

ANTI-PIED-PIPING

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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 sixty languages from over forty 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 linearization and stress assignment.*

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

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 discuss below.

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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.

For examples throughout, we have made glosses more uniform, following the Leipzig conventions where possible (<https://www.eva.mpg.de/lingua/resources/glossing-rules.php>), and have 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. The following additional abbreviations are used: CL: noun class marker, FM: focus marker, HAB: habitual, INCH: inchoative, INE: inessive, OF: object focus, PRF: perfect, SF: subject focus, TAM: tense-aspect-mood marker, VM: verb modifier. We use the gloss PRT for focus particles that do not have immediate parallels in English.

(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 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 Japanese, are given below. In 3, additional, nonfocused 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, nonfocused 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 placement³ (based on Kuroda 1965:78)Hanako-wa [[hon]_F-o kai]_{MSF}-**mo** shi, [[zasshi]_F-o kai]_{MSF}-**mo**

Hanako-TOP book-ACC buy -also do magazine-ACC buy -also

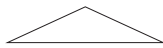
shi-ta.

do-PST

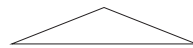
'Hanako bought [books]_F and also bought [magazines]_F.'

We schematize the syntactic configuration referred to as pied-piping in 5. In this article, 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

XP_{MSF}... YP_F ...

(6) Anti-pied-piping

YP_F... XP_{MSF} ...

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 focus position (see n. 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

² Ross (1967:§4.3) introduced the term 'pied-piping' (attributed to Robin Lakoff; see his p. 263, n. 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:§6.5 and Rooth 1985. Here we use the term pied-piping for this pattern of particle placement as well.

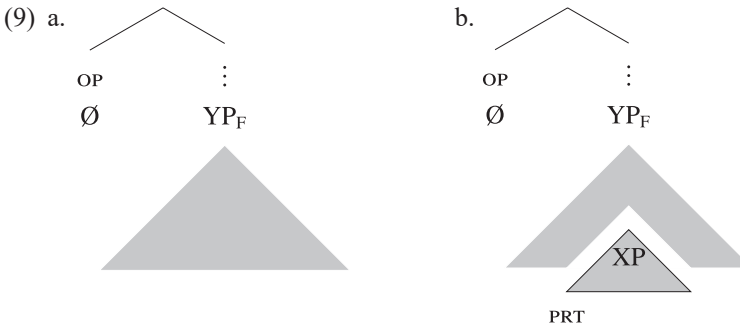
³ The additive particle *mo* naturally appears in each conjunct (see Kobuchi-Phillips 2009, Brasoveanu & Szabolcsi 2013) in example 4 and also 8 below, but we give the English additives *also* and *too* only once in their translations.

subconstituent of the logically focused constituent. It is this type of mismatch that we concern ourselves with in this article.

- (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 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 §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 sixty different languages from over forty 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 in the appendix. In addition, we show that the process of anti-pied-piping in many languages must make reference to the linear order of constituents.

In §4, we introduce a new theory for the syntax/semantics of focus particles that 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, 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



If the particle (PRT) is pronounced, we derive particle anti-pied-piping, as in 8. Alternatively, once the particle has been inserted into 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 show that this theory also naturally extends to cases of pied-piping and captures a number of parallels between the two.

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’ 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.

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, among others). 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 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 §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 §6. We conclude in §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 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

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 §4 develops an account of the relationship between such CONSTITUENT PARTICLES, which adjoin to a subsentential phrase, and SENTENTIAL PARTICLES, which adjoin to the clausal spine, as in 10a,b.

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 being on the object *sandwiches*. But in 11, the entire VP *made sandwiches* is focused. The first sentence with *only* therefore claims that Alex did not 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 did not do for Brie.

(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, 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 between 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 they address (13 vs. 14) and the shape of other felicitous answers to those questions.

In the following sections, we continue to indicate the position(s) of logical focus compatible with a particular surface form using F-marking notation. In the interest of space, in most cases we do 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 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

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 et al. 2021), but unfortunately difficult to address in research that heavily relies on existing descriptions by other scholars.

