent on the object *sandwiches*. But in (11), the entire VP *made sandwiches* is focused. The first sentence with *only* therefore claims that Alex didn't do anything for Brie except make sandwiches. The second sentence elaborates on this claim, mentioning washing the car as a particular alternative activity that Alex didn't do for Brie.

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[5] This notion of focus differs from the notion of focus as new information. See Rochemont 2013 for discussion of the relationship between these two senses of "focus."

[6] English *only* can also be closer to the focused constituent: for example, as *only sandwiches* in (10a) or *only for Brie* in (10b). Our analysis in section 4 develops an account of the relationship between such *constituent particles* that adjoin to a subsentential phrase and *sentential particles* that adjoin to the clausal spine as in (10a,b).

(11) Alex **only** [made sandwiches]$_F$ for Brie. She didn't (also) [wash the car]$_F$ for her.

The surface equivalence of sentences with different positions of focus, as in (10a) and (11) above, makes it challenging to confidently identify the position of focus in a sentence in isolation. As we see from the examples above, however, the position of focus can be elucidated by explicit contexts and continuations that make the extent of contrast between alternatives clear. Consider also the pair of examples with additive *also* in (12).

(12) a. Alex made soup for Brie. She **also** made [sandwiches]$_F$ for her.
b. Alex washed the car for Brie. She **also** [made sandwiches]$_F$ for her.

The preceding, contrasting propositions serve to identify the extent of contrast between salient alternatives: only the objects in (12a), but the VPs in (12b). The semantics introduced by *also* presupposes that another alternative is true, in contrast to *only* which claims that the other alternatives are false.

Constituent questions and their congruent answers are also useful for identifying the position of focus. Consider the object *wh*-question in (13) and the predicate *wh*-question in (14), each with two possible answers. The position of contrast amongst each set of answers bears focus, roughly corresponding to the material that has been replaced with a *wh*-word in the question.

(13) What did Alex make for Brie?
a. She made [sandwiches]$_F$ for her.
b. She made [soup]$_F$ for her.

(14) What did Alex do for Brie?
a. She [made sandwiches]$_F$ for her.
b. She [washed the car]$_F$ for her.

Again, the utterances in (13a) and (14a) both result in a pitch accent on *sandwiches* and cannot be distinguished in isolation, but we can identify their foci by considering the questions that they address ((13) vs (14)) and the shape of other felicitous answers to those questions.

In the following sections, we will continue to indicate the position(s) of logical focus compatible with a particular surface form using F-marking notation (subscript F). In the interest of space, in most cases we will not include the supporting contexts or continuations that are necessary to verify the choice of F-marking. Most of the data we present comes from work by other scholars; in all such cases, the original, cited sources include such supporting materials or otherwise have sufficiently detailed descriptions that allow us to confidently conclude that the reproduced example

indeed has the focusing possibility that we report.[7]

Finally, we note that other information-structural notions beyond focus, such as topic or contrast, may also exhibit mismatches between their logical semantic/pragmatic locus and their corresponding morphosyntactic target. We believe that the notions of pied-piping and anti-pied-piping as well as the theoretical proposal we put forward below also extend to other such information-structural categories and their corresponding morphosyntactic reflexes. However, we concentrate on focus here, due to the existence of well-established diagnostics for the logical position of focus, reviewed above, and the fact that focus phenomena is comparatively well described in a wide range of languages.

3 Properties of anti-pied-piping

We now explore the empirical landscape of anti-pied-piping and highlight some of its important properties and points of cross-linguistic variation. We show that anti-pied-piping is widely attested in a range of genetically unrelated and typologically varied languages, with both particle placement (§3.2) as well as phrasal movement (§3.3). We then discuss the choice of constituent that is targeted for MSF and variation in the obligatoriness of anti-pied-piping (§3.4).

3.1 Yaeyaman

We begin by presenting a detailed and instructive case of anti-pied-piping in Yaeyaman, a Southern Ryukyuan (Japonic) language, from Christopher Davis's work on the Miyara variety. We consider the focus particle *du*, which in the basic case appears as an enclitic on *wh*-phrases and the focused constituent in corresponding answers. This is illustrated by the question-answer pairs in (15–16).[8] Note that the answers in (15b) and (16b) convey the same proposition, that Chris ate soba. In (15b), as an answer to a subject *wh*-question, *du* appears on the subject. In (16b), as an answer to an object *wh*-question, *du* appears on the object.

[7] Some of the examples we reproduce are violent or are problematic from the perspective of gender representation and the perpetuation of gendered stereotypes. This is an area of ongoing concern for linguistic example sentences (Kotek, Dockum, Babinski & Geissler, 2021), but unfortunately difficult to address in research that heavily relies on existing descriptions by other scholars.

(15) **Subject focus:** (Davis, 2014: 124)

a. *Taa*-**du** suba-ba fai?
who-PRT soba-BA ate
'Who ate soba?'

b. [Kurisu-n]$_{F}$-**du** suba-ba fai.
Chris-NOM-PRT soba-BA ate
'[Chris]$_{F}$ ate soba.'

(16) **Object focus:** (*ibid.*)

a. Kurisu-ja *noo*-ba-**du** fai?
Chris-TOP what-BA-PRT ate
'What did Chris eat?'

b. Kurisu-ja [suba-ba]$_{F}$-**du** fai.
Chris-TOP soba-BA-PRT ate
'Chris ate [soba]$_{F}$.'

What is of particular interest is the behavior of *du* in utterances with *sentence focus* and *predicate focus* (Lambrecht 1994; see also Vydrina 2020 sec. 2.4), such as in the answer to the question 'What happened?' in (17) and to the question 'What did that woman do?' in (18). In (17b), where the entire sentence constitutes the focus in the answer to the question, the particle *du* appears on the subject. In (18b), where the predicate 'eat fish' is focused, *du* appears on the object. The placement of *du* in (17–18) constitutes cases of anti-pied-piping.[9]

(17) **Sentence focus:** (Davis, 2013: 33)

a. *Noo*-n-**du** ari?
what-NOM-PRT existed
'What happened?'

b. [Hajasi-san]$_{MSF}$-**du** ziroo-ba bari.
Hayashi-san-PRT Jiro-BA hit
'[Hayashi-san hit Jiro]$_{F}$.'

(18) **Predicate focus:** (*ibid.*)

a. Unu midunpïto-o *noo*-ba-**du** hii?
that woman-TOP what-BA-PRT did
'What did that woman do?'

b. Kunu midunpïto-o [izï-ba]$_{MSF}$-**du** fai.
this woman-TOP fish-BA-PRT ate
'This woman [ate fish]$_{F}$.'

Davis (2013) notes that this anti-pied-piping in (17–18) is obligatory — that is, *du* cannot instead appear inside or following the verbal complex — despite the fact that *du* can encliticize to the verb in cases of narrow focus on the verb. Instead, "*du* seems only to be able to occur attached

[8] We have made glosses more uniform following the Leipzig conventions, where possible, and simplified the glossing of word-internal morphology where orthogonal to the phenomena at hand. We refer readers to the original sources for further details on the morphology of these languages and on glosses reproduced here. We use the gloss PRT for focus particles that do not have immediate parallels in English.

[9] The placement of *du* on the *wh*-phrases in (17–18) may also constitute cases of anti-pied-piping. The theory we develop here also extends to particle placement and movement in *wh*-constructions as well, but we concentrate on focus constructions.

to the leftmost element within its associated focus" (p. 36). Shimoji (2018: 96) reports that this description also holds of all of fifteen other Ryukyuan language varieties that he has surveyed. We return to this leftmost effect and the general question of which subpart of the focus is targeted for MSF in anti-pied-piping in section 3.4.

3.2 Anti-pied-piping in particle placement

Anti-pied-piping in focus particle placement is readily attested in many other languages. Examples (19–29) all illustrate anti-pied-piping in predicate focus in eleven other verb-final languages from distinct language subfamilies or genera. In each of these transitive clauses, a focus particle targets the direct object for attachment (MSF) while semantically associating with the entire predicate VP.[10]

(19) **Burmese**[11] (Okell, 2002: 87)
[Caùn]$_{MSF}$-**hmá** mă-teqk'éhda.
school -PRT NEG-attended
'(I) didn't even [attend school]$_F$.'

(20) **Imbabura Quechua** (Kwon, 2013: 76)
[Pirkuti-ta]$_{MSF}$-**mi** wanyuchirka Pepe.
rat-ACC -PRT killed Pepe
a. 'Pepe killed [the rat]$_F$.'
b. 'Pepe [killed the rat]$_F$.'

(21) **Ishkashimi** (Karvovskaya, 2013: 81)
Salima [kulča]$_{MSF}$-**məs** pacu.
Salima kulcha -also bake
a. 'Salima also bakes [kulcha]$_F$.'
b. 'Salima also [bakes kulcha]$_F$.'

(22) **Khalkha Mongolian** (Jun Jie Lim, p.c.)
Tuyaa [ene nom-iig]$_{MSF}$-**l** unshsan.
Tuyaa this book-ACC -only read
a. 'Tuyaa only read [this book]$_F$.'
b. 'Tuyaa only [read this book]$_F$.'

(23) **Kakabe** (Vydrina, 2020: 518)
Mùséè kà [sòbéé]$_{MSF}$ **ɬé** tàbì.
woman PFV meat PRT prepare
a. 'The woman prepared [the meat]$_F$.'
b. 'The woman [prepared the meat]$_F$.'

(24) **Korean** (Choe, 1996: 677)
[Sakwa]$_{MSF}$-**man** mekesseyo.
apple -only ate
a. '(I) only ate [the/an apple]$_F$.'
b. '(I) only [ate the/an apple]$_F$.'

[10] Balogh & Kazemian (2021: ex. 16) documents the same pattern in Persian, which is related to Ishkashimi ((21)). For additional discussion of the data here, we thank Dorothy Ahn (Korean) and Rahul Balusu and Sreekar Raghotham (Telugu).

[11] The preceding context in the source shows that this is a predicate focus use, but based on the description there, we expect this structure to also allow for a narrow object focus use. The same applies to (29) below. On the semantics of *hmá*, see Erlewine & New 2021.

(25) **Masalit** (Leffel, 2011: 30–32)

Hawa [mada]$_{MSF}$ **de** taŋge.

Hawa mada only drink

a. ‘Hawa only drinks [mada]$_F$.’

b. ‘Hawa only [drinks mada]$_F$.’

(26) **Telugu** (based on Kotani, 2008: 191)

Suma [Jaya-ni]$_{MSF}$ **kuuḍa** meccukunindi.

Suma Jaya-ACC even praised

a. ‘Suma even praised [Jaya]$_F$.’

b. ‘Suma even [praised Jaya]$_F$.’

(27) **Tibetan** (Erlewine field notes[12])

Tshe.ring [deb]$_{MSF}$-**yang** ’bri.’dug.

Tsering book -also wrote

a. ‘Tsering also wrote [a book]$_F$.’

b. ‘Tsering also [wrote a book]$_F$.’

(28) **Turkish** (Kamali, 2011: 182)

Biz [iskambil]$_{MSF}$ **de/bile** oynadık.

we cards also/even played

a. ‘We also/even played [cards]$_F$.’

b. ‘We also/even [played cards]$_F$.’

(29) **Qunqi Dargwa** (Dmitry Ganenkov, p.c. to Forker & Belyaev 2016: 249)

… [it:i]$_{MSF}$-**ra** durt’ibce cadi.

them -also give COP

‘(they) also [gave them away]$_F$.’

As noted above, we do not reproduce supporting contexts or continuations that motivate each attested choice of F-marking, but such information is available in the original sources that we cite.

The focus particles associating with the VP in (19–29) appear between their MSF object and the inflected verb. We might wonder whether anti-pied-piping in such examples is a response to the fact that particle placement directly on the logically focused VP may disrupt the morphology of the verbal complex. The Japanese examples in (30) show that this cannot be the motivation for anti-pied-piping in the general case. When associating with a transitive VP, a focus particle such as additive *mo* may adjoin to the VP itself as in (30a) or to the object as in (30b), the latter being a case of anti-pied-piping parallel to those above. In the former case, (30a), the verbal morphology is indeed disrupted, triggering a process akin to *do*-support. (In addition to the intended predicate focus reading, *mo* in (30a) may associate narrowly with the object or the verb and (30b) also allows for narrow focus on the object.)

[12] The Tibetan judgments here and in (65) reflect the judgments of three native speakers in Dharamsala, India, consulted in 2018–2019.

(30) **Japanese** (Ohno, 2003: 323–324)

a. Taro-ga [tako-o tabe]$_{MSF}$-**mo** shi-ta.
Taro-NOM oct.-ACC eat -also do-PST
'Taro also [ate octopus]$_F$.'

b. Taro-ga [tako]$_{MSF}$-**mo** tabe-ta.
Taro-NOM octopus -also eat-PST
'Taro also [ate octopus]$_F$.'

This optionality of anti-pied-piping in Japanese — despite its obligatoriness in the related and morphosyntactically similar Yaeyaman language in the preceding section — shows that anti-pied-piping cannot be generally described as a kind of repair to satisfy morphological processes, and also that its application is subject to cross-linguistic variation that must be learned.

Focus may also trigger other morphosyntactic reflexes in a clause. In Tundra Yukaghir, when an object is focused with a particle such as *leŋ*, as in (31a), the subject agreement affix on the verb changes to a dedicated object focus (OF) form. In cases of predicate focus, a particle similarly appears on the object, again triggering the object focus agreement form, as in (31b). See also Nagasaki 2018 for parallel examples in (late 19th century) Kolyma Yukaghir.

(31) **Tundra Yukaghir** (Matić & Odé, 2015: 630)

a. Object focus:
Q: What do you fear?
[Labunme]$_F$-**leŋ** iŋeː-**meŋ**.
ptarmigan -PRT fear-OF.1/2SG
'I fear [ptarmigans]$_F$.'

b. Predicate focus:
Q: What do you do for a living?
Met [qajser]$_{MSF}$-**leŋ** wie-nun-**meŋ**.
1sg ski -PRT make-HAB-OF.1/2SG
'I [make skis]$_F$.'

