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The Phonological Analysis of Left Branch Extraction in Japanese*

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1 Left Branch Extraction in Japanese

Bošković (2005) lays out five prerequisites for Left Branch Extraction (LBE): (i) scrambling; (ii) the absence of DP; (iii) NP-over-AP structure; (iv) the left-edge condition; and (v) agreement (see

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also Bošković 2008, 2012, 2013).[1] Japanese seems to satisfy the prerequisites (i)-(iv), but not (v) agreement.[2] If agreement is a strict requirement for LBE, languages that lack φ-agreement, such as Japanese, are expected to disallow LBE. However, if agreement is merely a preferred or default option for LBE, it is plausible that languages without agreement may employ an alternative strategy to make LBE possible. Thus, closely examining whether Japanese allows LBE can impact both the typological understanding of LBE and its theoretical account, shedding new light on the architecture of grammar.

Regarding the grammaticality judgements of LBE, Kato (2007) and Kikuchi (1987) observe that Japanese disallows LBE, as shown in (1).[3] However, Takahashi and Funakoshi (2013) observe that while LBE of a *wh*-PP is possible, LBE of an NP or a non-*wh*-PP is not, as shown in (2). Shiobara (2017) finds both sentences in (2) acceptable and cites a grammatical LBE sentence with a non-*wh*-NP, as in (3). Furthermore, we find (1) and (2a) more acceptable when stress is placed on the extracted element. Sentence (3) is from Yatabe (1996), who judges LBE of an NP to be grammatical. We interpret such variation as evidence that LBE is, in principle, possible as a syntactic derivation, with its acceptability regulated by prosodic factors (Shiobara 2017).

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[1] More precisely, Bošković (2005) raises at least five possible factors to make *adjectival* LBE possible. In this paper, we primarily focus on *possessive* LBE in Japanese. This is because adjectival LBE is more severely restricted in Japanese, even with the prosodic manipulation outlined below. However, *wh*-adjectival LBE becomes more acceptable, as shown in (ib). This indicates that LBE requires focus to create a focus Op-v configuration, and that non-*wh*-adjectives are not sufficiently focused to form such an Op-v chain, while *wh*-adjectives can. This might be because *wh*-phrases are inherently focused. Note also that comma intonation improves acceptability, as shown in (ii). This further indicates that Japanese employs an alternative prosodic strategy to facilitate LBE. See the conclusion section (Section 4) for further discussion.

(i) a. *Monosugoku akai$_i$ Taroo-wa [t_i tiisyatu-o] katta.
terribly red T-TOP T-shirt-ACC bought
'Terribly red, Taroo bought a [*t* T-shirt].'
b. ?Donokurai akai Taroo-wa tiisyatu-o katta no?
how red T-TOP T-shirt-ACC bought Q

(ii) Akai, kare-wa tiisyatu-o katta.
red he-TOP T-shirt-ACC bought
'Red, he bought a [*t* T-shirt].'

[2] Regarding the left-edge condition, given that NP-internal object scrambling is impossible while NP-internal PP scrambling is possible in Japanese, the latter, but not the former, feeds LBE (Mamoru Saito p.c.).

(i) a. *Dono-gakusei-no$_i$ Ken-wa [Yamada-sensei-no [t_i suisenzyoo]]-o yonda no?
which-student-GEN Ken-TOP Yamada-teacher-GEN recommendation.letter-ACC read Q
'(Lit.) Which student, Ken read [Prof. Yamada's [recommendation letter of *t*]]?
b. Dare-e-no$_i$ Ken-wa [t_i Maki-no [t_i tegami]]-o yonda no?
who-to-GEN Ken-TOP Maki-GEN letter-ACC read Q
'(Lit.) To whom, Ken read [Maki's [letter *t*]]?'

[3] We add the acceptability judgements by 8 native speakers of Japanese to (1)–(2), (10)–(14), (16)–(21).