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 are 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 crosslinguistic 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) and 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 on the focused constituent in corresponding answers. This is illustrated by the question-answer pairs in 15–16. 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, while it appears on the object as an answer to an object WH-question in 16b.

- | | |
|--|---|
| (15) Subject focus (Davis 2014:124) | (16) Object focus (ibid.) |
| a. <i>Taa-du</i> suba-ba fai?
who-PRT soba-BA ate
'Who ate soba?' | a. Kurisu-ja <i>noo-ba-du</i> fai?
Chris-TOP what-BA-PRT ate
'What did Chris eat?' |
| b. [Kurusu-n] _F - <i>du</i> suba-ba fai.
Chris-NOM-PRT soba-BA ate
'[Chris] _F ate soba.' | b. Kurisu-ja [suba-ba] _F - <i>du</i> 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:§2.4), such as in the answers to the questions 'What happened?' in 17 and '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.⁸

- (17) Sentence focus (Davis 2013:33)
- | |
|--|
| a. <i>Noo-n-du</i> ari?
what-NOM-PRT existed
'What happened?' |
| b. [Hajasi-san] _{MSF} - <i>du</i> ziroo-ba bari.
Hayashi-san -PRT Jiro-BA hit
'[Hayashi-san hit Jiro] _F .' |
- (18) Predicate focus (ibid.)
- | |
|---|
| a. Unu midunpito-o <i>noo-ba-du</i> hii?
that woman-TOP what-BA-PRT did
'What did that woman do?' |
|---|

⁸ 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, but we concentrate on focus constructions.

- b. Kunu midunp̄ito-o [iz̄i-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 of 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 to the leftmost element within its associated focus’ (p. 36). Shimoji (2018:96) reports that this description also holds of all of the fifteen other Ryukyuan language varieties 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 §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 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.⁹

- (19) Burmese¹⁰ (Okell 2002:87)
 [Caùn]_{MSF}-**hmá** mǎ-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)
 Músèè kà [sòbéé]_{MSF} **l**é tàbi.
 woman PFV meat PRT prepare
 a. ‘The woman prepared [the meat]_F.’
 b. ‘The woman [prepared the meat]_F.’

⁹ Balogh and Kazemian (2021, ex. 16) document the same pattern in Persian, which is related to Ishkashimi (seen in ex. 21). For additional discussion of the data here, we thank Dorothy Ahn (Korean) and Rahul Balusu and Sreekar Raghotham (Telugu).

¹⁰ 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.

- (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.'
- (25) Masalit (Leffel 2011:30–32)
 Hawa [mada]_{MSF} **de** tange.
 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** meččukunindi.
 Suma Jaya-ACC even praised
 a. 'Suma even praised [Jaya]_F.'
 b. 'Suma even [praised Jaya]_F.'
- (27) Tibetan (Erlewine field notes¹¹)
 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., cited in Forker & Belyaev 2016:249)
 ... [iti]_{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 cited.

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.)

¹¹ The Tibetan judgments here and in 65 below reflect the judgments of three native speakers in Dharamsala, India, consulted in 2018–2019.

- (30) Japanese (Ohno 2003:323–24)
- a. Taro-ga [tako-o tabe]_{MSF}-**mo** shi-ta.
 Taro-NOM octopus-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 crosslinguistic 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 nineteenth century) Kolyma Yukaghir.

- (31) Tundra Yukaghir (Matić & Odé 2015:630)
- a. Object focus
 [Q: What do you fear?]
 [Labunme]_F-**leŋ** iŋe -**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, anti-pied-piping in predicate focus is attested in verb-medial languages as well. Schwarz (2009, 2010) also gives examples parallel to 33 in the related Oti-Volta Gur languages Buli, Gurene, and Kõnni. (Note that example 34 is also compatible with a narrow verb-focus reading (in 34c), which we address in n. 45 below.)

- (32) Awing (Fominyam & Šimík 2017:1039)
- a. A-pe'-náŋnə **tsó'ə** [ŋgəsáŋə]_{MSF}.
 AGR-PST-cook only maize
 ‘(He) only cooked [maize]_F.’
- b. A-tó-ndzí'ə **tsó'ə** [alí'ə]_{MSF}.
 AGR-PROG-till only farm
 ‘(She) is only [tilling the farm]_F.’
- (33) Dagbani (Fiedler & Schwarz 2005:120)
- ò bəl **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.