Anti-pied-piping in particle placement is not limited to verb-final languages. As seen in examples (32–34) below, anti-pied-piping in predicate focus is also attested in verb-medial languages. Schwarz (2009, 2010) also gives examples parallel to (33) in the related Oti–Volta Gur languages Buli, Gurene, and Kɔnni. (Note that example (34) is also compatible with a narrow verb focus reading (in (34c)), which we address in footnote 46 below.)

(32) **Awing** (Fominyam & Šimík, 2017: 1039)

a. A-pe'-náŋnə **tsɔ́'ə** [ŋgəsáŋɔ́]$_{MSF}$.
AGR-PST-cook only maize
'(He) only cooked [maize]$_F$.'

b. A-tə́-ndzí'ə **tsɔ́'ə** [alí'ə]$_{MSF}$.
AGR-PROG-till only farm
'(She) is only [tilling the farm]$_F$.'

(33) **Dagbani** (Fiedler & Schwarz, 2005: 9)

ɔ̀ bɔ̀l **lá** [George]$_{MSF}$.

3sg call PRT George

a. ‘She called [George]$_F$.’

b. ‘She [called George]$_F$.’

(34) **Tangale** (Hartmann & Zimmermann, 2007a: 119)

N fad-go **núm** [littáfi-i]$_{MSF}$.

1sg buy-PRF only book-the

a. ‘I only bought [the book]$_F$.’

b. ‘I only [bought the book]$_F$.’

c. ‘I only [bought]$_F$ the book.’

Anti-pied-piping in focus particle placement is also attested in verb-initial languages, which we exemplify with Tagalog later in this section.

Readers may note that the anti-pied-piping data just presented fall largely into two categories: OV (head-final) languages with postfocal particles ((19–31)) and VO (head-initial) languages with prefocal particles ((32–34)). Readers may rightly wonder whether other combinations are possible: that is, anti-pied-piping in head-final languages with prefocal particles or in head-initial languages with postfocal particles. We imagine that such languages may exist, but have not identified any here, due to the following systematic methodological challenge.

To illustrate the issue, consider example (35) below from Konkomba, another Oti–Volta Gur language related to Dagbani. Like the Dagbani example (33) above, (35) is able to express object focus or predicate focus.

(35) **Konkomba** (Schwarz, 2007a: 123, 126)

Ù ŋmán !ŋítùùn **lá**.

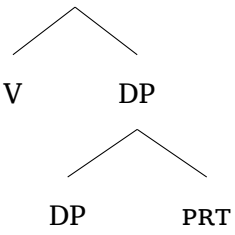
CL chew beans PRT

a. ‘She ate [beans]$_F$.’

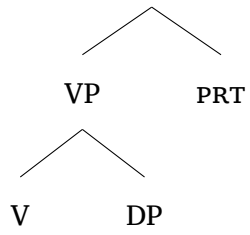
b. ‘She [ate beans]$_F$.’

Before we can determine whether there is a mismatch between the logical focus and focus particle placement, we must identify the syntactic position of the particle. Unlike in the Dagbani (33), the focus particle *lá* in the Konkomba (35) *follows* the entire head-initial verb phrase. Therefore, the surface structure in (35) is amenable to either of the parses in (36). Note that we use the label DP (for *Determiner Phrase*) for noun phrase projections (Szabolcsi, 1983; Abney, 1987).

(36) a.



b.



If object focus in (35a) and predicate focus in (35b) correspond respectively to the structures in (36a) and (36b), then there is no mismatch of anti-pied-piping nor pied-piping. However, if the particle is adjoined to the object as in (36a) for both readings in (35), we would describe (35b) as a case of anti-pied-piping. Without further work to establish the exact position of the particle, such examples are not sufficiently informative as to whether or not the particle exhibits anti-pied-piping.[13] In contrast, with postfocal particles in head-final structures and prefocal particles in head-initial structures, anti-pied-piping is more immediately identifiable.

Another common pattern of anti-pied-piping involves the subject being marked by a focus particle, with the sentence as a whole being interpreted as the logical focus, as seen in (37–42) below. We also saw this pattern with Yaeyaman *du* in (17).

(37) **Even** (Matić & Wedgwood, 2013: 153)

[Ama]$_{MSF}$-**dmar** ọmọlgọ-j negirin.
father -PRT son-REFL.POSS scolded
'[A father was scolding his son]$_F$.'

(38) **Ishkashimi** (Karvovskaya, 2013: 82)

[Wai mol]$_{MSF}$ -**məs** xi dusto-i zənayu isu.
DEM husband-also REFL hands-ACC wash come
a. '[Her husband]$_F$ goes to wash his hands, too.'
b. '[Her husband goes to wash his hands]$_F$, too.'

[13] Similar challenges hold for prefocal particles in head-final languages. To wit, there is an active debate concerning the analysis of prefocal particles in Germanic as either consistently adjoined to the head-final clausal spine (Jacobs, 1986; Büring & Hartmann, 2001) or potentially adjoined to subclausal constituents (see e.g. Smeets & Wagner 2018).

(39) **Kakabe** (Vydrina, 2020: 502)

[Túlân]$_{MSF}$ **dè** ká ɲààréènù súbé tólóɲè là.
mice PRT PFV cats choose game OBL
'[The mice chose the cats to have a party]$_F$.'

(40) **Korean** (Choe, 1996: 680)

[[Moduni]$_{MSF}$-**man** tonguiha-myen], na-to ttarukessso.
everybody -only agree-COND 1sg-also follow
'Only if [everybody agrees]$_F$, I too would follow.'

(41) **Lak** (Victor Friedman p.c. to Forker & Belyaev 2016: 251)

K'ič:a [ca č'iwis:a q:urši]$_{MSF}$-**gu** bahnu bur.
up.there one small box -also fall COP
'[From up there a small box fell]$_F$, too.'

(42) **Navajo** (Perkins, 1978: 25)

[[Jáan]$_{MSF}$ **hanii** chidí yiyíiɬchǫ'-go] t'áani' naashá.
John NEG.PRT car wreck-COMP afoot 1.walk
a. 'It's not because [John]$_F$ wrecked the car that I'm on foot.'
b. 'It's not [because John wrecked the car]$_F$ that I'm on foot.'

The Yukaghir languages also exhibit this same form of sentence-focus anti-pied-piping. Recall that verbal subject agreement morphology is affected by the presence of focus particles, as we saw in (31) above. Similarly, when an intransitive subject is focused with a particle as in (43a), the agreement morphology on the verb is replaced with an invariant subject focus (SF) suffix. When an entire intransitive clause is focused, as in (43b), its subject bears a focus particle, with the verb again appearing in the subject focus form.

(43) **Tundra Yukaghir** (Matić & Odé, 2015: 630)

a. Subject focus:
They say that [you]$_F$ are strong.
Ele:ń, [köde]$_F$-**leŋ** werwe-**l**.
no man-PRT strong-SF
'No, [the man]$_F$ is strong.'

b. Sentence focus:
Q: What is going on?
[Ilije]$_{MSF}$-**leŋ** werwe-mu-**l**!
wind-PRT strong-INCH-SF
'[The wind has gotten strong]$_F$!'

Anti-pied-piping in sentence focus is also attested in verb-medial languages, as in (44) and (45).

(44) **Ewe**[14] (Ameka, 2010: 151)

[ɖevíáwó]$_{MSF}$-**é** gba zea.
children -PRT break pot
'[The children broke the pot]$_F$.'

(45) **Konkomba**[15] (Schwarz, 2007a: 23, 24)

[Àjúá]$_{MSF}$ **lé** !ŋmán ŋítùùn.
Ajua FM chew beans
a. '[Ajua]$_F$ ate beans.'
b. '[Ajua ate beans]$_F$.'

Finally, we discuss anti-pied-piping in Tagalog and Latin, which will foreshadow our own proposal. In the Tagalog example (46a), the 'only' particle *lang* immediately follows the focus, which is an adjunct fronted to initial position. This gives the appearance of *lang* being an enclitic focus particle. In contrast, *lang* associates with the verb phrase 'give money' in (46b), but is positioned properly within the predicate, between 'give' and 'money.'

(46) **Tagalog** (Kaufman, 2005: 181)

a. [Sa simbahan]$_F$ =**lang** =ako nagbibigay ng pera.
OBL church only 1sg give GEN money
'I only give money [in church]$_F$.'

b. Sa simbahan ay nagbibigay =**lang** =ako ng pera.
OBL church TOP give only 1sg GEN money
'In church, I only [give money]$_F$.'

The behavior of *lang* in (46) is explained in part by recognizing its more general status as a second-position clitic. Second-position clitics in Tagalog follow one phrase or head within the clause, not counting topics (Kroeger, 1998; Kaufman, 2010). Note that the pronoun *ako* here is also such a second-position clitic and thus exhibits this same pattern of placement in (46a) vs (46b). Thus we can conclude that the anti-pied-piping manifested by *lang* in examples such as (46b) is

[14] Collins (1994) shows that sentence focus anti-pied-piping can target the subject as in (44) (see his p. 57 ex. 101) but may also involve object fronting (p. 53 ex. 86). Anti-pied-piping in sentence focus is also attested in other Kwa languages such as Akan (Bearth, 1999: 255–257), Fongbe (Collins, 1994: 53–54 exx. 89, 91), Gungbe (Aboh, 2006: 31 ex. 20b), Tuwuli (Harley, 2005: 222 ex. 145), and Yoruba (Manfredi, 2004: ex. 39a).

[15] Schwarz (2007a) argues against analyzing *lé* as a subject enclitic. The pattern in (45) also holds of four other Oti–Volta Gur languages, Buli, Dagbani, Gurene, and Kɔnni (Schwarz, 2009, 2010).

due to a more general property of second-position clitic placement in Tagalog. Focus particles in Thompson River Salish, which like Tagalog is a predicate-initial language, are also second-position clitics, resulting in expressions parallel to (46); see Koch & Zimmermann 2010: pp. 242–243 exx. 14a,b, 17a,b.

Latin too exhibits anti-pied-piping behavior involving the well-known second-position clitic *que* (see e.g. Zwicky 1977). Here we follow Mitrović & Sauerland (2014) and Szabolcsi (2015) in describing *que* as an additive focus particle rather than a conjunction. The placement of *que* in second-position within its logical focus leads to examples such as (47):[16]

(47) **Latin** (Julius Caesar, glossed in Carlson, 1983: 80)

A cultū prōvinciae longissime absunt, $[\text{minime}]_{\text{MSF}}$-**que** ad eōs mercatores
from culture province furthest be.absent least -also to them merchants
saepe commeant, $[\text{proximī}]_{\text{MSF}}$-**que** sunt Germānīs.
often visit near -also are Germany

'[They] are furthest from the civilization of Roman Italy, are [rarely visited by merchants]$_{\text{F}}$, and are also [closest to Germany]$_{\text{F}}$.'

We consider these examples in Tagalog and Latin to be instructive, as anti-pied-piping in these cases can be attributed straightforwardly to a general process of second-position clitic placement, resulting in a mismatch between the position of the particle and the position of its logical interpretation. Of the mismatch exhibited by Latin *que*, Carlson (1983) writes, "A much simpler interpretation of *-que* could be given, though, if we were to somehow 'postpone' its semantic effect until a larger unit is encountered in the tree" (p. 73). The analysis that we develop in section 4 builds on this intuition and generalizes it to other cases of anti-pied-piping.

3.3 Anti-pied-piping in phrasal movement

Many languages conventionally target focused constituents for movement. Such movement may also exhibit anti-pied-piping, targeting a constituent that is a proper subpart of the logical focus. Although some previous works have described such examples as involving movement that is independent of the focal structure of the sentence (as we review in section 5), we instead argue that

[16] The Turkish additive particle *dA* from (28) similarly encliticizes to the first constituent within clausal conjuncts. See Kornfilt 1997: 109 ex. 430. This parallels the placement of Japanese additive *mo* in (8) above; see note 3.

these patterns are most fruitfully described by paying close attention to the mismatch between the target of movement and the logical focus and then analyzed as related to the phenomenon of anti-pied-piping in focus particle placement.

The examples in (48–53) all illustrate predicate focus with transitive VPs where only the object is moved to a focus position, just as we saw in Hungarian in (7).

(48) **Bura** (Hartmann, Jacob & Zimmermann, 2008: 72)
[Yímí ní]$_{MSF}$ án tí da sá ____.
water DEF COP REL 3pl drink
'They [drank the water]$_F$.'

(49) **Garrwa** (Mushin, 2006: 311)
[Nganbi-nyi]$_{MSF}$ =ngayu yadajba lilyseed-DAT 1sg.NOM wait ____.
'I'm [waiting for lilyseed]$_F$.'

(50) **Haitian Creole** (Franz Cozier ms. in Fanselow & Lenertová 2011: 194)
Se [poul]$_{MSF}$ m ap kuit ____.
FM chicken 1sg TAM cook
'I am [cooking chicken]$_F$.'

(51) **Russian** (Fanselow & Lenertová, 2011: 203)
[Cvety]$_{MSF}$ oni sobrali ____.
flowers.ACC 3pl plucked
'They [plucked flowers]$_F$.'

(52) **Somali** (Lecarme, 1999: 284; see also Svolacchia, Mereu & Puglielli, 1995: 73–74)
[Búug]$_{MSF}$ **buu** ____ akhriyay.
book FM+3SGM read
'He [read a book]$_F$.'

(53) **Yoruba** (Manfredi, 2004: ex 39a)
[Ẹmụ]$_{MSF}$ **ni** Àràbá rà ____.
palmwine FM Araba buy
a. 'Araba bought [palmwine]$_F$.'
b. 'Araba [bought palmwine]$_F$.'

Fanselow (2004: 17–18) describes similar patterns in Czech, Croatian, and Polish as well. We discuss some Czech examples in section 6.

The fronted constituent may also host an overt focus particle, as in (54–56). In the German (54), the stranded verb has independently fronted to verb-second position.

(54) **German** (Fanselow, 2004: 17)
On his wedding anniversary ...
nur [einen Blumenstrauß]$_{MSF}$ überreicht jeder dritte Ehemann ____.
only a bunch.of.flowers hands.over every third husband
'every third husband only [hands over a bunch of flowers]$_F$.'

(55) **Kîîtharaka** (Abels & Muriungi, 2006: 9)

I-[nyomba]$_{MSF}$ Maria araakire __.

PRT-house Maria built

a. 'Maria built [the house]$_F$.'

b. 'Maria [built the house]$_F$.'