(1) *Dare-no$_i$ Taroo-ga [t_i tegami]-o suteta no? (OK: 1; ?: 1; *: 6)
who-GEN T.-NOM letter-ACC discarded Q
'(Lit.)Whose did John discard letter?' (Takahashi & Funakoshi 2013: 238)

(2) a. ??Hanako-kara-no$_i$ Taroo-ga [t_i tegami]-o suteta no? (?: 2; *: 6)
H.-from-GEN T. -NOM letter-ACC discarded Q
'From Hanako, Taro discarded a letter?'
b. Dare-kara-no$_i$ Taroo-ga [t_i tegami]-o suteta no? (OK: 4; ?: 2; ??:1; *: 1)
who-from-GEN T. -NOM letter-ACC discarded Q
'From who Taro discarded a letter?' (Takahashi & Funakoshi 2013: 244)

(3) Tanaka-sensei-no$_i$, tabun kore-ga [t_i saigo-no tyosyo]-ni naru daroo. (OK: 3; ?: 2; ??: 1)
Prof. T.-GEN probably this-NOM last-GEN book-DAT become it.seems
'(Lit.) Prof. Tanaka's, it seems that this will probably become last book.' (Yatabe 1996)

As is illustrated above, LBE in Japanese is subject to speaker- and construction-based variation. Therefore, the very existence of possible cases of LBE serves as counterevidence against the assumption that agreement is a prerequisite for LBE. We argue that Japanese, which lacks φ-agreement, employs an alternative strategy based on prosody to facilitate LBE. We argue that the low acceptability of LBE in Japanese results from a phonological restriction on the relevant movement. We show that the phonological restriction can be alleviated or overridden by prosodic factors related to focus and topic. Building on Arano and Oda's (2019) observation that LBE in Japanese involves A'-movement, we argue that LBE creates an operator-variable construction, which must be contained within the same ι-phrase. When another focus element intervenes, forming a separate ι-phrase, the chain becomes infelicitous at the syntax-phonology interface, giving rise to degraded acceptability judgements.

2 Assumptions: Mapping Hypothesis and LBE as A'-movement

2.1 Mapping Hypothesis

Selkirk (1978, 1984, 1986, 1996) argues that prosodic structure consists of the hierarchically layered prosodic constituents, such as prosodic words (ω), phonological phrases (PhPs; φ), and intonational phrases (ι), which correspond to syntactic words, phrases, and clauses, respectively (see also Nespor & Vogel 1986). Ishihara (2003, 2007) shows that *wh*-questions exhibit focus intonation, characterized by an F_0-rise on the *wh*-phrase and post-focal reduction within its scope domain. Crucially, these studies presuppose that the post-focal domain aligns with both the scope domain and the ι-phrase domain. We interpret this as a restriction requiring a focus element and its variable to be contained within the same ι-phrase when movement occurs.

2.2 LBE as A'-movement

It has been observed that clause-internal scrambling in Japanese may exhibit both A- and A'-properties, while long-distance scrambling shows A'-properties. For instance, although Japanese is a scope-rigid language, as shown in (4a), clause-internal scrambling can alter scope possibilities as in (4b), whereas long-distance scrambling cannot, as in (4c), demonstrating a radical

reconstruction effect (Saito 1992, Tada 1993). Interestingly, however, Arano and Oda (2019) observe that LBE in Japanese exhibits only A'-properties, even when the movement is clause-internal. Thus, LBE, despite being clause-internal, behaves like long-distance scrambling by showing an obligatory reconstruction effect, as shown in (5). This indicates that LBE exhibits A'-movement properties.[4]

(4) a. Dareka-ga minna-e tegami-o kaita.
someone-NOM everyone-to letter-ACC wrote
'Someone wrote a letter to everyone.' ($\exists > \forall$; $*\forall > \exists$)
b. Minna-e dareka-ga tegami-o kaita.
everyone-to someone-NOM letter-ACC wrote
'Someone wrote a letter to everyone.' ($\exists > \forall$; $*\forall > \exists$)
c. Minna-e dareka-ga [John-ga tegami-o okutta to] itta.
everyone-to someone-NOM John-NOM letter-ACC sent C said
'Someone said that John wrote a letter to everyone.' ($\exists > \forall$; $*\forall > \exists$)
(Arano & Oda 2019: 48–9)