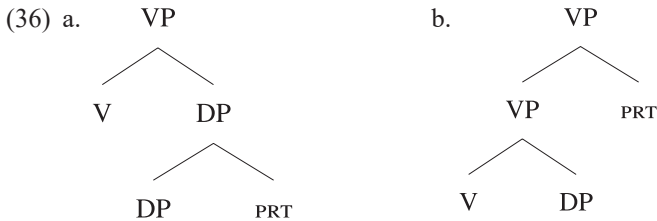
Readers may note that the anti-pied-piping data just presented fall largely into two categories: OV (head-final) languages with postfocal particles (19–31) and VO (head-initial) languages with prefocal particles (32–34). Readers may rightly wonder whether other combinations are possible: that is, anti-pied-piping 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 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 (A. Schwarz 2007:123, 126)

- Ù ηmán !ηítùùn **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).



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 or 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 the particle exhibits anti-pied-piping.¹² In contrast, anti-pied-piping is more immediately identifiable with postfocal particles in head-final structures and prefocal particles in head-initial structures.

¹² 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).

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. We also saw this pattern with Yaeyaman *du* in 17.

- (37) Even (Matić & Wedgwood 2013:153)
 [Ama]_{MSF}-**dm̩ar** ɔmɔlɔ-ɟ negirin.
 father -PRT son-REFL.POSS scolded
 ‘[A father was scolding his son]_F.’
- (38) Ishkashimi (Karvovskaya 2013:82)
 [Wai mol]_{MSF}-**m̩əs** 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.’
- (39) Kakabe (Vydrina 2020:502)
 [Túlân]_{MSF} **d̩è** ká ɲààrèènú 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., cited in Forker & Belyaev 2016:251)
 K’iča [ca č’iwisa 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 yiyíłchɔ’-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
 [Context: ‘They say that [you]_F are strong.’]
 Ele.ń, [kõde]_F-**leŋ** werwe-I.
 no man -PRT strong-SF
 ‘No, [the man]_F is strong.’
- b. Sentence focus
 [Q: ‘What is going on?’]
 [Ilije]_{MSF}-**leŋ** werwe-mu-I!
 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) Ewe¹³ (Ameka 2010:151)
 [dɛvíáwó]_{MSF}-é gba zea.
 children -PRT break pot
 ‘[The children broke the pot]_F.’
- (45) Konkomba¹⁴ (A. Schwarz 2007:130)
 [Àjúá]_{MSF} lé !ɲmán ɲítùùn.
 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 like 46b is 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 2010:242–43, 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 and 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 47.¹⁵

¹³ 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 attested in other Kwa languages as well, such as Akan (Bearth 1999:255–57), 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).

¹⁴ A. Schwarz (2007) 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).

¹⁵ 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 n. 3.

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

A cultū prōvinciae longissime absunt, [minime]_{MSF}-**que** ad eōs
 from culture province furthest be.absent least -also to them
 mercatores saepe commeant, [proximī]_{MSF}-**que** sunt Germānis.
 merchants often visit near -also are Germany
 ‘[They] are furthest from the civilization of Roman Italy, are [rarely visited
 by merchants]_F, and are also [closest to Germany]_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 (1983:73) writes that ‘[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’. The analysis we develop in §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 §5), we instead argue that 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 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 et al. 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., cited 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 et al. 1995:73–74)

[Búug]_{MSF} **buu** ___ akhriyay.
 book FM+3SG.M read
 ‘He [read a book]_F.’

- (53) Yoruba (Manfredi 2004, ex. 39a)

[Èmù]_{MSF} **nì** 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 §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)

[Context: 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) Kĩĩtharaka (Abels & Muriungi 2006:9)

I-[nyomba]_{MSF} Maria arakire ___ .

PRT-house Maria built

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

- (56) Mandarin (Constant & Gu 2010:28)

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 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)

ñũ [a rú ngopho]_{MSF} kəha ... bi-kokhi-'a.