(56) **Mandarin** (Constant & Gu, 2010)

Tā **lián** [tóufa]$_{MSF}$ dōu bù shū ____.

3sg even hair DOU NEG comb

a. 'He doesn't even comb [his hair]$_F$.'

b. 'He doesn't even [comb his hair]$_F$.'

Focus movement with anti-pied-piping is also attested with sentence focus. Examples (57–61) below are all reported as answers to questions such as 'What happened?' or 'What's the matter?', but where only the subject moves to a dedicated focus position. The relevant position is a cleft pivot position in (57), (59), and (60), V2 prefield position in (58), and a left-peripheral position marked by a focus marker in (61).

(57) **French** (Sasse, 1987: 538)

C' est [maman]$_{MSF}$ qui ____ me bat.

this is mother who 1sg hit

'[Mum's hitting me]$_F$.'

(58) **German** (Fanselow & Lenertová, 2011: 181)

[Eine Krankenschwester]$_{MSF}$ hat ____ einen Patienten getötet.

a nurse has a patient killed

'[A nurse killed a patient]$_F$.'

(59) **Tilapa Otomi** (Palancar, 2018: 261)

ñü [a rú ngopho]$_{MSF}$ kẹha ____ ... bi-kokhi-'a.

PRT DEF POSS.3SG brain COP bleed

'[Her brains bled]$_F$.'

(60) **Welsh** (Mac Cana 1973: 93, as glossed in Sasse 1987: 539)

[Y ffermwr]$_{MSF}$ (a) adawodd y glwyd ar agor.

DEF farmer REL let DEF gate open

a. 'It was [the farmer]$_F$ that left the gate open.'

b. '[The farmer left the gate open]$_F$.'

(61) **Wolof** (Robert, 1991: 125)

[Patron bi]$_{MSF}$ **moo** ____ ma taamu.

boss DEF FM.3SG 1sg choose

'[The boss chose me]$_F$.'

While such patterns are common, there are also cases of anti-pied-piping with sentence focus leading to focus movement of the object rather than the subject. This is the case in (62) and (63), where there is no overt subject that can be fronted. Bianchi, Bocci & Cruschina (2016) also report this possibility in standard Italian (p. 36 ex. 43).

(62) **Breton** (Jouitteau, 2007: 178)

[Va lein]$_{MSF}$ e tebrin ____.

my breakfast E eat.FUT.1SG

'[I will eat my breakfast]$_F$.'

(63) **Sicilian** (Cruschina, 2012: 71)

[A machina]$_{MSF}$ m' arrubbaru ____!

the car to.me stole.3PL

'[They stole the car from me]$_F$!'

3.4 Position

Having established the existence of anti-pied-piping, we now turn to the question of which subconstituent of the logical focus is targeted for MSF. We will see that, in many languages, the element targeted for MSF is at or near the left edge of the logical focus, but there is also substantial cross-linguistic variation in the presence or strength of this effect.

First, recall that in Yaeyaman and Ishkashimi, sentence focus is marked by particle placement on the subject and transitive predicate focus is marked by particle placement on the object. For these two languages, Davis (2013) and Karvovskaya (2013) also show that other possibilities are ungrammatical. These options are schematized below.

(64) **Miyara Yaeyaman *du* (Davis, 2013, 2014) and Ishkashimi *məs* (Karvovskaya, 2013):**

a.	Sentence focus:	[S O V]$_F$	⇒	✓S-PRT O V	*S O-PRT V
b.	Predicate focus:	S [O V]$_F$	⇒	*S-PRT O V	✓S O-PRT V

Similar leftmost effects are observed in other languages as well, although with the status of a preference rather than a hard constraint. Example (65) is a case of predicate focus with a ditransitive predicate in Tibetan. For the intended reading, consulted speakers prefer to place the particle *yang* after the leftmost (goal) argument within the predicate.

(65) **Tibetan** (Erlewine field notes)

Kunga's a very good person. She prays at the temple every day.

Kun.dga' khyi-la-{✓**yang**} kha.lag-{?**yang**} sprad.gi.'dug.

Kunga dog-DAT -also food -also gives

'Kunga also [gives food to dogs]$_F$.'

In Japanese, the leftmost requirement is subject to some speaker variation. Ohno (2003: 324) reports that for the sentence focus reading in a SOV sentence, all speakers allow the additive particle *mo* on the subject as in (66a) but only some also allow the particle on the object as in (66b).[17]

(66) **Japanese** (based on Aoyagi 1998: 151, 2006: 123)

At yesterday's party, not only did Hanako dance a dance, but ...

a. ✓[Taro]$_{MSF}$-**mo** piano-o hiita.

Taro -also piano-ACC played

'[Taro played piano]$_F$, too.'

b. %Taro-ga [piano]$_{MSF}$-**mo** hiita.

Taro-NOM piano -also played

'[Taro played piano]$_F$, too.'

Dash & Datta (2020) report optionality in anti-pied-piping particle placement in Hindi-Urdu and Bangla. For instance, both variants of the ditransitive example (67) below are described as grammatical for predicate focus, but with a "weak leftmost preference"; we therefore report the second option with ?.

(67) **Hindi-Urdu** (Dash & Datta, 2020: exx. 5, 17)

During Diwali, Pulkit plans to feed the poor and also distribute gifts to children. However, due to some emergency, he fails to be able to feed the poor.

(Vo) (sirf) bachcho-ko {✓**hii**} tohfe {?**hii**} de payaa hai.

3sg only children-DAT PRT gifts PRT give able AUX

'He could only [give gifts to children]$_F$.'

[17] This variation is also reflected in the literature: Aoyagi (1998: 151, 2006: 123) reports optionality of placement in examples parallel to (66), whereas Numata (2009: 70) claims that anti-pied-piping particles always target the leftmost constituent within the focus. Given these conflicting reports, explicitly noted by Ohno (2003: 324), we reproduce Aoyagi's example but with judgment marks that reflect the full range of attested judgments in (66a,b). We thank Heidi Harley (p.c.) for bringing Ohno's work to our attention.

Next we turn to anti-pied-piping involving phrasal movement. Here too, leftmost effects have been described in some languages. In the German (68), fronting of the ditransitive's theme allows for the predicate focus reading in (68aii), but fronting of the goal in (68bii) does not. The theme is naturally leftmost in the VP's base order.

(68) **German** (Fanselow, 2004: 11)

a. [Die Bücher]$_{MSF}$ hab ich ____ ins Regal gestellt.
the books have 1sg into.the shelf placed
i. 'I put [the books]$_F$ on the shelves.'
ii. 'I [put the books on the shelves]$_F$.'

b. [Ins Regal]$_{MSF}$ hab ich die Bücher ____ gestellt.
into.the shelf have 1sg the books placed
i. 'I put the books [on the shelves]$_F$.'
ii. * 'I [put the books on the shelves]$_F$.'

A weaker leftmost preference is reported in Kikuyu. Schwarz (2003: 95) notes that for predicate focus with a ditransitive VP with goal–theme base order, goal fronting as in (69a) "seems to be slightly preferred" over the theme fronting in (69b), "although both seem to be acceptable."

(69) **Kikuyu** (Schwarz, 2003: 95)

Q: What does Abdul do?

a. **Ne**-[mwana]$_{MSF}$ Abdul aðomaɣera ____ iβuku.
PRT 1.child Abdul read book

b. ? **Ne**-[iβuku]$_{MSF}$ Abdul aðomaɣera mwana ____.
PRT book Abdul read child
'Abdul [read the child a book]$_F$.'

In contrast, in San Martín Peras Mixtec (base order: VSO), sentence focus may involve fronting of either the subject or object with apparent optionality.

(70) **San Martín Peras Mixtec** (Hedding, 2019: exx. 43a,b)

a. [Tsìnà]$_{MSF}$ shàshi ____ koñu.
dog ate meat
'[The dog ate the meat]$_F$.'

b. [Koñu]$_{MSF}$ shàshi tsìnà ____.
meat ate dog
'[The dog ate the meat]$_F$.'

We conclude that anti-pied-piping in many languages is subject to a leftmost requirement, whereby MSF must or prefers to target the leftmost subphrase of the logical focus, although there is considerable cross-linguistic variation in the presence or absence and strength of such effects.[18] We discuss further details of this process and its relation to stress placement and the theory of focus projection in section 6, after we present our core proposal in section 4. For now, it suffices to note that the process of MSF target selection that results in anti-pied-piping must be able to make reference to linearized structures, and ultimately to phrasal stress or its determinants as well. We also note that anti-pied-piping behavior in particle placement and phrasal movement parallel each other, and these parallels will be strengthened in section 6.2. Both of these properties of anti-pied-piping will be important features of the proposal we develop here.

3.5 Summary

We have now established a number of facts about anti-pied-piping. Anti-pied-piping is attested in a wide range of languages: in total, we have identified anti-pied-piping in over 60 languages from over 40 different subfamilies or genera, which we list in an index at the end. Both particle placement as well as focus fronting allow for anti-pied-piping, with the choice of constituent targeted often subject to a leftmost requirement.

Although the availability of anti-pied-piping is wide-spread, we do not believe it to be universal. There are, for example, languages where scholars have specifically investigated broad focus constructions and have shown that possible patterns of anti-pied-piping are not attested. This is the case in two Zapotec languages, which are both verb-initial and express narrow argument focus by fronting to a preverbal position but where broad focus must be expressed using a verb-initial clause without fronting (Lee, 1997: 237–238; Bueno Holle, 2016: ch. 5). Just as there is variation amongst the behavior of languages with anti-pied-piping, its availability too is a point of potential variation that must be learned.

The existence of anti-pied-piping complicates the syntax/semantics of focus particles. It forces us to divorce the pronounced position of particles and their position of interpretation, just as Carlson (1983) suggests in his discussion of Latin *que* as noted above. The analysis that we develop is also inspired by contemporary theories of pied-piping, allowing us to unify anti-pied-piping

[18] We give a definition for "leftmost" in section 6 below that is not simply determined by linear extent. In particular, as motivated by the data in this section, the object in a VO verb phrase counts as "leftmost" within the verb phrase for purposes of particle placement and movement.

in particle placement and in movement and explain their similarities, as well as to account for parallels between anti-pied-piping and pied-piping, which we present in section 6.

4 Proposal

We now present our analysis for the anti-pied-piping patterns presented above. Anti-pied-piping constitutes a serious challenge for the compositional semantics of focus particles, as a central expectation of focus semantics since Jackendoff 1972 and Rooth 1985 is that the focus be within the focus particle's sister. We therefore begin by putting forward a new and general theory for the compositional semantics and syntactic derivation of focus particle constructions, which will allow for anti-pied-piping in focus particle placement. We then address cases of anti-pied-piping in focus movement, building on the influential proposal for pied-piping as the result of movement targeting a particle-adjoined phrase (see e.g. Tanaka, 1999; Horvath, 2000, 2007; Watanabe, 2006; Cable, 2007, 2010a,b). We address the question of how the position of particles is determined in greater detail in section 6 below.

4.1 Severing the particle from its semantics

There are broadly two analytic approaches to the semantics of focus particles that adjoin to a subclausal phrase such as the *only* in (71) below.

(71) Alex made **only** [sandwiches]$_{\mathrm{F}}$ for Brie.

The first approach, which we call the QUANTIFICATIONAL PARTICLE theory, takes the pronounced *only* to be a semantically contentful, two-place functor denotation as in (72) below. Under this view, *only* composes with its sister (the α argument, of type σ) to form a quantificational meaning that then composes with its scope (β).[19] The resulting expression presupposes the prejacent proposition $\beta(\alpha)$ and will be true if and only if all other, alternative meanings to α in the alternative set C, when composed with β, are false.[20]

[19] In examples such as (71), [only α] forms a quantificational noun phrase meaning that must undergo a scope-taking operation in order to compose with its second argument, β. We illustrate this in (81) below.

[20] The denotations that we sketch for *only* in (72) and (73) are presented using an extensional semantics and are somewhat simplified. Most notably, they require the negation of all non-prejacent alternative propositions, whereas technically all and only alternative propositions that are not entailed by the prejacent proposition should be negated. See for

(72) **Two-place *only* meaning for the quantificational particle PRT_{only}:**

$$[\![\text{only}_{\text{two-place}}]\!] = \lambda\alpha_{\sigma} \,.\, \lambda\beta_{\langle\sigma,t\rangle} : \underbrace{\beta(\alpha)}_{\text{presupposition}} \,.\, \underbrace{\forall\gamma \in C\,[(\gamma \neq \alpha) \rightarrow \neg\beta(\gamma)]}_{\text{truth condition}}$$

Under the second approach, which we call the OPERATOR–PARTICLE theory, the pronounced *only* in (71) is not itself semantically contentful but is instead simply a morphological flag that signals the presence of a corresponding, unpronounced ONLY operator in the clause (Lee 2004, 2005; Hirsch 2017; Hole 2017; Sun 2021; a.o.).[21] The covert operator adjoins to the clausal spine, above the logical focus and its corresponding particle, resulting in a dissociation between the position of the particle and its associated semantics. The ONLY operator in (73) takes a sister of propositional type with denotation φ (the prejacent), presupposes φ, and returns true if and only if all other alternatives in a set of propositional alternatives C are false.

(73) **One-place *only* meaning for the operator OP_{only}:**

$$[\![\text{only}_{\text{one-place}}]\!] = \lambda\varphi_{t} : \underbrace{\varphi}_{\text{presupposition}} \,.\, \underbrace{\forall\psi \in C\,[(\psi \neq \varphi) \rightarrow \neg\psi]}_{\text{truth condition}}$$

In either case, the alternative set C is a contextually determined variable that contains alternatives that are congruent in focus structure to the meaning of the interpreted *only*'s sister. We can ensure the congruence of alternatives by making reference to logical F-marking as in the Alternative Semantics of Rooth 1992, 2016, or without reference to F-marking as in Büring 2015. We will continue to discuss examples with *only* in this section, but these two approaches to the syntax/semantics of *only* also extend to other types of focus particles.

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example von Fintel 1997.

[21] The idea that focus particle constructions reflect structures with both a sentential operator and a subsentential particle, only one of which is pronounced, has also been motivated on primarily syntactic grounds in Horvath 2000, 2007, 2013, Barbiers 2010, 2014, Bayer & Obenauer 2011, and Bayer 2020. However, these works are less clear regarding the semantic division of labor between the operator and particle.