(5) ?Minna-e-no$_i$ dareka-ga [t_i tegami]-o okutta.
everyone-to-GEN someone-NOM letter-ACC sent
'[To everyone]$_i$ someone wrote [t_i a letter].' ($\exists > \forall$; $*\forall > \exists$) (Arano & Oda 2019: 49)

Similarly, short-distance scrambling, when functioning as A-movement, can establish a new binding relation, whereas long-distance scrambling cannot (Saito 1992), as illustrated in (6). In the case of LBE, however, the moved element fails to bind an anaphor, suggesting that this movement is necessarily A'-movement, as shown in (7).

(6) a. *[Otagai$_i$-no sensei]-ga [John-to Mary]$_i$-o hihansita.
each.other-GEN teacher-NOM J.-and M.-ACC criticized
'Each other's teachers criticized John and Mary.'
b. [John-to Mary]$_i$-o [otagai$_i$-no sensei]-ga t_i hihansita.
J.-and M.-ACC each.other-GEN teacher-NOM criticized
'John and Mary, each other's teachers criticized.'
c. *[John-to Mary]$_i$-o [otagai$_i$-no sensei]-ga [Bill-ga t_i hihansita to] itta.
J.-and M.-ACC each.other-GEN teacher-NOM B.-NOM criticized C said
'Each other's teachers criticized John and Mary.' (Arano & Oda 2019: 49)

(7) *[John-to Mary]$_i$-kara-no [otagai$_i$-no sensei]-ga [t_i tegami]-o yonda.
J.-and M.-from-ACC each.other-GEN teacher-NOM letter-ACC read
'From John and Mary, each other's teachers read [letters *t*].' (Arano & Oda 2019: 50)

[4] Abbreviations used here that are not included in the Leipzig glossing rules include C = complementizer, and HON = honorific marker.

Arano and Oda (2019) argue that the A/A'-distinction is contextually determined: When movement takes place within a transfer domain, it is classified as A-movement, while movement crossing a transfer domain is classified as A'-movement (Miyagawa 2010). Assuming that nominal phrases in Japanese are headed by KP (Takahashi 2010) and that KP, as the highest projection in the extended domain of a lexical category, is a phase (Bošković 2014), they argue that LBE necessarily crosses a transfer domain, that is, the complement of KP, resulting in A'-movement.[5]

3 Proposal: An Intonational Phrase as a Reflection of an Operator-Variable Configuration

Given the standard assumption that syntactic derivation feeds representations at the syntax-phonology and syntax-semantics interfaces, it is reasonable to hypothesize that the A'-movement property of LBE is reflected at these interfaces. At the syntax-semantics interface, the representation is mapped onto an operator-variable (Op-v) configuration. Similarly, at the syntax-phonology interface, information supporting the Op-v configuration can be mapped onto accent and prosody.[6] Specifically, we argue that this Op-v configuration corresponds to an ι-phrase, meaning that both the operator and its variable should be included in an ι-phrase.

(8) $[XP_{Fi}\ [\ldots t_i \cdots]\ ] \rightarrow (\ \iota\ \ XP_{Fi} \ldots t_i \ldots\ )$

The restriction in (8) at the syntax-prosody interface, which is fed by syntactic A'-movement, makes another prediction: A configuration in which an operator and its variable are interrupted by another focus, which heads another ι-phrase, should be degraded, as schematized in (9).

(9) $[_{CP} \ldots [XP_{Fi}\ YP_F\ [\ldots t_i \ldots]\ ]] \rightarrow *(\iota \ldots XP_{Fi}\ )(\ \iota\ YP_F \ldots t_i\ )$

Based on (8) and (9), the present analysis makes predictions that a purely syntactic analysis may not: LBE is more acceptable when the intervening element is a topic phrase, which lacks head prominence or focus. In fact, (10) is more acceptable than (11), as the latter includes a nominative-marked subject that readily receives head prominence or focus.

