Sato, Yosuke & Ikawa, Hisako. 2025. Renumerating *wh*-compound questions in Japanese at the syntax-morphology interface. *Glossa: a journal of general linguistics* 10(1). pp. 1–43. DOI: https://doi.org/10.16995/glossa.15377

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Renumerating *wh*-compound questions in Japanese at the syntax-morphology interface

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In this paper, we investigate *wh*-compound questions in Japanese to adjudicate between lexicalist and non-lexicalist approaches to word formation. We first show that *wh*-compound questions pass standard diagnostic tests for wordhood in Japanese, thereby forming a word-level unit in the lexicalist sense. We then present novel evidence to show that the formation of *wh*-compounds follows the same rules as that of regular *wh*-questions. These two types of evidence present an ordering paradox for lexicalist theories of the syntax-morphology interface. We present our analysis of *wh*-compound questions within the Distributed Morphology framework (Halle and Marantz 1993) whereby certain sub-structures created in the syntax, including *wh*-compounds, are spelled-out and renumerated into the current derivational workspace as derived terminal elements (Uriagereka 1999; Sato 2010; Harley 2011). We compare our analysis with Kimura and Narita's (2021; 2023) recent analysis of *wh*-compound formation and argue that the former is superior to the latter on both empirical and theoretical grounds. We also reject an alternative analysis of *wh*-compounds based on Kageyama's (1993; 2001; 2016) W^+ theory of the Japanese morphology-syntax interface.

1 Introduction

One of the central theoretical issues that have been vigorously debated in the literature on the syntax-morphology interface is how words and their formation rules relate to derivational rules responsible for larger objects such as phrases and sentences in the syntax. There are two prominent positions on this issue within the generative framework.

One is the Lexicalist Hypothesis (hereafter, LH) (Chomsky 1970; Di Sciullo and Williams 1987; Anderson 1992; Bresnan and Mchombo 1995, among others). This hypothesis holds that words are formed in the Lexicon to serve as unanalyzable terminal elements for the purposes of syntax. This position thus gives rise to the Lexical Integrity Principle, namely, that syntactic derivation cannot have access to the internal structure or derivational history of words, which enter the syntactic component as atomic operands.

The competing approach to the interface question stated above is upheld by the Distributed Morphology (hereafter, DM) framework (Halle and Marantz 1993; Marantz 1997; Harley and Noyer 1999; Embick and Noyer 2007; see also the Nanosyntactic approach to word formation, e.g., Taraldsen 2019). This framework hypothesizes that all complex objects are assembled through the same generative system in the syntax, so principles composing 'words' are identical to those composing larger complex objects such as phrases and sentences. Accordingly, the DM framework proposes that there is no principled distinction to be drawn between 'word' and phrase; such a distinction, if any, is not only superfluous but also undefinable because this framework admits no dedicated special module for word formation, such as the Lexicon.

Against this background, we will investigate here the syntactic and morphological structures of *wh*-compound questions in Japanese (Kageyama 1993; Harada 2014; Kimura and Narita 2016; 2017; 2021; 2023) to adjudicate between the two competing approaches to the nature of the syntax-morphology interface regarding the notion of word and the locus of word formation in the overall grammatical architecture. We will show that this type of question creates an ordering paradox for any version of the lexicalist theory, a paradox that can be successfully resolved under the alternative DM-based theory, which aims to dispense with the pre-syntactic Lexicon as a dedicated module for word formation. We will also develop our own syntactic analysis of *wh*-compound questions which capitalizes on the existing proposal (Uriagereka 1999; Johnson 2004; Sato 2010; Harley 2011) that certain sub-chunks of a syntactic derivation can be spelled-out early and renumerated into the current syntactic workspace as a derived terminal item.

This paper is organized as follows. We will start in section 2 by providing three arguments supporting the word status of *wh*-compounds in Japanese: sequential voicing, the Compound Accent Rule and the impossibility of word-internal modification. We will then present three types of argument – partial fragment answers to *wh*-compound questions, island/intervention/additional *wh*-effects and non-interrogative readings of *wh*-compounds – demonstrating that syntactic computation has regular access to the internal structure of this type of compound. These two sets

of arguments lead us to conclude that the very existence of *wh*-compound questions in Japanese, with various properties transcending what has been traditionally considered as the syntax-lexicon border, poses an ordering paradox for any analysis couched within the lexicalist model.

In section 3, we will develop our analysis of *wh*-compound questions modeled after a DM-based analysis of phrasal compounds independently proposed by Sato (2010) and Harley (2011). We will show how this analysis derives internal syntactic visibility of this type of question through regular combinatorial procedures in the syntactic derivation while at the same time deriving their alleged impenetrability effects through early spell-out and renumeration (Uriagereka 1999; Johnson 2004). In section 4, we will compare our analysis with Kimura and Narita's (2021; 2023) analysis of *wh*-compound question formation. We will argue that our analysis provides a novel perspective on two outstanding issues revolving around this construction that remain unaddressed in their work, one concerning the technical mode of ellipsis/deletion involved in fragment answers to a *wh*-compound question, and the other concerning the origin of "wordhood/lexicality" and its compatibility with the basic tenets of the DM model. In section 5, we will consider another alternative analysis of *wh*-compound questions based on the notion of Word Plus (W^+) proposed by Kageyama (1993; 2001; 2016) and reject this analysis based on Yashima's (2021) findings. We will conclude this paper in section 6.