There is also earlier work that takes constituent focus particles to be interpreted at a higher, clause-adjoined position at Logical Form (LF) (see e.g. Lahiri 1998 on *even* and Herburger 2000 on *only*, as well as Aoyagi 1998, 1999, 2006 on focus particles in Japanese), perhaps following a type of covert movement operation. To our knowledge, this intuition was first articulated in the generative tradition in Kuroda 1965's discussion of "attachment transformations." In addition, work such as Chierchia 2006, 2013 propose that certain other expressions such as polarity-sensitive items lexically require the presence of covert operators akin to *even* or *only*. Such proposals can be recast as other instances of operator–particle pairs in our theory.

Under the operator–particle approach, example (71) above reflects the syntactic structure in (74) below: an operator OP with the semantics of one-place *only* in (73) is adjoined to the clausal spine, here taking *v*P as its sister,[22] and a corresponding particle PRT is adjoined to the focused phrase *sandwiches*. In English, either the operator or particle can be pronounced as *only*, but not simultaneously (Hirsch, 2017; Quek & Hirsch, 2017). If the particle is pronounced, we yield (71) above. If the operator is pronounced instead, we yield the form in (75) with sentential *only*, which has the equivalent interpretation. See also Hirsch 2017 chapter 7, Quek & Hirsch 2017, and Bassi, Hirsch & Trinh 2022 for extensive motivation for the operator–particle theory from the scope-taking behavior of English *only*.

(74) Alex $\mathbf{OP_{only}}$ [$_{vP}$ *t* made [$\mathbf{PRT_{only}}$ [sandwiches]$_F$] for Brie]

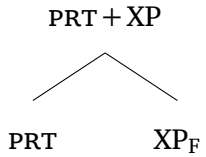
(75) Alex **only** made [sandwiches]$_F$ for Brie. =(10a)

Some languages allow both the particle and corresponding operator to be pronounced simultaneously, descriptively in a concord-like relationship, unlike in English. This is attested in Dutch (Barbiers, 2010, 2014), German Sign Language (Deutsche Gebärdensprache) (Herrmann, 2013: 299–300), Vietnamese (Hole, 2013, 2017; Erlewine, 2017; Sun, 2020: 331–332), and Lavukaleve (see (87) below). See also Bayer 2020: 64–66 for discussion of naturally occurring examples in English and German that may be best analyzed as rare cases of simultaneous pronunciation of the operator and particle.

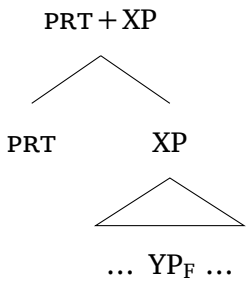
In (74), the particle has adjoined directly to the logical focus, as also schematized in (76). But faithful adjunction to the focused constituent is not the only possibility. The particle could be adjoined to a constituent that properly contains the logical focus, as in (77); this is pied-piping. The particle could also be adjoined to a constituent properly contained within the focus, as in (78), which is the configuration we recognize as anti-pied-piping.

[22] We adopt the *predicate-internal subject hypothesis* (see e.g. Kitagawa, 1986; Kuroda, 1988; McCloskey, 1997), whereby agentive subjects start as the argument of a verbal functional head *v* and then move to a high, canonical subject position, as in (74). Operators must take a constituent of propositional type as their sister. *v*P is proposition-denoting, with extensional type *t*.

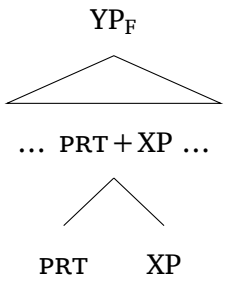
(76) **No mismatch (MSF = F)**



(77) **Pied-piping (MSF > F)**



(78) **Anti-pied-piping (MSF < F)**



We argue that the semantic interpretation of anti-pied-piping requires the operator–particle theory with one-place operator semantics. To see why this is the case, we discuss the interpretation of a predicate focus structure where PRT has adjoined to the object, a proper subpart of the logical focus. For presentational purposes, we discuss a pseudo-English example pronounced as (79a) but interpreted as (79b), modeled after the Hungarian example (7). Although this pattern of anti-pied-piping is not attested in English, this example stands in for the many examples of predicate focus with particle placement on the object discussed above.

(79) a. "Peter read only [Hamlet]$_{MSF}$."
b. 'Peter only [read Hamlet]$_F$.' (He didn't do anything else.)

Under the operator–particle theory, we could posit (80) as the underlying structure for (79). The higher, unpronounced operator OP is interpreted with the one-place denotation for *only* in (73) above.

(80) **Structure for (79) under the operator–particle theory:**

Peter **OP$_{only}$** [$_{vP}$ *t* [$_{VP}$ read [**PRT$_{only}$** [Hamlet]$_{MSF}$]]$_F$]

Notice that the entire focus (VP) is within the sister of the interpreted operator OP. This allows OP to consider alternatives that vary in their VP meanings, contrasting 'read Hamlet' with other contextually relevant descriptions, like the transitive 'read Macbeth' and 'clean the car,' as well as the intransitive 'swim.' The presence of PRT serves only to morphologically indicate the presence of the corresponding operator OP that is interpreted; PRT itself is semantically inert.

In contrast, let's consider how we might attempt to interpret (79) using the quantificational particle theory. Interpreting the pronounced particle in (79a) with the two-place semantics for *only* in (72) above, the constituent [only Hamlet] will yield a quantificational noun phrase meaning.

Following *Quantifier Raising* (QR; May 1977; see also Heim & Kratzer 1998: ch. 7), this results in a *Logical Form* (LF) representation as in (81), where the trace position is interpreted as a variable (x) and a corresponding λ-binder is adjoined above. For ease of presentation, we illustrate (81) with the agent *Peter* reconstructed into its base position.

(81) **LF structure for (79) under the quantificational particle theory:**

LF: [**only** Hamlet] [λx [$_{vP}$ Peter [$_{VP}$ read x]]]

Recall that the two-place denotation for *only* as in (72) considers alternatives to its sister, *Hamlet*, in the contextually specified variable C and requires that all of those alternatives that are not *Hamlet*, when composed with its second argument (λx . Peter read x), will be false. For instance, if C includes *Macbeth*, (81) would require that Peter did not read Macbeth. However, because only alternatives to the object are considered, (81) cannot be used to derive the intended predicate focus meaning which contrasts 'read Hamlet' with alternative VP meanings involving other verbs. In other words, if the pronounced particle itself introduces the semantics of *only* with denotation as in (72), the logical focus must be the particle's sister or a subpart thereof (pied-piping); anti-pied-piping focus association cannot be modeled in this way.[23]

The operator–particle theory is also supported by the existence of cases of anti-pied-piping involving multiple particles within a single focus. Eaton (2010a) observes that focus particles in Sandawe exhibit anti-pied-piping, as they "mark the constituent in question as contained within the focus of the sentence" (p. 10). For instance, example (82a) is described as a felicitous sentence-

[23] The outlook for the quantificational particle theory can be improved slightly by modifying the two-place denotation for *only* as in (i) below, so that it considers alternatives for the particle's sister α, in set C, as well as alternatives for the particle's second argument β, in set D.

(i) $[\![\text{only}_{\text{two-place}}]\!] = \lambda\alpha_{\sigma} \,.\, \lambda\beta_{\langle\sigma,t\rangle} : \beta(\alpha) \,.\, \forall\gamma \in C, \delta \in D\,[(\gamma \neq \alpha \vee \delta \neq \beta) \rightarrow \neg\delta(\gamma)]$

If C includes *Hamlet*, *Macbeth*, as well as 'the car,' and D includes (λx . Peter read x) as well as (λx . Peter clean x) which differs in its transitive verb, then *only* in (81) could accurately require that Peter didn't clean the car, and also that he didn't read Macbeth, et cetera. However, this denotation would still have difficulty considering an intransitive VP such as 'swim' as an alternative to 'read Hamlet.'

The idea that predicate focus in the Hungarian equivalent of (79) involves association with a pair of foci — a focused object and a focused verb — is suggested in passing by Koopman & Szabolcsi (2000: 199) but critiqued by Surányi (2018: 249 fn. 7).

focus answer to 'What happened?', with focus particles appearing on both the subject and object. Example (82b) from Jonah 1:5 is an instance of predicate focus, where the theme, goal, and source arguments of the verb all bear particles. The verb can also host focus particles, but only in cases of narrow focus on the verb.

(82) **Sandawe**[24]

a. [Nâm]$_{MSF}$-**aː** [sómbá]$_{MSF}$-**sà** t^{h}ìmè.
Nam -PRT.NOM fish -PRT.3SGF cook
'[Nam cooked the fish]$_{F}$.' (Eaton, 2002: 276)

b. … [mêlìtàtʃèé]$_{MSF}$-**à?** [mìzígòːtsʼì]$_{MSF}$-**à?** [tsʼâtànà]$_{MSF}$-**à?** kù?ùm̀sè.
from.boat -PRT.3PL the.load -PRT.3PL into.water -PRT.3PL throw
'… (they) [threw the loads out of the boat into the water]$_{F}$.' (Eaton, 2010b: 112)

Similar multiple particle placement within a single focus is also attested in Kokama-Kokamilla; see Vallejos Yopán 2009: pp. 422–423, exx. 25a–c.

Such patterns can be modeled straightforwardly under the operator–particle theory. These languages simply allow for multiple particles to be adjoined within a single focused constituent. A single logical operator then takes the entire focus in its scope. Under the operator–particle theory, particles and operators need not be one-to-one, although that is often the case. See also Krifka 1991: 144 and Lee 2004: 47 for discussion of similar structures with multiple focus particles in English and Korean, respectively.

A practical issue that arises in the analysis of focus particle constructions in the operator–particle theory is determining whether a particular overt expression is the realization of an operator or a particle, in our technical sense. Three diagnostics are useful here. First is syntactic position and constituency: Operators adjoin to the clausal spine — to a node of propositional

[24] Note that the forms of these particles differ. The focus particle on subjects as in (82a) is limited specifically to focus-marked subjects and thus is described as "nominative" in this literature and is glossed PRT.NOM here. The form of the focus particle on non-subjects reflects the φ-features of the subject: for example, third singular feminine in (82a) and third plural in (82b). We thank Helen Eaton (p.c.) for discussion of these examples and related aspects of Sandawe. See Branan 2021 for discussion of the syntax of such agreement morphology that appears on other nominals, and see also Forker 2016 (especially pp. 20–21) for discussion of subject agreement markers with focus particle-like distribution in other, unrelated languages.

type (i.e. type *t*, at *v*P or higher; see footnote 22) — whereas particles may adjoin to subsentential phrases of arbitrary syntactic category and semantic type, such as noun phrases or prepositional phrases. Second is semantic scope: Operators make a semantic contribution, so if they are pronounced, their overt position indicates their scope, whereas particles do not directly indicate the scope of their associated semantics and therefore may lead to scope ambiguities.[25] Consider the observation from Taglicht 1984 that English *only* adjoined to a subsentential constituent may take variable scope as in (83), but *only* in a preverbal, sentential adverb position takes fixed scope as in (84).

(83) **Constituent *only* has flexible scope:** (based on Taglicht, 1984: 150)
I knew (that) he had learned **only** [Spanish]$_F$. (✓only > know, ✓know > only)

(84) **Sentential *only* has fixed scope:** (*ibid.*)
a. I **only** knew (that) he had learned [Spanish]$_F$. (✓only > know, *know > only)
b. I knew (that) he had **only** learned [Spanish]$_F$. (*only > know, ✓know > only)

Such facts receive an immediate explanation under the operator–particle theory. We propose that the two interpretations of (83) reflect two different syntactic structures, in (85) below, with varying operator positions. Example (83) reflects a realization of (85a) or (85b) where the particle is pronounced *only* and its corresponding operator is unpronounced.[26] In contrast, examples (84a) and (84b) reflect the possibility of pronouncing the operator in (85a,b) as *only*, explaining the fact that the position of *only* in these examples directly reflects its interpreted scope.

(85) **Two structures underlying (83) and (84):**
a. I **OP$_{only}$** knew [that he had learned [**PRT$_{only}$** [Spanish]$_F$]]. only > know
b. I knew [that he had **OP$_{only}$** learned [**PRT$_{only}$** [Spanish]$_F$]]. know > only

[25] Relatedly, since operators must be one-to-one with their semantics, multiple exponence with a single corresponding semantic contribution must involve the realization of multiple particles, as in (82), or the simultaneous realization of an operator and a particle, as discussed in section 4.1.

[26] Scope ambiguities as in (83) can potentially also be explained using the quantificational particle theory, taking [only Spanish] to QR to positions above or below *know*. However, for many English speakers, quantificational noun phrases cannot scope out of embedded finite clauses; see Wurmbrand 2018. This suggests that the availability of the wide-scope *only* interpretation in (83) should not be attributed to QR, thus supporting the analysis that we present here using the operator–particle theory.

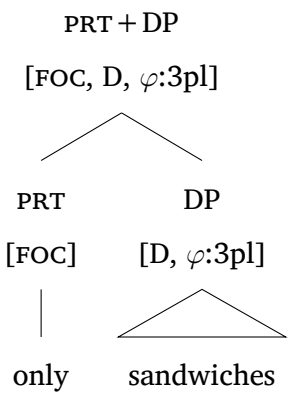
The third and final diagnostic is the availability of anti-pied-piping: Semantic interpretation in the operator–particle theory requires that the logical focus be within the operator's sister at LF, but not necessarily within a particle's sister. Particles therefore may exhibit anti-pied-piping patterns of focus association, but operators do not (except where attributable to independent movements which then reconstruct; see section 5.2).

4.2 Particle syntax in the operator–particle theory

We have argued that considerations of compositional semantics necessitate the adoption of the operator–particle theory for focus particles that allows for anti-pied-piping mismatches. Under this theory, a semantically inert particle is adjoined within the scope of the operator. In this section, we discuss syntactic consequences of particle insertion, accounting for patterns of focus-targeting agreement and movement, before discussing the derivational timing of particle adjunction in section 4.4.