(10) ?/??/*Dare-no$_i$ John-wa [t_i hon]-o yonda no? (OK: 3; ?: 1' ??: 2; *: 2)
who-GEN J.-TOP book-ACC read Q
'(lit.)Whose did John read book?'

[5] See Arano and Oda (2019) for an additional argument for this based on movement out of the coordinate structures (cf. Oda 2017, 2021, 2022 on the violability of the Coordinate Structure Constraint in Japanese and other languages).

[6] Toru Ishii (p.c.) suggests that Op-v configuration may be in conflict with the radical reconstruction property, which Saito (1989) argues to be characteristic of A'-scrambling in Japanese. However, Mamoru Saito (p.c.) notes that it is not necessarily evident that Op-v configuration always results in radical reconstruction. In addition, Yagi (to appear) argues that A/A'-properties of scrambling can be accounted for in terms of the availability of syntactic reconstruction, trace conversion and semantic reconstruction. In other words, with respect to reconstruction, what is important is not the movement properties per se, but the positions of the traces. We leave this issue for future research.

(11) *Dare-no$_i$ Taroo-ga [t_i tegami]-o suteta no? (OK: 1; ?: 1; *: 6)
who-GEN T.-NOM letter-ACC discarded Q
'(Lit.)Whose did John read book?' (Takahashi & Funakoshi 2013: 238)

LBE is less acceptable when the moved element is a topic (or a non-focal element), as shown in (12). This is because topicalization does not yield an Op-v construction which is typically created by a focus operator (Lasnik & Stowell 1991, Rizzi 1997).

(12) Speaker A: Kimi-no ronbun-nituite Tanaka-sensei-wa nante iwa-re-masi-ta ka?
you-GEN paper-about Prof.T.-TOP what say-HON-POLITE-PST Q
'What did Prof. Tanaka say about your article?'
Speaker B: *Watasi-no$_i$ Tanaka-sensei-ga [t_i ronbun]-o hometekure-masi-ta. (?: 1; *: 7)
I-GEN Prof.T.-NOM paper-ACC praise-POLITE-PST
'(Lit.) My, Prof. Tanaka praised paper.'

Furthermore, when an intervening focus element introduces its own ι-phrase boundary, the element undergoing LBE and its trace fall into separate ι-phrases, resulting in unacceptability, as shown in (13b) and (14b).

(13) a. ?/??Dare-kara-no$_i$ Ken-wa Maki-ni [t_i syasin]-o ageta no? (OK: 2; ?: 3; ??: 3)
who-from-GEN K.-TOP M.-DAT picture-ACC gave Q
'Whose did Ken give Maki pictures?'
b. ??/*Dare-kara-no$_i$ Ken-wa Maki-ni-**dake** [t_i syasin]-o ageta no? (??: 5; *: 3)
who-from-GEN K.-TOP M.-DAT-**only** picture-ACC gave Q
'(lit.)Whose did Ken give only Maki pictures?'

(14) a. ?/?*Dare-kara-no$_i$ Taroo-ga [t_i tegami]-o yomanakatta no? (OK: 3; ?: 2; ?*: 2)
who-from-GEN T. -NOM letter-ACC read.not Q
'(lit.)From who, Taro did not read a letter?'
b. ??Dare-kara-no$_i$ Taroo-**sae** [t_i tegami]-o yomanakatta no? (??: 2; *:5)
who-from-GEN T**.-even** letter-ACC read.not Q
'From who, even Taro did not read a letter?'

Evidence that this phenomenon is prosodic or phonological rather than purely syntactic comes from the fact that LBE with a null operator remains grammatical (15).

(15) Maki -ga [Op$_i$ Ken-ga [[t_i ~~omise] no tyokoreeto] o~~ tabeta yori-mo]
M.-NOM K.-NOM shop-GEN chocolate-ACC ate more.than-also
[takusan-no$_i$ omise-no tyokoreeto]-o tabeta.
much-GEN shop-GEN chocolate-ACC ate
'(Lit.) Maki ate the chocolate of more shops than Ken ate.'