2 *Wh*-Compound Questions in Japanese and an Ordering Paradox for the LH

Wh-compound questions in Japanese are illustrated in (1Q).

(1) Q: Kimi-wa kinoo nani-gayu-o tabeta-no?
you-TOP yesterday what-porridge-ACC ate-Q
'intended: [What-porridge] did you eat yesterday?'

A: Tamago-gayu desu.
egg-porridge COP.POL
'I ate an [egg-porridge] yesterday.'

In (1Q), *nani-gayu* 'what-porridge' consists of *nani* 'what' and the head noun *kayu* 'porridge' (see also our discussion immediately below (5a, b)). This expression signals a genuine *wh*-question, for it must be answered with an appropriate value specified for the *wh*-word, such as *tamago-gayu* 'egg-porridge' (as shown in (1A)), *nanakusa-gayu* 'seven herb-porridge' or *natto-gayu* 'natto-porridge'. Examples in (2Q) and (3Q) are two other examples of the *wh*-compound question. Note furthermore that (3Q) is a multiple *wh*-question employing the *wh*-compound question strategy.

(2) Q: Omae-wa nani-iri-onigiri-ga suki-na-no?
you-TOP what-containing-rice.ball-NOM like-COP-Q
'intended: [What-containing rice balls] do you like?'

A: Zibun-wa suziko-iri-onigiri-ga suki-ssu-ne.
I-TOP salted.salmon.roe-containing-rice.ball-NOM like-POL-SFP
'I like [salted salmon roe-containing rice balls].'

(3) Q: Rio-tyan-te Keio-daigaku nani-gakubu nani-gakka
Rio-TIT-TOP Keio-University what-faculty what-department
dare-zemi-kiboo-nan-da-kke?
who-seminar-wish.for-Q-COP-SFP
'intended: Rio, [who-seminar] of [what-department] from [what-faculty] do you wish to get enrolled for at Keio University?'

A: Bun-gakubu eibun-gakka Suzuki-zemi-da-kedo.
humanity-faculty English-department Suzuki-seminar-COP-SFP
'I wish to get enrolled for [Suzuki-seminar] of the [Department of English] from the [Faculty of Humanities].'

(4) lists possible combinations of *wh*-words presented by Harada (2014) which form acceptable *wh*-compound questions, together with some representative examples.

(4) a. *nani* 'what' → *nani-nabe* 'what-hot.pot', *nani-kankei* 'what-related'
b. *dare* 'who' → *dare-toku* 'who-benefiting', *dare-mati* 'who-waiting'
c. *doko* 'where' → *doko-zyoohoo* 'where-from information',
doko-keeyu 'where-through'

(Harada 2014: 25)

2.1 Three Arguments Supporting the Lexical Wordhood of *Wh*-Compound Questions

There are three arguments showing that *wh*-expressions like the boxed ones in (1–3) indeed form compounds. Firstly, it is well-known that in Japanese, the process of sequential voicing, or *rendaku*, voices the initial obstruent of the second member of a compound. This morphophonological process is illustrated in (5a, b).

(5) a. ame + **k**asa → ama**g**asa
rain umbrella umbrella
b. neko + **s**ita → neko**z**ita
cat tongue sensitive tongue

(Kubozono 1995: 58)

In (5a), the initial voiceless consonant of the noun *kasa* 'umbrella', [k], changes to its voiced counterpart, [g], when it is compounded with another noun *ame* 'rain' to yield *amagasa* 'umbrella'. The same process is responsible for the change from [s] to [z] in *nekozita* 'sensitive

tongue' in (5b), which results from compounding *neko* 'cat' and *sita* 'tongue'. Importantly for our present purposes, what we have dubbed *wh*-compounds may also undergo sequential voicing, as shown in (6a, b). Here, the initial voiceless consonant [k] of *karami* 'related' and *kayu* 'porridge' changes to its voiced counterpart, [g], when they are compounded with *wh*-words, *doko* 'where' and *nani* 'what'. Note that the phrasal combinations that are closest approximations to the two compounds, shown in (6a') and (6b'), do not undergo sequential voicing.

(6) a. doko + **k**arami → doko-**g**arami 'where-related'
where related where-related

a'. doko-ni + **k**aranda →* doko-ni **g**aranda 'related to where'
where-to related where-to related

b. nani + **k**ayu → nani-**g**ayu 'what-porridge'
what porridge what-porridge

b'. nan-no + **k**ayu →* nan-no **g**ayu 'porridge of what'
what-GEN porridge what-GEN porridge

((6a) from Harada 2014: 27)

Secondly, what we call *wh*-compounds are subject to the same accent rule as bona fide compounds in Japanese. Kubozono (1995) observes that compounds abide by the Compound Accent Rule defined in (7).