We propose that particles are adjoined clitics, as explicitly claimed by Aoyagi (1998), targeting maximal projections. Although particles are semantically inert, they may introduce formal features. Formal features of both the particle (PRT) and its sister XP will project to their mother. We refer to the result as a *particle phrase* and label it PRT + XP in the general case. Suppose a particle optionally pronounced as *only* and bearing the feature [FOC] adjoins to a DP *sandwiches*, as in our English example structure in (74) above. The resulting phrase *only sandwiches* will project the [FOC] feature as well as features projected from *sandwiches* such as the category [D] and its φ-features, as in (86).[27]

(86)



[27] See Bayer 1996: 15, Bayer & Obenauer 2011: 476, Bayer 2018 for precursors to this proposal. On the joint projection of both daughters' features, see also Citko 2008 and Kotek 2014 and footnote 29 below.

The particle and its corresponding operator are then linked by the derivational operation Agree that allows them to exchange additional formal feature values (see e.g. Chomsky, 2000), as proposed in Lee 2004, 2005, Hirsch 2017, and Quek & Hirsch 2017.[28] Focus constructions in Lavukaleve (brought to our attention by Isaac Gould, p.c.) offer explicit evidence for this operation. In Lavukaleve, particles encliticize to focused arguments: the subject in (87a) and object in (87b). Notice that the form of the particle inflects to reflect the φ-features of the constituent it adjoins to. Lavukaleve then also allows for the pronunciation of another marker in a fixed, postverbal position, which we analyze as the corresponding operator, and which also inflects to reflect the φ-features of the focused constituent.

(87) **Lavukaleve** (Terrill, 2003: 277)

a. [Aira la]$_F$ **feo** fo'sal na aua **heo**.
woman(f) ART.SGF PRT.3SGF fish(m) ART.SGM ate.AGR OP.3SGF
'[The woman]$_F$ ate a fish.'

b. Aira la [fo'sal na]$_F$ **fin** oum **hin**.
woman(f) ART.SGF fish(m) ART.SGM PRT.3SGM ate.AGR OP.3SGM
'The woman ate [a fish]$_F$.'

Such patterns of φ-agreement arise straightforwardly on our account. As illustrated in (86) above, the particle phrase will bear both the formal features of the particle (e.g. [FOC]) and of its host, such as its φ-features. Agree between the particle phrase and its corresponding operator, based on their shared feature ([FOC]), then allows for the particle phrase's φ-features to be copied onto the operator.

This approach to particle syntax may also serve to explain interactions between focus and case-marking as in Kakataibo (Valle, 2014) and Beria (Wolfe & Abdalla Adam, 2018). Transitive subjects in each of these languages can be unmarked, but appear with an optional ergative case marker especially when they are narrowly focused, as well as in cases of sentence focus, constituting a form of anti-pied-piping. (We do not reproduce this data here.) In these languages, targeting

[28] In addition, the particle phrase may be thought to covertly move to the corresponding operator at LF, as proposed for English in Wagner 2006 and Erlewine & Kotek 2018 a.o. Such covert movement would also account for the behavior of particles that are not allowed to be separated from their corresponding operator position by syntactic islands, as in Premodern Japanese, Okinawan, and Sinhala (see Hagstrom 1998 and references there), Imbabura Quechua (Hermon, 1984), Tlingit (Cable, 2007, 2010b), and Tundra Yukaghir (Matić, 2014).

a subject for MSF — analyzed as adjoining an unpronounced particle — has the result of affecting the realization of case-marking on the subject.

The adjunction of a focus particle may have other consequences for its host, by affecting the structural relationship between the host and its surrounding structure. The syntactic presence of adjoined particles may serve to explain the inability of focused phrases to undergo incorporation or to be visible for external morphological operations (Haiman, 1988), or the ability of focus particles to shield nominals from what would otherwise be binding-theoretic violations (Heim, 1998: 242).

The syntactic visibility of features such as [FOC] on the particle phrase is also key to our account for anti-pied-piping in phrasal movement. For concreteness, let us return to our basic English example with the particle phrase *only sandwiches*. Introducing a higher head that probes for the [FOC] feature and moves its goal will result in movement of the particle phrase PRT + DP, such as in a cleft:

(88) It's $[_{\text{PRT+DP}}\ \text{PRT}_{\text{only}}\ [\text{sandwiches}]_{\text{F}}\ ]$ that Alex made ____ for Brie.
⇒ It's only SANDWICHES that Alex made for Brie.

Suppose furthermore that there is also a PRT that introduces the [FOC] formal feature but is unpronounced. Adjunction of this particle to *sandwiches* will lead to the appearance of *sandwiches* moving alone to become the cleft pivot, without an overt particle.

(89) It's $[_{\text{PRT+DP}}\ \text{PRT}_{\emptyset}\ [\text{sandwiches}]_{\text{F}}\ ]$ that Alex made ____ for Brie.
⇒ It's SANDWICHES that Alex made for Brie.

As we have discussed above in the case of overt focus particles, suppose a particle PRT adjoins instead to a proper subpart of the logical focus, as in (90a). Probing for a formal feature introduced by the particle and projected by the particle phrase (e.g. PRT + DP) will result in movement of a proper subpart of the logical focus, as in (90b). With non-pronunciation of both the operator and particle and together with independent subject raising, this derives the anti-pied-piping focus movement in the Hungarian example repeated here as (91). Recall that the entire VP with the object *Hamlet* reconstructed is within the scope of the interpreted operator OP (assumed here to be just above *v*P) and thereby can contrast with other contextually relevant VP meanings such as 'swim.'

(90) a. OP [$_{vP}$ Peter [$_{VP}$ read [$_{PRT+DP}$ PRT [Hamlet]$_{MSF}$] in the garden]$_{F}$]

b. [$_{PRT+DP}$ PRT [Hamlet]$_{MSF}$] OP [$_{vP}$ Peter [$_{VP}$ read ____ in the garden]$_{F}$]

(91) **Anti-pied-piping in Hungarian focus movement:** (Kenesei, 1998a: 77)

Péter [a Hamletet]$_{MSF}$ [olvasta fel ____ a kertben]$_{F}$, nem pedig [úszott]$_{F}$.
Peter the Hamlet read VM the garden.INE not rather swim
'Peter [read out Hamlet in the garden]$_{F}$, rather than [swim]$_{F}$.' =(7)

Following a suggestion by Cable (2007, 2010b: ch. 6), we propose that all Ā-movement is, by definition, movement of particle phrases.[29] Under this proposal, the parallels observed between anti-pied-piping in particle placement and in phrasal movement — for example, in both being subject to leftmost requirements in many languages (discussed in further detail in section 6) — fall out immediately: Ā-movement such as focus movement is always movement of a particle phrase, although in many cases the relevant particle is unpronounced.[30]

This view of Ā-movement grows out of an influential analysis of pied-piping as particle phrase movement, developed by Tanaka (1999), Horvath (2000, 2007), Watanabe (2006), and Cable (2007, 2010a,b). Not accidentally, then, our proposal for particle syntax also allows for pied-piping mismatches. Particle placement may target a focus-*containing* phrase, as in (92a). Ā-movement targeting the particle phrase then results in focus movement with pied-piping, as in

[29] This explains Van Urk 2015's featural criterion for the distinction between *A-movement* (hypothesized for cross-clausal argument sharing and argument structure alternations) and *Ā-movement* (associated with particular information structure or in relativization): A-movement targets obligatory features of lexical items, such as category features, whereas Ā-movement targets optional features. These optional features are introduced by particle adjunction. In contrast, A-movement does not pied-pipe, nor anti-pied-pipe, because A-movement does not target a feature introduced by a particle, and thus there is never apparent optionality or mismatch in the size of the moved constituent. We discuss further consequences of our theory for the A/Ā-distinction in the conclusion.

Recent work has motivated the existence of *composite probes*, which seek a goal that will simultaneously satisfy both an A-feature and an Ā-feature; see for example Van Urk 2015, Van Urk & Richards 2015, Erlewine 2018, Bossi & Diercks 2019, Colley & Privoznov 2020, Branan & Erlewine 2023, and Scott 2021. Projection of the features of both the particle and its sister, proposed and shown in (86) above, is necessary to form possible targets for such composite probes.

[30] In particular, we argue against the idea that syntactic operations make direct reference to information-structural annotations such as F-marking. The existence of anti-pied-piping in focus movement challenges this idea, as also noted by Fanselow (2006) and Hartmann & Zimmermann (2007b: 388), in much the same way that pied-piping does. See also Branan & Erlewine 2021 for further discussion.

(92b). This derivation followed by independent subject raising yields the Hungarian pied-piping example repeated in (93).

(92) a. OP [$_{vP}$ Anna sold [$_{PRT+DP}$ PRT [the [used]$_F$ car]$_{MSF}$]]

b. [$_{PRT+DP}$ PRT [the [used]$_F$ car]$_{MSF}$] OP [$_{vP}$ Anna sold ____]

(93) **Pied-piping in Hungarian focus movement:** (Kenesei, 1998b: ex. 13b)

Anna [a [használt]$_F$ autót]$_{MSF}$ adta el ____.

Anna the used car.ACC sold VM

'It's the [used]$_F$ car that Anna sold (not the new one).' =(3)

In section 6.4 below, we will present parallels in the fine-grained behavior of pied-piping and anti-pied-piping that further motivate their unification.

4.3 Support from idiom chunks

Additional support for our proposal for anti-pied-piping involving a one-place covert operator comes from the fact that focus particles can appear on a proper subpart of an idiom chunk while taking the entire idiom as its logical focus, in an anti-pied-piping pattern. In example (94) from Japanese, the verb phrase is literally 'eat weeds' but idiomatically means to loiter or waste time along a path. The additive particle *mo* encliticizes to the object but associates with the predicate with its idiomatic meaning.

(94) **Japanese *mo* within an idiom chunk:** (Ohno, 2003: 248)

Taro-wa [michi-kusa]$_{MSF}$-**mo** kutta.

Taro-TOP road-grass -ALSO ate

'Taro also [loitered on the way]$_F$.'

Under the proposal here, the pronounced particle itself has no semantic contribution and therefore the VP 'eat weeds' can be interpreted as a single constituent with its non-compositional interpretation, all within the scope of a covert additive operator and contrasted against other relevant VP meanings. In contrast, under the quantificational particle theory, the particle's surface sister (here: 'weeds') and its second argument (including 'eat') would be interpreted separately and then composed via the semantics of the particle, which only considers focus alternatives for its sister.

Anti-pied-piping focus movement can also target a subpart of an idiom chunk while retaining idiomatic interpretation. This is observed in the Hungarian example (95), where the VP 'scrape horsehide' retains its idiomatic meaning of sleeping. Similar examples are attested in Dutch (Van Riemsdijk & Zwarts, 1974: 18–19), German (Büring, 1997: 72 ex. 58), Czech (Lenertová & Junghanns, 2007: 355 ex. 21), and Hausa (Newman, 2000: 261), as also discussed by Fanselow & Lenertová (2011).

(95) **Hungarian focus fronting of part of an idiom chunk:** (Kenesei, 1998a: 85)

Nem [a lóbőrt]$_{MSF}$ húzza ____, hanem keményen dolgozik.
not the horsehide.ACC scrapes but hard works
'He's not [sleeping]$_{F}$, but is working hard.'

Under the operator–particle theory, there is no particular semantics that applies specifically to the fronted phrase, but there is instead a corresponding sentential operator that takes the entire focus in its scope. By reconstructing the fronted phrase to its base position, the entire VP 'scrape horsehide' can be interpreted as a unit and thereby idiomatically, within the scope of the covert operator involved in contrastive focus, and contrast as a whole with other VP meanings.

4.4 The timing of particle placement

We now turn to the question of when and how particles are introduced into the derivation. Recall that anti-pied-piping behavior makes reference to the linear order of constituents (§3.4) and furthermore also correlates with stress assignment in some languages, as we elaborate in section 6 below. It follows that particle placement must make reference to structures that are linearized and possibly prosodified. But at the same time, particle placement cannot be entirely post-syntactic. As we just proposed, particle placement also feeds further syntactic processes, by forming targets for movement and agreement.

Our solution will be to adopt a theory of cyclic structure-building where structures are built without access to the phonology, and then undergo a process of *Spell-Out* at certain punctuated points in the derivation (Uriagereka, 1999; Chomsky, 2000, 2001; a.o.). Spell-Out is triggered following the construction of particular, designated structures, called *phases*. When a structure undergoes Spell-Out, the pronunciation of its terminal nodes, their relative linear order, and its prosodic representation are calculated (see e.g. Dobashi, 2003, 2010; Ishihara, 2004, 2007; Fox &

Pesetsky, 2005; Kratzer & Selkirk, 2007; Kahnemuyipour, 2009; Sato, 2012a). Further derivational steps may build on the output of Spell-Out. Following Fox & Pesetsky 2005 and subsequent work, we take Spell-Out to target complete phases including their specifiers, in contrast to the description in Chomsky 2001. We concentrate here on the effects of particle placement during Spell-Out of the *v*P phase, which allow us to account for the patterns of anti-pied-piping in sentence focus and predicate focus documented above.[31]

We propose that particles are adjoined during cyclic Spell-Out, just as López (2009) has claimed for abstract information-structural features.[32] When a phase undergoes Spell-Out, first its linear and prosodic representation is calculated. Particle adjunction then takes place via *Late Adjunction* (Lebeaux, 1988, 1991), targeting a subpart of the structure that has already been built.[33] As noted above, particles may adjoin directly to a focused phrase, or to a containing phrase (pied-piping) or to a contained phrase (anti-pied-piping). The determination of particle position can then make reference to the phase's linear and prosodic representation at this stage, allowing for the leftmost effects above.

Concretely, we summarize our proposal for particle placement in (96) below. We discuss and

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[31] See footnote 22 on the notion of *v*P. Other common candidates for phasehood include full clauses (CP) and noun phrases (DP). If we assume that particles and their corresponding operators must be quite local, examples of anti-pied-piping where the corresponding operator scopes outside of the complementizer, rather than simply over the event description — as in the Korean (40) and Navajo (42) above — may require analyses involving particle placement during CP Spell-Out. Anti-pied-piping is also attested within the noun phrase: focus on the entire noun phrase may lead to particle placement on its proper subpart in Tundra Nenets (Nikolaeva, 2019: 383 ex. 24) and movement of its proper subpart in Hinuq (Forker & Belyaev, 2016: 245 ex. 11b). These effects may be described in terms of particle placement during DP Spell-Out.