PRT DEF POSS.3SG brain COP bleed

'[Her brain 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 et al. (2016:36, ex. 43) also report this possibility in standard Italian.

- (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 crosslinguistic 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 in 64.

- (64) Miyara Yaeyaman *du* (Davis 2013, 2014) and Ishkashimi *məs* (Karvovskaya 2013)
- a. Sentence focus: [S O V]_F ⇒ \checkmark S-PRT O V *S O-PRT V
 b. Predicate focus: S [O V]_F ⇒ *S-PRT O V \checkmark 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)
 [Context: Kunga’s a very good person. She prays at the temple every day.]
 Kun.dga’ khyi-la- $\{\checkmark$ -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 an 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.¹⁶

¹⁶ 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

- (66) Japanese (based on Aoyagi 1998:151, 2006:123)
 [Context: At yesterday's party, not only did Hanako dance, but ...]
 a. \checkmark [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 and Datta (2020) report optionality in anti-pied-piping particle placement in Hindi-Urdu and Bangla. For instance, both variants of the ditransitive example 67 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)
 [Context: 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 $\{\checkmark$ hii} tohfe $\{?$ hii} de payaa hai.
 3SG only children-DAT PRT gifts PRT give able AUX
 ‘He could only [give gifts to children]_F.’

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 68a(ii), but fronting of the goal in 68b(ii) 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 theme fronting (69b), ‘although both seem to be acceptable’.

- (69) Kikuyu (Schwarz 2003:95)
 [Q: What does Abdul do?]
 a. Ne-[mwana]_{MSF} Abdul aḏomayera __ iḃuku.
 PRT 1.child Abdul read book
 b. $?$ Ne-[iḃuku]_{MSF} Abdul aḏomayera mwana __ .
 PRT book Abdul read child
 ‘Abdul [reads the child a book]_F.’

target the leftmost constituent within the focus. Given these conflicting reports, explicitly noted by Ohno (2003:324), we reproduce Aoyagi's example in 66a,b but with judgment marks that reflect the full range of attested judgments. We thank Heidi Harley (p.c.) for bringing Ohno's work to our attention.

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. [Tsinà] _{MSF} shàshi __ koñu.
dog ate meat
‘[The dog ate the meat] _F .’ | b. [Koñu] _{MSF} shàshi tsinà __ .
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 crosslinguistic variation in the presence or absence and strength of such effects.¹⁷ We discuss further details of this process and its relation to stress placement and the theory of focus projection in §6, after we present our core proposal in §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 in phrasal movement parallel each other, and these parallels will be strengthened in §6.2. Both of these properties of anti-pied-piping are 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 sixty languages from over forty different subfamilies or genera, which we list in the appendix. Both particle placement and 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 widespread, 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, both of which are 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 1997:237–38, Bueno Holle 2016:Ch. 5). Just as there is variation in the behavior of languages with anti-pied-piping, so too is its availability 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 we develop is also inspired by contemporary theories of pied-piping, allowing us to unify anti-pied-piping in particle placement and in movement and to explain their similarities, as well as to account for parallels between anti-pied-piping and pied-piping, which we present in §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

¹⁷ We give a definition for ‘leftmost’ in §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.

Rooth 1985 has been 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 of 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 §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.

(71) Alex made **only** [sandwiches]_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. 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).¹⁸ 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.¹⁹

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

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

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, among others).²⁰ 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.

¹⁸ 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.

¹⁹ The denotations 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 nonprejacent alternative propositions, whereas technically all and only alternative propositions that are not entailed by the prejacent proposition should be negated. See for example von Stechow 1997.

²⁰ 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's (1965) discussion of 'attachment transformations'. In addition, works 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.

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

$$\llbracket \text{only}_{\text{one-place}} \rrbracket = \lambda\phi_t: \underbrace{\phi}_{\text{presupposition}} . \underbrace{\forall\psi \in C [(\psi \neq \phi) \rightarrow \neg\psi]}_{\text{truth condition}}$$

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 continue to discuss examples with *only* in this section, but these two approaches to its syntax/semantics extend to other types of focus particles as well.