Note in passing that comma intonation plays little or no role in Japanese LBE, as shown in (16)–(21) (only (19) becomes slightly more acceptable compared to the example without comma

intonation (18)).

(16) OK/??/*Dare-no$_i$ John-wa [t_i hon]-o yonda no? (OK:3; ?: 1; ??: 2; *: 2)
who-GEN J.-TOP book-ACC read Q
'(Lit.) Whose did John read book?'

(17) OK/?/?*Dare-no$_i$, John-wa [t_i hon]-o yonda no? (OK: 3; ?: 2; ?*: 2)
who-GEN J.-TOP book-ACC read Q
'(Lit.) Whose did John read book?'

(18) *Dare-no$_i$ Taroo-ga [t_i tegami]-o suteta no? (OK: 1; ?: 1; *: 6)
who-GEN T.-NOM letter-ACC discarded Q
'(Lit.) Whose did John read book?' (Takahashi & Funakoshi 2013: 238)

(19) OK/?/?*Dare-no$_i$, Taroo-ga [t_i tegami]-o suteta no? (OK: 3; ?: 2; ?*: 2)
who-GEN T.-NOM letter-ACC discarded Q
'(Lit.)Whose did John read book?' (cf. Takahashi & Funakoshi 2013: 238)

(20) a. ?/??Dare-kara-no$_i$ Ken-wa Maki-ni [t_i syasin]-o ageta no? (OK: 2; ?: 3; ??:3)
who-from-GEN K.-TOP M.-DAT picture-ACC gave Q
'Whose did Ken give Maki pictures?'
b. ??/*Dare-kara-no$_i$ Ken-wa Maki-ni-**dake** [t_i syasin]-o ageta no? (??: 5; *:3)
who-from-GEN K.-TOP M.-DAT-**only** picture-ACC gave Q
'(Lit.) Whose did Ken give only Maki pictures?'

(21) a. OK/?*Dare-kara-no$_i$, Ken-wa Maki-ni [t_i syasin]-o ageta no? (OK: 3; ?: 1; ?*: 3)
who-from-GEN K.-TOP M.-DAT picture-ACC gave Q
'Whose did Ken give Maki pictures?'
b. ??/*Dare-kara-no$_i$, Ken-wa Maki-ni-**dake** [t_i syasin]-o ageta no? (??: 3; *: 4)
who-from-GEN K.-TOP M.-DAT-**only** picture-ACC gave Q
'(Lit.) Whose did Ken give only Maki pictures?'

This aligns with the analysis that the Op-v chain must be contained within a single ι-phrase in Japanese LBE. Since comma intonation signals the presence of ι-phrase boundary, it does not improve the grammaticality of LBE.

4 Conclusion

To summarize, we argue that in Japanese, the Op-v chain created by movement is mapped onto an intonational-phrase exhibiting focus prosody. An interesting prediction of our proposal concerns the cross-linguistic variation in the availability of LBE. Bošković's (2005, 2008, 2012) original typological generalization states that LBE is possible only in languages without definite articles. Crucially, the absence of definite articles is a necessary condition, that is, languages without definite articles in principle allow LBE, but not all such languages actually do. The literature has left

open the question of what differentiates the languages that fully allow LBE from those that do not. If phonological factors play a crucial role in the full availability of LBE, as proposed here, then languages that productively allow LBE should show well-formed prosodic and intonational patterns in LBE, whereas those that do not should fail to create such patterns. In this context, Oda (2021) observes that movement out of coordinate structures, which is allowed only in languages without definite articles or with affixal definite articles, is most acceptable in Serbo-Croatian, Icelandic, and Swedish when the remnant in the base-position receives focus or nuclear stress at the end of an ι-phrase. This is in parallel with *wh*-in-situ in Spanish (see Reglero 2007 for Spanish *wh*-in-situ). Notably, Stjepanović (2014) and Oda (2021) argue that LBE and movement out of coordinate structures are essentially the same phenomenon. This suggests that a broader syntax-phonology interface condition may underlie these patterns across languages, despite their surface differences. We will investigate this issue in future research.

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