[32] López however does not discuss overt particle placement or use this to explain (anti-)pied-piping mismatches. We believe that our overall proposal can also be extended to López's facts, with López's features recast as unpronounced particles in our terms, but we leave this extension for future work. We thank an anonymous reviewer for highlighting the relevance of López's work.

[33] The appeal to Late Adjunction here can be thought of as similar to theories of second-position clitic placement that involve counter-cyclic placement or displacement in the post-syntax (see e.g. Halpern, 1995; Embick & Noyer, 2001; Legate, 2008), but not applying entirely post-syntactically, which will be important below.

Our proposal echoes the conjecture in Zyman 2021 that all adjunction involves Late Adjunction "immediately before" the point of phasal Spell-Out. Together with Stepanov 2001 and López 2009, these discussions form a growing body of converging evidence that ties the timing of adjunction to phasal Spell-Out. One important difference, however, is that for the cases of adjunction that Zyman investigates, the result of adjunction cannot be a later target of movement, unlike with particle insertion.

formalize the relevant notion of "left-alignment" in section 6 below.[34]

(96) **Particle placement:** (preliminary; to be revised in section 6)
During phasal Spell-Out, Late Adjoin the particle to a phrase that {is left-aligned / is preferably left-aligned / overlaps} with the logical focus.

As a final step during Spell-Out, we propose that the newly derived particle phrase may optionally move to the edge of the phase. This is necessary in our framework of analysis for allowing the particle phrase to then move out of the current phase, due to a well-established restriction by which only material at the edge of a phase is accessible for further syntactic processes (see e.g. Chomsky, 2000, 2001; Fox & Pesetsky, 2005). This movement may also be covert; see also footnote 28 above.

Another advantage of this Late Adjunction approach to particle placement is that it allows us to account for the fact that particles do not disrupt selection between their host and its selector, despite the fact that particle phrases themselves are later syntactically visible for syntactic operations. See Aoyagi 1998 ch. 2 for discussion of this tension. We see this as a case of derivational opacity: the strictly local structural relationship necessary for selection between, for instance, a transitive verb and its object is satisfied during the construction of the phase, prior to the introduction of particles during phasal Spell-Out.

After one phase undergoes Spell-Out, the syntactic derivation can continue, building on the result of the lower phase. Therefore a particle phrase built during a lower phase's Spell-Out will be visible for syntactic operations from above, including for movement and agreement, as we have seen. Ultimately, for the derivation to converge, the corresponding operator must be present and Agree with its particle(s), as discussed above, and the logical focus must be in the scope of the operator. (Association is also possible with a focus that has moved out of the scope of the operator, even without reconstruction, for some operators but not others; see Erlewine 2014.)

Further motivation for our proposal comes from opaque interactions between particle placement and other movements. Consider the Ishkashimi example in (97), where the object has scrambled over the subject and the subject bears the focus particle *məs*. Karvovskaya (2013) reports this sentence as "marked but somewhat acceptable" with sentence-focus interpretation, which we in-

[34] As noted in footnote 18 above, our final proposal will allow for objects in VO verb phrases to count as "left-aligned" with the entire verb phrase, in the relevant sense. It will also address various systematic exceptions to leftmost effects, which we present in section 6.

dicate with ?. The (relative) acceptability of (97) is puzzling given the strict leftmost requirement of anti-pied-piping particle placement in Ishkashimi (see (64)): the particle targets the subject in (97), which is not leftmost within the material that makes up the logical focus.

(97) **Ishkashimi** (cf. 38) (Karvovskaya, 2013: 88)

?Xi dusto-i [wai mol]$_{MSF}$ **-məs** ____ zənayu isu.

REFL hands-ACC DEM husband-also wash come

'[Her husband goes to wash his hands]$_F$, too.'

The possibility of (97) with its sentence-focus interpretation supports our proposal for the timing of particle placement in (96). We take the sentence-focus construal to involve focus on the *v*P event description, which includes the base position of the subject as well as the object, which in turn contains a reflexive that must be bound by the subject. When the *v*P phase undergoes Spell-Out in (98a), the phase is first linearized in its basic SOV order, and then particle placement applies, targeting the leftmost constituent within the focus: the subject. Scrambling of the object then applies for independent reasons, in (98b), fronting the object across the subject to the phase edge, and potentially later to a higher position.

(98) a. At phasal Spell-Out, Late Adjoin particle to the leftmost subphrase in the focus:

[$_{vP}$ S-**PRT** O V]$_F$

b. Independently scramble object across subject:

O S-PRT ____ V

A similar interaction is also reported for Japanese. Consider example (99), where the object is marked with the focus particle *dake*, and has been fronted across the subject. Kotani (2009) shows that examples of this form allow for a predicate-focus interpretation, as indicated in (99). Dash & Datta (2022) show this same interaction to hold in Hindi-Urdu and Bangla as well.

(99) **Japanese** (based on Kotani, 2009: 30)

[Furo]$_{MSF}$**-dake** Takuya-wa ____ wakashita.

bath -only Takuya-TOP heated

'Takuya only [heated up a bath]$_F$.'

Recall that Japanese allows optional anti-pied-piping in predicate focus (see (30)), with particle placement targeting a proper subpart of the VP. On the surface, however, the constituent targeted by particle adjunction in (99) is not a subpart of the logical focus (i.e. the VP).

Such examples are also accounted for straightforwardly under our proposal. We begin by linearizing the *v*P phase, including the base position of the subject, when it undergoes Spell-Out in (100a). Particle adjunction here optionally targets a subpart of the focus, resulting in anti-pied-piping particle placement on the object. Subsequent movement operations, as in (100b), may target the resulting particle phrase.

(100) a. At phasal Spell-Out, Late Adjoin particle within the focused VP:

$[_{vP}$ S $[_{VP}$ O-**PRT** V $]_F$ $]$

b. Scramble object particle phrase across subject:

O-PRT S ____ V

Notice that we cannot explain such examples by appeal to post-syntactic lowering (see e.g. Embick & Noyer, 2001). Such an approach may posit that particles are first adjoined directly to their logical focus but then lower after the end of the syntactic derivation onto its surface host. Contrary to fact, we would then expect movement of an object to a position higher in the clause to bleed particle placement in cases such as (99), or to feed particle placement on the object in the Ishkashimi sentence focus example with object fronting in (97). In contrast, the theory developed here, which interleaves particle placement and movement operations, derives the attested counterbleeding and counterfeeding patterns above.

4.5 Argument/adjunct asymmetries

The empirical landscape laid out in section 3 was restricted, in that the patterns of anti-pied-piping consistently involved core arguments, without adjuncts. While this is in part a function of the sources from which our survey was built, there is also evidence of a systematic asymmetry between arguments and adjuncts in anti-pied-piping.

Consider the Japanese examples in (101) below. Aoyagi (1998) and Ohno (2003: 317–318) independently observe that when the focus particle appears on an object, as in (101a), both narrow focus and anti-pied-piping predicate focus readings are available, while in (101b), when the focus particle appears on an adverbial, only a narrow focus reading is available.

(101) **Japanese** (Aoyagi, 1998: 175)

a. Ichi-nichi san-kai [kusuri]$_{MSF}$-**mo** nonda.
one-day three-times medicine -also drank
i. '(He) also took [medicine]$_F$ three times a day.'
ii. '(He) also [took medicine three times a day]$_F$.'

b. [Ichi-nichi san-kai]$_{MSF}$-**mo** kusuri-o nonda.
one-day three-times-also medicine-ACC drank
i. '(He) even took medicine [three times a day]$_F$'.
ii. * '(He) also [took medicine three times a day]$_F$.'

Kenesei (1998a) observes a similar asymmetry between arguments and adjuncts in Hungarian focus movement. Although the object can be fronted to the preverbal focus position to express predicate focus, as shown here again in (102a), an adverb such as *hangosan* 'aloud' in the focus position as in (102b) is only compatible with narrow focus on the adjunct.

(102) **Hungarian** (Kenesei, 1998a: 77)

a. Péter [a Hamletet]$_{MSF}$ olvasta fel a kertben.
Peter the Hamlet.ACC read VM the garden.INE
'Peter [read out Hamlet in the garden]$_F$.' =(7/91)

b. Péter [hangosan]$_{MSF}$ olvasta fel a Hamletet.
Peter aloud read VM the Hamlet.ACC
i. 'Peter read out Hamlet [aloud]$_F$.'
ii. * 'Peter [read out Hamlet aloud]$_F$.'

Hyman & Polinsky (2010) discuss a similar argument/adjunct asymmetry in the interpretation of the Immediately After the Verb (IAV) focus position in Aghem. With the object in IAV position, narrow object focus and predicate focus interpretations are both possible. However, if an adjunct occupies the IAV position, only a narrow adjunct focus reading is available. If we analyze the IAV position in Aghem as involving movement to a dedicated position, these facts clearly parallel that in Hungarian, with the predicate focus examples being another instance of anti-pied-piping.

The theory developed here — in which particle placement takes place at punctuated points in the derivation — allows us to account for this asymmetry, based on an approach to the argument/adjunct asymmetry proposed by Lebeaux (1988, 1991) and in much subsequent work. On this approach, adjuncts but not arguments can be introduced into the clause via Late Adjunction,

during cyclic Spell-Out (see footnote 33). This offers a way of understanding the impossibility of adjunct anti-pied-piping: the adjunct is not yet present in the structure at the point of *v*P Spell-Out, when particles for predicate focus are adjoined. Since these elements are not present, they cannot be targeted for particle adjunction. We leave a fuller investigation of such argument/adjunct contrasts and their consequences for derivational timing for future work.

5 Alternative analyses

We briefly discuss two alternative analyses for anti-pied-piping. The first treats a subpart of the logical focus as carrying a separate, marked information-structural status. The second treats apparent anti-pied-piping as the result of independent movements out of the logical focus. We will see that these approaches could potentially account for a limited set of anti-pied-piping examples, but they fail to explain the wide-spread possibility of anti-pied-piping and its cross-linguistic tendencies, which our proposal explains.

5.1 Nesting

We first discuss the possibility that anti-pied-piping may involve structures where a subpart of the logical focus independently bears a marked information-structural status. We first observe that it is possible to nest a narrow focus within a larger focus, as discussed in work such as Krifka 1991 and Neeleman & Szendrői 2004 and illustrated in (103). For expository purposes, we annotate the two foci F1 and F2.

(103) **Nested foci:** (based on Krifka, 1991: 131)
Ted was behaving strangely at last night's party. At one point, he went back to his room to take a nap. He **also** [drank **only** [water]$_{F1}$ (all night)]$_{F2}$. I wonder if he's feeling ok.

In (103), we can detect the semantic contribution of two overt focus particles, each with their expected semantics: *only* associates with *water* (F1), contrasting with other beverages available at the party, while *also* associates with the entire VP (F2), contrasting with going to take a nap.

Now suppose we have a structure with nested foci akin to (103) but where overt focus morphosyntax applies only to the embedded focus F1 and a focus-sensitive semantics is clearly detectable only in relation to F2. This would lead to the appearance of anti-pied-piping. However, under this approach we expect the syntax/semantics associated with the embedded focus F1 to

be independent of the syntax/semantics associated with the larger focus F2, as in (103) above. Instead, in focus particle anti-pied-piping, the choice of overt focus particle (by hypothesis, adjoined to and narrowly associating with F1) correlates with the semantics that associates with the higher focus (F2). The Japanese examples in (104) with predicate focus interpretation illustrate this correlation between particle form and interpreted semantics.[35]

(104) **Semantics associated with wide focus correlates with embedded particle choice:**

(Ohno, 2003: 324, 336)

a. Taro-ga [tako]$_{MSF}$-**mo** tabeta.
Taro-NOM octopus -also ate
'Taro also [ate octopus]$_F$.' =(30b)

b. Taro-ga [tako]$_{MSF}$-**dake** tabeta.
Taro-NOM octopus -only ate
'Taro only [ate octopus]$_F$.'

Such correspondences are unexpected if apparent anti-pied-piping is generally attributed to the availability of nested foci, and instead motivate our own operator–particle proposal, where a syntactic dependency (Agree) ensures a correlation between the choice of overt particle and the choice of semantically contentful but unpronounced operator.

Next we turn to cases of anti-pied-piping in phrasal movement without overt particle placement. Such examples appear to be more amenable to a nesting analysis: as long as a subpart of the focus has some marked information-structural status (as a "focus" or otherwise) and the language can front such material, it may be moved out of the larger focus. This movement trigger may be a loose pragmatic notion such as "emphasis," which has been associated with fronting in many languages (see e.g. Frey, 2010).[36] It is difficult to rule out the possibility, suggested by a reviewer, that some such pragmatically-motivated movement may underly some of our examples of movement anti-pied-piping in section 3.3, especially as the descriptions of the relevant pragmatic

[35] A further complication for analyzing examples such as (104a,b) as involving nested foci is the fact that the particle's semantics is not interpreted as associating with its sister at all. That is, the semantics of 'also' and 'only' apply to the predicate *instead of* — rather than *in addition to* — the object in (104a,b). The sentences in (104) also allow for object narrow focus interpretations.

[36] Others describe fronting in various languages as related to "newsworthiness" (Mithun, 1992), "emphasis for intensity" (Beltrama & Trotzke, 2019), "unexpectedness" or "mirativity" (Cruschina, 2012; Bianchi et al., 2016), or being "surprising" (Hartmann & Zimmermann, 2007b). See Cruschina 2021 for discussion of these different fronting constructions and their descriptions.

notions (see footnote 36) are in many cases not precise enough to confidently determine whether they apply narrowly to the fronted constituent or to the larger focus as a whole.

There are, however, at least two considerations that cast doubt on the idea that movement anti-pied-piping is generally due to the fronting of an embedded, independently pragmatically marked constituent. First, under this type of nesting account, the requirement in many languages for anti-pied-piping to target a leftmost subpart of the logical focus (discussed further in section 6) goes unexplained; in principle, any subpart of the logical focus may be subject to "emphasis," depending on the speaker's communicative goals. Second, anti-pied-piping in both particle placement and phrasal movement is generally not described as semantically or pragmatically marked as compared to non-anti-pied-piping constructions,[37] and in particular is to our knowledge never described as licensed only in a particular, more complex discourse structure.