Under the operator-particle approach, example 71 above reflects the syntactic structure in 74: an operator OP with the semantics of one-place *only* in 73 is adjoined to the clausal spine, here taking vP as its sister,²¹ 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:Ch. 7, Quek & Hirsch 2017, and Bassi et al. 2022 for extensive motivation for the operator-particle theory from the scope-taking behavior of English *only*.

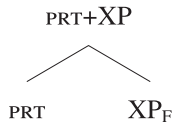
(74) Alex OP_{only} [vP t made [PRT_{only} [*sandwiches*] $_F$] for Brie]

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

Some languages allow both the particle and the 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), 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.

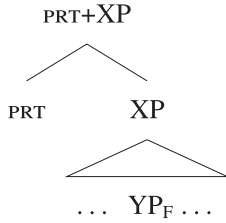
In 74, the particle has adjoined directly to the logical focus, as also schematized in 76. But faithful adjunction to the focused constituent is not the only possibility. The particle could be adjoined to a constituent that properly contains the logical focus, as in 77; this is pied-piping. The particle 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.

(76) No mismatch (MSF = F)

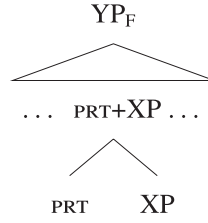


²¹ We adopt the PREDICATE-INTERNAL SUBJECT HYPOTHESIS (see e.g. Kitagawa 1986, Kuroda 1988, McCloskey 1997), whereby agentive subjects start as the argument of a verbal functional head v and then move to a high, canonical subject position, as in 74. Operators must take a constituent of propositional type as their sister. vP is proposition-denoting, with extensional type t .

(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 discussed above with particle placement on the object.

- (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 us 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.²²

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:10) 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'. For instance, example 82a is described as a felicitous sentence-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) Sandawe²³
- a. [Nám]_{MSF-a:} [sómbá]_{MSF-sà} thimè.
 Nam -PRT.NOM fish -PRT.3SG.F cook
 '[Nam cooked the fish]_F.' (Eaton 2002:276)
- b. ... [mêlitât[èé]_{MSF-à?} [mizígò:ts'i]_{MSF-à?}
 from.boat -PRT.3PL the.load -PRT.3PL
 [ts'âtànà]_{MSF-à?} kù?ùmsè.
 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 Vallejós Yopán 2009:422–23, 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.

²² The outlook for the quantificational particle theory can be improved slightly by modifying the two-place denotation for *only* as in (i), 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) $\llbracket \text{only}_{\text{two-place}} \rrbracket = \lambda\alpha_{\sigma} . \lambda\beta_{(\sigma,t)} : \beta(\alpha) . \forall\gamma \in C, \delta \in D [(\gamma \neq \alpha \vee \delta \neq \beta) \rightarrow \neg\delta(\gamma)]$

If C includes *Hamlet* and *Macbeth*, as well as *the car*, and D includes $(\lambda x . \text{Peter read } x)$ as well as $(\lambda x . \text{Peter clean } x)$, 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 and Szabolcsi (2000:199) but critiqued by Surányi (2018:249, n. 7).

²³ 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 nonsubjects 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 Branán 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.

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 type (i.e. type *t*, at *vP* or higher; see n. 21)—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.²⁴ 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, given 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.²⁵ 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*

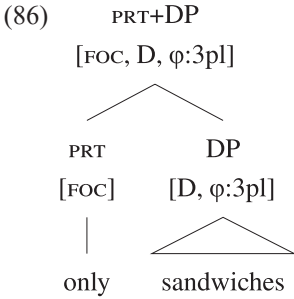
The third and final diagnostic is the availability of anti-pied-piping: semantic interpretation in the operator-particle theory requires that the logical focus be within the operator's sister at LF, but not necessarily within a particle's sister. Particles therefore may exhibit anti-pied-piping patterns of focus association, but operators do not (except where attributable to independent movements which then reconstruct; see §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, which 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 §4.4.

²⁴ 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 above.

²⁵ 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.