Furthermore, in cases where the semantics associated with fronting is clearer and more precisely described, we are able to construct forceful arguments against the nesting account. This is the case for movement to the preverbal focus position in Hungarian (see footnote 1). As Surányi (2018: 248–249) discusses, the exhaustive identificational semantics associated with focus movement in Hungarian applies to the entire logical focus in anti-pied-piping examples, and not narrowly to the constituent that is moved to the preverbal focus position. This is unexpected under the nesting account, where the observed focus fronting should constitute an independent focus movement of an embedded focus, with its associated conventional semantics, and would not lead to that same semantics instead applying to the larger focus.

We conclude that the availability of information-structural nesting — with a subpart of the larger focus being an independent narrow focus or having some other marked pragmatic status — fails to provide a general explanation for patterns of anti-pied-piping in both particle placement and phrasal movement.

5.2 Movement out of the focus

Next we discuss the possibility that anti-pied-piping mismatches are only apparent, due to independent movements out of the focused constituent that make focus morphosyntax appear to target only a subpart thereof.

[37] One exception is Fanselow & Lenertová (2011), who describe the invocation of anti-pied-piping as "more 'emphatic'" but then note that "this emphasis affects the predicate as a whole and never the fronted part of the predicate alone" (p. 179), undermining a potential nesting account.

This hypothesis is articulated most clearly for focus particle anti-pied-piping in Japanese by Kotani (2008, 2009). Consider the case of anti-pied-piping in predicate focus in (105). Kotani proposes that the particle adjoins directly to its logical focus (VP), but the verb then optionally moves out of the VP to T in order to form the verbal complex. This results in the appearance of object attachment, as schematized in (106) below.

(105) **Anti-pied-piping in Japanese predicate focus:** (Ohno, 2003: 324)

Taro-ga [tako]$_{MSF}$-**mo** tabe-ta.

Taro-NOM octopus -also eat-PST

'Taro also [ate octopus]$_F$.' =(30b/104a)

(106) S [$_{VP}$ O t_V]$_F$-PRT V-T

If this movement does not take place, the focus particle stays transparently adjacent to its focus, with a process akin to *do*-support taking place to host the tense affix, as attested in (30a) above.

Movement out of the pronounced particle's sister could also explain the anti-pied-piping pattern in the English example (107), where preverbal *only* — which must associate with its sister or a subpart thereof (Jackendoff, 1972; Erlewine, 2014) and which we analyze as the realization of the operator (see (74)) — associates with the entire proposition.

(107) The judge **only** sent you to prison; your wife didn't leave you too.

(McCawley, 1970: 296)

Assuming that the subject *the judge* originated within *v*P and moved out (see footnote 22), we may straightforwardly think of this as a case of *only* associating with the content of its sister *v*P with the subject reconstructed (Kayne, 1998: 159 fn. 75; Erlewine, 2014: 82). Krifka (1991: 142–143) offers a similar analysis for cases of German predicate focus, where a portion of the VP has moved out of the surface sister of a focus particle.[38]

However, such cases where anti-pied-piping patterns can be fully attributed to the effects of independently motivated movements are few and far between. For example, returning to Japanese,

[38] As a reviewer notes, anti-pied-piping in the Grassfields language Awing includes cases involving a particle ('only' *tsɔ́'ə* as in example (32)) for which our core proposal may apply, but also cases involving a structurally rigid operator *lə́* with verb movement out of a focused VP, akin to what we schematize in (106). See discussion in Fominyam & Šimík 2017: 1064–1065.

the approach in (106) above fails to naturally extend to other examples such as cases of anti-pied-piping in sentence focus, which Kotani does not discuss. To explain the word order in examples such as (108), not only the verb but also the object would have to move descriptively to the right, which has no independent motivation in the language.

(108) **Anti-pied-piping in Japanese sentence focus:** (based on Aoyagi 1998: 151, 2006: 123)

[Taro]$_{MSF}$-**mo** piano-o hii-ta.
Taro -also piano-ACC play-PST
'[Taro played piano]$_F$, too.' =(66a)

Fanselow (2004: 29–35) similarly discusses anti-pied-piping in phrasal movement as involving *remnant movement*: that is, with some material independently moving out of the logical focus before it undergoes movement, but concludes that such an approach is not feasible as the necessary movements are otherwise unattested. In contrast, our operator–particle theory does not require an overt particle to take the logical focus as its sister at any point in the derivation, avoiding the need to hypothesize such otherwise unmotivated movements.

This alternative approach to anti-pied-piping mismatches also faces difficulty with the multiple exponence of focus particles. Recall that focus particles can appear multiply in anti-pied-piping, as in (82) above, and that subsentential particles and their corresponding operators can be pronounced simultaneously in some languages, as noted in section 4.1 (see (87)). Such examples are also modeled straightforwardly in the operator–particle theory.

6 Particle placement and left-alignment

We now return to the question of how languages determine which subconstituent of the focus to target for focus particle placement and/or movement in anti-pied-piping. We saw in section 3.4 that anti-pied-piping in many languages exhibits a leftmost effect: MSF often targets the leftmost subphrase of the logical focus, with some variation in the strength of this requirement. In this section, we discuss this aspect of anti-pied-piping in further detail. We motivate a general description for such leftmost requirements which will relate particle position to phrasal stress assignment in stress languages, but which also extends to languages without phrasal stress. We then show how this description naturally explains certain parallels between pied-piping and anti-pied-piping behavior.

6.1 Exceptions to leftmost requirements

Our starting point is the observation that there appears to be a common class of exceptions to the leftmost requirements described above: Certain nominals — roughly corresponding to those that are indefinite, given, or less informative — are skipped for the evaluation of "leftmost." We illustrate this first with Czech focus fronting: for sentence focus, object fronting is blocked across the subject *Linda* in (109a), but is allowed across an indefinite subject in (109b). Example (109a) can only be interpreted with narrow focus on the object instead.

(109) **Czech** (Radek Šimík, p.c., based on Lenertová & Junghanns, 2007: 356)

Q: What's new?

a. # [Janu]$_{MSF}$ **Linda** hledala ____.
Jana.ACC Linda.NOM looked.for.SGF
Intended: '[Linda was looking for Jana]$_F$.'

b. [Janu]$_{MSF}$ **někdo** hledal ____.
Jana.ACC somebody.NOM looked.for.SGM
'[Somebody was looking for Jana]$_F$.'

Similar facts are reported for German, where the effect has been studied experimentally by Féry & Drenhaus (2008) and Wierzba & Fanselow (2020). Here we present the results of an acceptability rating study in Féry & Drenhaus 2008. In this experiment, participants were asked to rate audio recordings of question-answer pairs on a 1–6 scale, where 6 is most natural. Example (110) is one representative set of stimuli to test the acceptability of object fronting in a sentence-focus context, with accented words in smallcaps. Notice that the subject is a pronoun in (110a), an unaccented DP in (110b), and an accented DP in (110c). In all cases, the fronted object was accented. The numbers on the right correspond to average ratings for each condition exemplified by the item at left.

(110) **German** (Féry & Drenhaus, 2008: 24–25)

Q: Why are your neighbors complaining?

a. [Die MIETE]$_{MSF}$ haben **sie** wieder mal ____ erhöht. 5.5/6
the rent have they again once raised

b. [Die MIETE]$_{MSF}$ hat **der Hauswirt** wieder mal ____ erhöht. 4.8/6
the rent has the landlord again once raised

c. [Die MIETE]$_{MSF}$ hat **der HAUSWIRT** wieder mal ____ erhöht. 2.2/6
the rent has the landlord again once raised

'[They/the landlord raised the rent once again]$_F$.'

The results reflect a clear and statistically significant difference between these conditions (see Féry & Drenhaus, 2008: 25–26 fn. 10): object fronting is highly degraded across an accented subject ((110c)) but acceptable across a pronominal subject ((110a)) or otherwise deaccented subject ((110b)), which may be interpreted as being given under accommodation.

We observe a similar effect in Japanese. Recall that for sentence focus in Japanese, the additive particle *mo* could be placed on the subject or object, as we saw in (66) above. In (111), we have modified example (66) so that the subject is indefinite. Speakers then disprefer the placement of the particle on the indefinite subject.[39]

(111) **Japanese** (based on (66) above from Aoyagi 1998, 2006)

At yesterday's party, not only did Hanako dance a dance, but ...

a. # [dareka]$_{MSF}$-**mo** piano-o hiita.
someone-also piano-ACC played
'[someone played piano]$_F$, too.'

b. dareka-ga [piano]$_{MSF}$-**mo** hiita.
someone-NOM piano-also played
'[someone played piano]$_F$, too.'

These contrasts show that a certain class of elements are skipped for the evaluation of leftmost requirements. Furthermore, these elements — which are indefinite, given, or less informative — form a natural class in that they avoid phrasal stress in stress languages. This suggests a connection between the process of particle placement and phrasal stress assignment.

[39] We report the contrast in (111) based on the judgments of eight native speakers of Japanese. Hoshi (2008: 26) similarly observes that anti-pied-piping particle placement in Japanese cannot target a leftmost but given and non-contrastive pronoun. Vydrina (2020: 520–521) describes similar interactions in anti-pied-piping particle placement in Kakabe.

6.2 Two stress-based hypotheses

In this section, we consider proposals for particle placement that explicitly make reference to stress information, motivated by the data above.[40] We will however conclude that such approaches are inadequate in the general case, especially considering the possibility of anti-pied-piping in languages without phrasal stress. This sets the stage for our own proposal, in section 6.3, which maintains the connection to stress assignment discussed here, but also extends to languages without phrasal stress.

Recall that we propose that particle placement takes place during cyclic Spell-Out (§4.4), and therefore can make reference to information associated with *Phonological Form* (PF) including linear order and prosodic structure. This architecture allows for Hypothesis 1 in (112).

(112) **Hypothesis 1 for particle placement given stress information:**
Particle placement in anti-pied-piping targets the phrase that bears main stress within the focus.

On this approach, cases of apparent optionality would have to be described as fed by independent manipulations in the choice of main stress placement.

This description is conceptually attractive as it relates anti-pied-piping to the phenomenon of *focus projection*, which relates the positions of main prosodic prominence and logical focus. (See Arregi 2016 for an overview.) Indeed, a number of previous authors have suggested an explicit comparison or explanatory link between the process of focus projection and anti-pied-piping; we are aware of such discussions in Zsámboki 1995, Choe 2002, Szendrői 2003, Fanselow 2004, Yoshimura 2007, Schwarz 2007b: 147–149, Kotani 2009, and Karvovskaya 2013.

However, one immediate challenge for Hypothesis 1 comes from cases where the target of MSF is clearly not the most prominent. Consider the case of predicate focus in German ditransitive clauses, as in (68) above. As noted in Fanselow 2004: 23 and Fanselow & Lenertová 2011, both objects in such cases receive pitch accents, but it is the second object (the goal) that bears a more prominent pitch accent. Nonetheless, it is the first (leftmost) object that is targeted for anti-pied-piping as in (68). Another concrete challenge comes from patterns of anti-pied-piping in Japanese transitive clauses with sentence focus. As discussed in Ishihara 2000, 2001 and Sato

[40] In his discussion of focus particle syntax, Bayer (1996: 14) interestingly claims, "the only requirement seems to be that [focus particles] attach to a [+max] category which is able to bear stress," foreshadowing the connection to stress which we discuss here.

2012b, nuclear stress in Japanese generally targets the immediately preverbal phrase. Nonetheless, as shown in (66) above, MSF may target either the subject or the object, with some speakers in fact preferring subject placement (see footnote 17). See also Kahnemuyipour & Megerdoomian 2017 for explicit arguments against tying focus particle position to main stress in Eastern Armenian, although without discussion of anti-pied-piping.

Given these issues, we turn to Hypothesis 2 in (113), which does not refer to the main stress and also allows for the observed cross-linguistic variation in the strength of leftmost effects.[41]

(113) **Hypothesis 2 for particle placement given stress information:**
Particle placement in anti-pied-piping targets {the leftmost / preferably the leftmost / any} accented subphrase of the focus.

An immediate challenge that affects Hypothesis 2 (as well as Hypothesis 1) comes from the possibility of anti-pied-piping in languages that do not utilize accents or stress, unlike many of the languages discussed thus far. One such example is Hausa, a tone language that lacks accents of the relevant sort, and where focus is not generally prosodically marked.[42] Nevertheless, Hausa demonstrates anti-pied-piping behavior similar to that in other languages with stress and/or accent. Sentence focus may be expressed by fronting the subject before the focus marker *nèe*, as in (114a). However, in certain circumstances, as in (114b), the object is fronted instead; it is further noted that fronting the subject in (114b) is not an available option.

[41] Fanselow & Lenertová (2011) propose what may be thought of as a particular version of Hypothesis 2 ((113)). In order to explain the leftmost condition on movement anti-pied-piping and its exceptions in Czech ((109)) and German ((110)), they propose a ban on the movement of an accent-bearing phrase across another accent-bearing phrase: in most cases, the leftmost subpart of the focus is accented, thereby blocking movement of another subpart across it, but when the leftmost subpart is deaccented, movement across it is allowed. This description however does not explain leftmost restrictions on the placement of particles with anti-pied-piping as in Yaeyaman and Ishkashimi (see §3.4), and in particular cannot explain the parallels between restrictions on particle placement as in the Japanese in (111) and focus movement in Czech and German here above.

[42] Leben, Inkelas & Cobler (1989) note a tonal phenomenon involving raising of H tones involving preverbal constituents, which naturally include focus-fronted objects. While Hartmann & Zimmermann (2007b) suggest that this tonal phenomenon is a reflex of focus marking, it is equally conceivable that this is a result of the phonological phrasing generally enforced on preverbal arguments in the language, independent of considerations of focus. Postverbally, focused and non-focused constituents are not prosodically distinguished.

(114) **Hausa** (Hartmann & Zimmermann, 2007b: 385)

a. [B'àràayii]$_{MSF}$ **nèe** ____ su-kà yi mîn saatàa!
robbers FM 3PL-REL do to.me theft
'[Robbers have stolen from me]$_F$!'

b. [Dabboobi-n jeejìi]$_{MSF}$ **nee** mutàanee su-kà kaamàa ____.
animals-of wild FM men 3PL-REL catch
'[The men caught wild animals]$_F$!'