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 86.²⁶



The particle and its corresponding operator are then linked by the derivational operation *Agree*, which allows them to exchange additional formal feature values (see e.g. Chomsky 2000), as proposed in Lee 2004, 2005, Hirsch 2017, and Quek & Hirsch 2017.²⁷ 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.SG.F PRT.3SG.F fish(m) ART.SG.M ate.AGR OP.3SG.F
 'The woman]_F ate a fish.'
- b. Aira la [fo'sal na]_F **fin** oum **hin**.
 woman(f) ART.SG.F fish(m) ART.SG.M PRT.3SG.M ate.AGR OP.3SG.M
 '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 the formal features both of the particle (e.g. [FOC]) and of its host, such as its ϕ -features. *Agree* between the particle phrase and its

²⁶ See Bayer 1996:15, 2018 and Bayer & Obenauer 2011:476 for precursors to this proposal. On the joint projection of both daughters' features, see also Citko 2008 and Kotek 2014 and n. 29 below.

²⁷ 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, among others. 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).

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 they 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 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 [_{PRT+DP} PRT_{only} [sandwiches]_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 [_{PRT+DP} PRT_∅ [sandwiches]_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 nonpronunciation 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 vP) 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 Hamlet in the garden]_F, rather than [swim]_F.' [= 7]

Following a suggestion by Cable (2007, 2010b:Ch. 6), we propose that all A'-movement is, by definition, movement of particle phrases.²⁸ 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 §6)—fall out immediately: A'-movement such as focus movement is always movement of a particle phrase, although in many cases the relevant particle is unpronounced.²⁹

This view of A'-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. A'-movement targeting the particle phrase then results in focus movement with pied-piping, as in 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 §6.4 below, we 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 in 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.'

²⁸ This explains van Urk's (2015) featural criterion for the distinction between A-MOVEMENT (hypothesized for cross-clausal argument sharing and argument structure alternations) and A'-MOVEMENT (associated with particular information structure or in relativization): A-movement targets obligatory features of lexical items, such as category features, whereas A'-movement targets optional features. These optional features are introduced by particle adjunction. In contrast, A-movement does not pied-pipe, nor does it 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/A'-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 A'-feature; see for example van Urk 2015, van Urk & Richards 2015, Erlewine 2018, Bossi & Diercks 2019, Colley & Privoznov 2020, Scott 2021, and Branam & Erlewine 2022. 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.

²⁹ 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 and Zimmermann (2007b:388), in much the same way that pied-piping does. See also Branam & Erlewine 2021 for further discussion.

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 noncompositional 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 1997 [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 and Lenertová (2011).

- (95) Hungarian focus fronting of part of an idiom chunk (Kenesei 1998a:85)
 Nem [a ló**b**ört]_{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 §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 postsyntactic. 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, among others). 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.³⁰

³⁰ See n. 21 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

We propose that particles are adjoined during cyclic Spell-out, as López (2009) and Hartmann (2016) have claimed for abstract information-structural features.³¹ 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.³² 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 §6. We discuss and formalize the relevant notion of 'left-alignment' in §6 below.³³

- (96) Particle placement (preliminary; to be revised in §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 n. 27 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.

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.

³¹ López and Hartmann do not, however, discuss overt particle placement or use this to explain (anti-)pied-piping mismatches. We believe that our overall proposal can also be extended to their facts, with their information-structural features recast as unpronounced particles in our terms, but we leave such extensions for future work.

³² 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 postsyntax (see e.g. Halpern 1995, Embick & Noyer 2001, Legate 2008), but not applying entirely postsyntactically, 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, as well as López 2009 and Hartmann 2016, 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.

³³ As noted in n. 17 above, our final proposal allows for objects in VO verb phrases to count as 'left-aligned' with the entire verb phrase, in the relevant sense. It also addresses various systematic exceptions to leftmost effects, which we present in §6.

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 indicate 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 *vP* 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 *vP* 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 and 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 *vP* 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 postsyntactic 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 counter-feeding patterns above.

4.5. ARGUMENT/ADJUNCT ASYMMETRIES. The empirical landscape laid out in §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 (2003:317–18) 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 compatible only 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 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 Hamlet [aloud]_F.'

ii. *'Peter [read Hamlet aloud]_F.'