The argument skipped for the evaluation of leftmost in (114b) again seems to be of the sort that is skipped in Czech, German, and Japanese above: one which is indefinite, given, or less informative.[43]

Among other languages that demonstrate anti-pied-piping discussed here, Schwarz (2009) shows that, in the Oti-Volta Gur languages described above (see (33) and (45)), there are no prosodic effects of focusing. Focus is also not reflected prosodically in Wolof (see (61)) (Rialland & Robert, 2001).

We see that anti-pied-piping behavior with leftmost effects — including its familiar exceptions — may be observed in languages such as Hausa that lack phrasal accents and do not prosodically realize focus. This suggests that the cross-linguistically common leftmost effect in anti-pied-piping should not be described as parasitic on surface phonological information such as accent or stress, but should instead rely on a more abstract representation that might feed subsequent phonological processes.

6.3 Proposal: • assignment and left-alignment

We put forward a theory that takes Hypothesis 2 above to be on the right track — that in languages with phrasal stress, anti-pied-piping appears to target the leftmost accented subphrase of the focus — but without making reference to stress or accents in the general case. We suggest that particle placement is sensitive to the same information that languages with phrasal stress use to determine which elements receive stress and which do not. For expository purposes, we refer to this information as •-*marking* (read: *bullet*), a rule for which is given below in (115).

[43] Hartmann & Zimmermann (2007b: 385) suggest that the choice of movement target reflects what is most "interesting or surprising," but it is not clear for example why 'robbers' would be particularly surprising in a context where stealing is reported. See section 5.1 for a more general critique of such explanations for anti-pied-piping behavior.

(115) • **assignment:**

At phasal Spell-Out, assign a • to each phrase that is not a part of the extended projection that contains the phase head.

Our rule for •-marking in (115) draws on a long line of work arguing that information relevant for nuclear stress determination is assigned cyclically throughout the derivation (see e.g. Bresnan, 1971, 1972; Legate, 2003; Adger, 2007; Kahnemuyipour, 2009; Sato, 2012b; Richards, 2018). Although these prior works differ in the details of this process, •-marking and the rule in (115) are meant to be theory-neutral abstractions standing in for what its proper characterization turns out to be.[44]

Importantly for our current purpose, •-marking is abstract in a way that phrasal stress in and of itself is not. • assignment may feed a realization rule like that in (116) — giving rise to what we would call a language with phrasal stress — but, crucially, • assignment takes place independent of the existence of such a rule in a language. In languages like Hausa, for instance, • assignment takes place, but there is no rule like that in (116).

(116) • **realization:**

Each element marked with • is realized with phonological prominence.

One possibility, suggested by a reviewer, is that •-marking may instead be relevant for prosodic phrasing in Hausa, following Féry 2013. That is to say, the rule in (116) may not be the only way that •-marking can be realized and learned. The strong hypothesis would be that •-marking is always realized in some form, with the inventory of possible reflexes of •-marking being a question for future research.

We now put forward our general statement for particle placement, in (117), making reference to a •-relativized notion of left-alignment, in (118).[45]

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[44] For the discussion that follows we take these rules to be language-invariant. However, we could imagine that variation in the prosodic systems of different languages might be reflected in differences in their rules for •-marking, leading to differences in particle placement patterns, as suggested by a reviewer. We think that an investigation along these lines is in order, and hope to pursue it in future work, but set this question aside for now.

[45] As we also emphasize elsewhere, our proposal for particle placement may also fruitfully explain the distribution and syntax of other items beyond focus particles. For example, Wu (2022) shows that in English disjunction, *either* may adjoin to the leftmost contrasting phrase within a left disjunct, which may be explained by (117).

(117) **Particle placement:** (revised; subsumes (96))
During phasal Spell-Out, Late Adjoin the particle to a phrase that {is •-left-aligned / is preferably •-left-aligned / overlaps} with the logical focus.

(118) **•-relativized left-alignment:**
X and Y are •-*left-aligned* if the leftmost •-marked phrase in X and the leftmost •-marked phrase in Y are left-aligned.

We will leave as an open question whether or not a language's choice between the strong, weak, or free variant of (117) can be predicted by independent properties of the language.

As we have seen earlier in this section, certain types of phrases are cross-linguistically commonly skipped for the determination of particle placement.[46] We propose that these elements resist •-marking.

(119) **• avoidance:**
Indefinite, given, or less informative elements are not assigned a •.

This rule explains why these exceptional elements are commonly destressed or deaccented: (119) bleeds (116). However, the calculation of • assignment is independent of the presence of a realization rule such as (116), explaining the availability of similar leftmost effects in languages without phrasal stress such as Hausa.

6.4 Pied-piping and anti-pied-piping

Recall that the operator–particle theory that we propose also allows for the derivation of pied-piping. In this section, we show that our proposal for particle placement above — motivated by the leftmost effects observed in anti-pied-piping — can also account for observed restrictions on

[46] We may wonder what happens if there is not a valid host for particle placement (cliticization) that aligns with the logical focus. Such a situation appears to come about in many languages in cases of narrow focus on the lexical verb, leading to a range of different responses. In Tangale, narrow focus on the verb is expressed with particle placement on an object, if present (see (34c) above); otherwise, the language employs an altogether different strategy for marking narrow focus on intransitive verbs (Hartmann & Zimmermann, 2007a: 106–107). In cases of narrow focus on intransitive verbs, particle placement is simply disallowed in Ishkashimi (Karvovskaya, 2013: 89 fn. 8), but in the related language of Turkish, the verb itself may host the focus particle (Kamali & Karvovskaya, 2013: 182 exx. 2d–e). In Yaeyaman, an objectless verb may host a focus particle itself, but speakers seem to prefer to insert a vacuous manner adjunct to serve as the host (Davis, 2013: 38 exx. 19–20). We leave a full survey of such responses as a topic for future research.

pied-piping. This further supports our account, which views pied-piping and anti-pied-piping as a unified phenomenon.

Pied-piping in many languages also exhibits a form of leftmost requirement. For instance, as shown in (120), pied-piping in English interrogative *wh*-movement requires the logical focus — the locus of variation across semantic alternatives, i.e. the *wh*-word — to be at the left edge of its pied-piped constituent. The pair in (121) furthermore shows that the restriction is sensitive to linear position, rather than depth of embedding.

(120) **Leftmost requirement in English pied-piping:**

a. [*Whose* picture] did you frame ____?

b. * [A picture of *whom*] did you frame ____?

(121) a. [[[*Whose* brother]'s friend]'s father] did you see ____?

b. * [The father of [[*whose* brother]'s friend]] did you see ____?

(Kotek & Erlewine 2016: 687 based on Cable 2012: 823)

We propose that this behavior can also be explained by our proposal for particle placement in (117) above. In the case of pied-piping, a particle adjoins to a constituent that *contains* the logical focus (here, the *wh*-word) and that is •-left-aligned with the *wh*-word. Consider (122a,b) below, which represent the base structures for (120) prior to particle adjunction at *v*P Spell-Out.

(122) a. you frame [$_{DP}$ *whose* picture]

b. you frame [$_{DP}$ a picture of *whom*]

In (122a), the constituent marked DP is •-left-aligned with the *wh*-word, so an unpronounced particle PRT can adjoin to it. Probing for the resulting particle phrase PRT + DP leads to what we describe as *wh*-movement with pied-piping, following the intuition for pied-piping developed in works such as Tanaka 1999, Horvath 2000, 2007, Watanabe 2006, and Cable 2007, 2010a,b. In contrast, in (122b), DP is not •-left-aligned with the *wh*-word and therefore cannot host a particle according to the strict formulation of (117).

Our rule for particle placement based on •-relativized left-alignment also predicts that this leftmost requirement on pied-piping will tolerate certain exceptions, in allowing it to skip material that does not bear stress. This prediction is borne out. For example, in English, a light preposition like *to* may intervene between the left edge of the pied-piped constituent and the *wh*-phrase as in (123), but anything heavier such as a lexical noun as in (120b) and (121b) may not.

(123) **Not quite leftmost in English *wh* pied-piping:**

[To [*which*]$_{F}$ student's friend]$_{MSF}$ did you speak ____?

Anti-pied-piping with Latin *que*, discussed in section 3.2 above, also tolerates exceptions of precisely this form. *Que* generally follows one word at the left edge of its logical focus, but skips monosyllabic prepositions.

(124) **Not quite leftmost in Latin *que* anti-pied-piping:** (Carlson, 1983: 73)

... [ob [eās]$_{MSF}$-**que** rēs]$_{F}$

because these -also things

'... and [because of these things]$_{F}$, too'

The fact that these phonologically light elements are ignored for the evaluation of leftmost effects in both pied-piping and anti-pied-piping is a welcome consequence of our proposal for particle placement in (117) and its application to both pied-piping and anti-pied-piping. We expand on our rule in (119) above to propose that these phrases headed by phonologically light prepositions avoid •-marking. Their presence at the left edge will thus be ignored for the evaluation of •-left-alignment, allowing for the "not quite leftmost" pattern of pied-piping in (123) and anti-pied-piping in (124).

Not all instances of pied-piping are subject to this leftmost requirement. For example, Russian does not require interrogative *wh*-words to be left-aligned within their pied-piped constituents (see (125)). Similarly, relative pronouns in English need not be left-aligned (see (126)), unlike interrogative *wh*-words.

(125) **No leftmost requirement in Russian pied-piping:** (Heck, 2008: 79)

Interesno [$_{CP}$ [na sestre druga *č'ej* materi] on ženilsja ____].

interesting on sister friend whose mother he married

'I wonder whose mother's friend's sister he married.'

(126) **No leftmost requirement in English relative pronoun pied-piping:** (Ross, 1967: 198)

Reports [$_{RC}$ [the height of the lettering on the covers of *which*] the government prescribes ____] should be abolished.

Recall that our rule for particle placement allows for parametric variation. English *wh*-interrogatives require •-left-alignment between the *wh*-word and the target for particle placement (and hence, the target for movement), but Russian *wh*-interrogatives and (certain types of) English relative clauses do not. This distinction parallels the variation observed in anti-pied-piping particle placement, in section 3.4. The ability of our proposal for particle placement to account for these leftmost effects, including their variation and their exceptions, in both pied-piping and anti-pied-piping in a uniform manner, strengthens our view that the two forms of mismatches should be treated together as a unified phenomenon, reflecting different options for particle placement.

7 Discussion and conclusion

The study of focus has featured prominently in linguistic theory, in part because choices of focus placement have consequences for interpretation, morphosyntax, and prosody, naturally leading to questions of grammatical architecture and modularity. In this paper, we described *anti-pied-piping*, a form of mismatch between the morphosyntax and semantics of focus where focus morphosyntax targets a proper subpart of the interpreted position of focus. Anti-pied-piping is quite widely attested cross-linguistically — with examples identified here in over 60 languages from over 40 distinct subfamilies or genera — with some notable parallels to well-studied pied-piping behavior. In particular, both mismatches require alignment at the left edge between the logical focus and the correspondingly morphosyntactically marked element in many languages.

The details of anti-pied-piping behavior motivate a theory of particle placement in which particles are introduced into the syntactic structure independent of their corresponding semantic operator (the operator–particle theory), at certain punctuated points in the derivation (Spell-Out) where PF-branch information such as statements of linear order are accessible to the syntax. The cyclic Spell-Out model of grammar (Uriagereka, 1999; Chomsky, 2000, 2001, a.o.) adopted here allows us to account for certain opaque interactions between particle placement and scrambling, as well as to unify the anti-pied-piping behavior of overt focus particle placement with anti-pied-piping in focus movement, following previous work on the syntax of pied-piping.

These facts and the resulting theory developed here have important further consequences for the theory of grammar, especially regarding the nature and behavior of Ā-movement. Following Tanaka 1999; Horvath 2000, 2007; Watanabe 2006; Cable 2007, 2010a,b, we take Ā-movement to be movement of particle phrases built from a process of particle placement. The theory thus

explains aspects of the classic A/Ā-distinction in terms of the timing of particle placement (see also Safir, 2019): for instance, as particle placement takes place at phasal Spell-Out, we predict that a constituent cannot undergo Ā-movement until a containing phase is complete and undergoes Spell-Out. Furthermore, if movement operations take place as soon as possible, all things being equal, we predict A-movement (movement not contingent on particle placement) to precede Ā-movement.

In addition, in the final section we discussed parallels between particle placement position and positions of prosodic prominence, and sketched an approach to both sets of facts that indirectly derives their parallels. Again, as Ā-movement is always movement of a particle phrase, we predict that Ā-movement can only target phrases that can bear pitch accents in languages with phrasal accents, as has been independently motivated in work such as Cheung 2009 and Branan 2018. We leave the exploration of these and other consequences of the proposal here for future work.

A Languages with anti-pied-piping by genus

We follow the major subfamily and genus (see Dryer, 1989) classifications of the WALS Genealogical Language List (Dryer, 2013) but with some simplifications to genus names and by separating Bantu and Grassfields languages. Languages that we discuss in the paper as exhibiting anti-pied-piping behavior, but for which we do not reproduce examples here in the interest of space, are listed in parentheses.

Athapaskan
- Navajo, 42

Bantu
- Kîîtharaka, 55
- Kikuyu, 69

Bodic
- Tibetan, 27, 65

Celtic
- Breton, 62
- Welsh, 60

Chadic
- Bura, 48
- Hausa, 114
- Tangale, 34

Chinese
- Mandarin, 56

Cushitic
- Somali, 52

Daghestanian
- (Hinuq),
- Lak, 41
- Qunqi Dargwa, 29

Defoid
- Yoruba, 53

Dravidian
- Telugu, 26

Garrwa, 49

Germanic
- (Dutch),
- English, 107
- German, 54, 58, 68, 110

Grassfields
- (Aghem),
- Awing, 32

Gur
- (Buli, Gurene, Kɔnni),
- Dagbani, 33
- Konkomba, 35, 45

Haitian Creole, 50

Indic
- (Bangla),
- Hindi-Urdu, 67

Iranian
- (Persian),
- Ishkashimi, 21, 38, 97

Japonic

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