Hyman and 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 those 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 n. 32). 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 ν 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 widespread possibility of anti-pied-piping and its crosslinguistic 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 okay.

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.³⁴

- (104) Semantics associated with wide focus correlates with embedded particle choice (Ohno 2003:324, 336)
- | | |
|--|--|
| a. Taro-ga [tako] _{MSF} - mo tabeta. | b. Taro-ga [tako] _{MSF} - dake tabeta. |
| Taro-NOM octopus -also ate | Taro-NOM octopus -only ate |
| ‘Taro also [ate octopus] _F .’ | ‘Taro only [ate octopus] _F .’ |

Such correspondences are unexpected if apparent anti-pied-piping is generally attributed to the availability of nested foci, and they 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).³⁵ It is difficult to rule out the possibility, suggested by a referee, that some such pragmatically motivated movement may underlie some of our examples of movement anti-pied-piping in §3.3, especially as the descriptions of the relevant pragmatic notions (see n. 35) 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 §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,³⁶ 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

³⁴ 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 narrow object-focus interpretations.

³⁵ 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.

³⁶ One exception is Fanselow and 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.

account. This is the case for movement to the preverbal focus position in Hungarian (see n. 1). As Surányi (2018:248–49) 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.

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.

(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} \uparrow 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 *vP* and moved out (see n. 21), we may straightforwardly think of this as a case of *only* associating with the content of its sister *vP* with the subject reconstructed (Kayne 1998:159, n. 75, Erlewine 2014:82). Krifka (1991:142–43) 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.³⁷

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, the approach in 106 above fails to naturally extend to other

³⁷ As a referee notes, anti-pied-piping in the Grassfields language Awing includes cases involving a particle (*tsɔʔə* ‘only’, as in example 32) for which our core proposal may apply, but also cases involving a structurally rigid operator *lɔ* with verb movement out of a focused VP, akin to what we schematize in 106. See discussion in Fominyam & Šimik 2017:1064–65.

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 §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 §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 that will relate particle position to phrasal stress assignment in stress languages, but that 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.

- (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.SG.F
 intended: ‘[Linda was looking for Jana]_F.’
 b. [Janu]_{MSF} **někdo** hledal ____ .
 Jana.ACC somebody.NOM looked.for.SG.M
 ‘[Somebody was looking for Jana]_F.’

Similar facts are reported for German, where the effect has been studied experimentally by Féry and Drenhaus (2008) and Wierzba and 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 small caps. 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, n. 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 a nonspecific indefinite. Speakers then disprefer the placement of the particle on the nonspecific indefinite subject.³⁸

- (111) Japanese (based on 66 above from Aoyagi 1998, 2006)
- [Context: 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.

6.2. TWO STRESS-BASED HYPOTHESES. In this section, we consider proposals for particle placement that explicitly make reference to stress information, motivated by

³⁸ 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 noncontrastive pronoun. As Teruyuki Mizuno (p.c.) notes, specific indefinites do not resist particle placement as nonspecific indefinites do. Vydrina (2020:520–21, 2023:56) describes similar interactions in anti-pied-piping particle placement in Kakabe.

the data above.³⁹ We conclude, however, 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 §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, F. Schwarz 2007:147–49, Yoshimura 2007, 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 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 n. 16). See also Kahnemuyipour & Megerdooimian 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 crosslinguistic variation in the strength of leftmost effects.⁴⁰

- (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.

³⁹ 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 we discuss here.

⁴⁰ Fanselow and 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.

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.⁴¹ 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 is not an available option in 114b.

- (114) Hausa (Hartmann & Zimmermann 2007b:385)
- a. [B'aràayii]_{MSF} **nèe** __ su-kà yi mìn saataa!
 robbers FM 3PL-REL do to.me theft
 'Robbers have stolen from me]_F!'
- b. [Dabboobi-n jeejii]_{MSF} **nèe** 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 that is indefinite, given, or less informative.⁴²

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 crosslinguistically 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 in 115.

- (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

⁴¹ Leben et al. (1989) note a tonal phenomenon involving raising of H tones involving preverbal constituents, which naturally include focus-fronted objects. While Hartmann and 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 nonfocused constituents are not prosodically distinguished.

⁴² Hartmann and 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 §5.1 for a more general critique of such explanations for anti-pied-piping behavior.

(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 whatever its proper characterization turns out to be.⁴³

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 independently 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 referee, 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 118.⁴⁴

- (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 leave as an open question whether 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 crosslinguistically commonly skipped for the determination of particle placement.⁴⁵ 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.

⁴³ 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 referee. 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.

⁴⁴ 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.

⁴⁵ 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:106–7). In cases of narrow focus on intransitive verbs, particle placement is simply disallowed in Ishkashimi (Karvovskaya 2013:89, n. 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.

6.4. PIED-PIPING AND ANTI-PIED-PIPING. Recall that the operator-particle theory 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 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, that is, 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, which represent the base structures for 120 prior to particle adjunction at vP 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 §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 §3.4. The ability of our proposal for particle placement to account for these leftmost effects, including their variation and their exceptions, in a uniform manner in both pied-piping and anti-pied-piping 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 article, 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 crosslinguistically—with examples identified here in over sixty languages from over forty 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 corresponding 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, among others) 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 A'-movement. Following Tanaka 1999, Horvath 2000, 2007, Watanabe 2006, and Cable 2007, 2010a,b, we take A'-movement to be movement of particle phrases built from a process of particle placement. The theory thus explains aspects of the classic A/A'-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 A'-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 A'-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 A'-movement is always movement of a particle phrase, we predict that A'-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.

APPENDIX: LANGUAGES WITH ANTI-PIED-PIPING BY GENUS

We list here more than sixty languages from over forty distinct language groups in which anti-pied-piping is attested. 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 with separation of Bantu and Grassfields languages. Numbers indicate where examples from each language can be found in this article. Languages that we discuss in the article as exhibiting anti-pied-piping behavior, but for which we did not include examples in the interest of space, are listed in parentheses.

Athapaskan	Garrwa, 49
Navajo, 42	Germanic
Bantu	(Dutch)
Kiitharaka, 55	English, 107
Kikuyu, 69	German, 54, 58, 68, 110
Bodic	Grassfields
Tibetan, 27, 65	(Aghem)
Celtic	Awing, 32
Breton, 62	Gur
Welsh, 60	(Buli, Gurene, Konni)
Chadic	Dagbani, 33
Bura, 48	Konkomba, 35, 45
Hausa, 114	Haitian Creole, 50
Tangale, 34	Indic
Chinese	(Bangla)
Mandarin, 56	Hindi-Urdu, 67
Cushitic	Iranian
Somali, 52	(Persian)
Daghestanian	Ishkashimi, 21, 38, 97
(Hinuq)	Japonic
Lak, 41	Japanese, 2, 4, 8, 30, 99, 101
Qunqi Dargwa, 29	Yaeyaman, 15–18
Defoid	Khoe-Kwadi
Yoruba, 53	Sandawe, 82
Dravidian	Korean, 24, 40
Telugu, 26	

Kwa	Latin, 47, 124
(Akan, Fongbe, Gungbe, Tuwuli)	Sicilian, 63
Ewe, 44	Saharan
Lolo-Burmese	(Beria)
Burmese, 19	Salishan
Maban	(Thompson River Salish)
Maslit, 25	Samoyedic
Mande	(Tundra Nenets)
Kakabe, 23, 39	Slavic
Mixtec	(Croatian, Polish)
San Martín Peras Mixtec, 70	Czech, 109
Mongolic	Russian, 51
Khalkha, 22	Tungusic
Otomian	Even, 37
Tilapa Otomi, 59	Tupian
Panoan	(Kokama-Kokamilla)
(Kakataibo)	Turkic
Philippine	Turkish, 28
Tagalog, 46	Ugric
Quechua	Hungarian, 1, 3, 7, 102
Imbabura, 20	Wolof, 61
Romance	Yukaghir
French, 57	(Kolyma Yukaghir)
(Italian)	Tundra Yukaghir, 31, 43

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