(7) The Compound Accent Rule
The Compound Accent Rule destroys the lexical accent structures of the constituent parts of a compound and integrates the two accentual phrases into a single accent phrase.
(Kubozono 1995: 58)

Let us see how this rule works, using (8a, b) for illustration.

(8) a. sararíiman-no + síntoo → [$_{NP}$ sararíiman-no síntoo]
office.worker-GEN new.party office.worker-GEN new.party
'a new party for office workers'

b. sararíiman + síntoo → [$_{compound}$ sarariiman-síntoo]
office.worker new.party office.worker-new.party
'office-worker's New Party'

In (8a), we have the noun phrase *sararíiman-no síntoo* 'a new party for office workers' whose phrasehood is diagnosed by the presence of the genitive case marker *no*. The phrase in question has phrase accent in the sense that the lexical accent nuclei of the two input nouns are maintained in the noun phrase. In (8b), by contrast, we have *sarariimansíntoo* 'office-workers' New Party' without the genitive case marking. This expression exhibits compound accent in the sense that

it has only one accent nucleus, an accent pattern suggestive of the application of the Compound Accent Rule in (7).

With this accentual difference between phrases and compounds in mind, consider now examples in (9a, b).

(9) a. d**ó**ko-kara-no + zy**ó**ohoo → [$_{NP}$ d**ó**ko-kara-no zy**ó**ohoo]
where-from-GEN information where-from-GEN information
'information from where'

b. d**ó**ko + zy**ó**ohoo → [$_{compound}$ doko-zy**ó**ohoo]
where information where-information
'from-where information'

(9a) illustrates the phrasal accent pattern of *dóko-kara-no zyóohoo* 'information from where', which retains the original accent nuclei of the two input nouns. This pattern is to be contrasted with the compound accent pattern of *doko-zyóohoo* 'where-from information', which behaves on a par with (8b), not with (8a), with respect to accent placement; it only has one accent nucleus on the second member. This observation lends further support to the conclusion that what we have deemed *wh*-compounds are indeed compounds and hence form a word-level unit in the lexicalist sense.

Finally, *wh*-compounds obey the ban on word-internal modification. That is, compounds in general do not accept modification into any component part, unlike phrases. To illustrate, consider examples in (10a, b).

(10) a. aozyasin (compound) → * hanbun aozyasin
'blueprint' half blueprint
'intended: a half blueprint'

b. aoi syasin (phrase) → hanbun aoi syasin
blue photo half blue photo
'a half blue photo'

In (10a), the nominal compound *aozyasin* 'blueprint' consists of *aoi* 'blue' and *syasin* 'photo'. Its compoundhood is independently confirmed by the presence of sequential voicing, which changes [s] of the head noun to [z]. The ungrammaticality of (10a) shows that the degree adverb *hanbun* 'half' cannot modify the adjectival member of the compound alone. This ban on compound-internal modification is not observed with phrases, however, as shown by the grammaticality of (10b), where the same adverb can modify the adjectival *aoi* 'blue' contained within the NP *aoi syasin* 'a blue photo'.

Now, the ill-formedness of the examples in (11a–c) indicates that *wh*-compounds, such as *dare-toku* 'who-benefiting', *nani-nabe* 'what-porridge', and *doko-zyoohoo* 'where-from information', all

exhibit the ban on word-internal modification, for no degree modifier may intervene between the two members of the relevant compounds.[1]

(11) a. dare-(*__tyoo__)-toku
who-exceedingly-benefiting
'intended: benefiting-who-exceedingly'

b. nani-(*__oo__)-nabe
what-big-hot.pot
'intended: what-big.hotpot'

c. doko-(*__ura__)-zyoohoo
where-secret-information
'intended: where-from secret information'

(Harada 2014: 26)

It is clear from the above that *wh*-N expressions in the examples introduced so far constitute a subspecies of genuine compounds in Japanese grammar and hence a word-level unit from the standpoint of the lexicalist theory of the syntax-morphology interface, according to which compounds are formed in the pre-syntactic lexical component and enter the syntactic derivation as an unanalyzable atomic operand. In the next section, however, we will introduce novel data pointing to the opposite conclusion that *wh*-compounds do allow certain syntactic operations to have access to their internal structure.

2.2 Three Arguments Supporting the Internal Syntactic Accessibility of *Wh*-Compounds

We will now present three arguments showing that the internal structure of *wh*-compounds is accessible to certain syntactic processes and constraints, contrary to the conclusion reached in section 2.1.

2.2.1 Partial Fragment Answers to *Wh*-Compound Questions

Firstly, direct evidence for syntactic penetrability into the internal structure of a *wh*-compound is presented by Kimura and Narita's (2016; 2017; 2021; 2023) observation regarding partial fragment answers. Kimura and Narita observe that a *wh*-compound yields a regular interrogative interpretation for its *wh*-constituent part alone embedded within the whole compound. This observation is illustrated by the availability of a partial answer to a *wh*-compound question in (12A) and (13A).

[1] We will come back to a more in-depth examination of the unacceptable status of (11a–c) in section 3.4.

(12) Q: Keisatu-wa nani-gorosi-no hannin-o tukamaeta-no?
police-TOP what-slaughter-GEN culprit-ACC caught-Q
'lit. [The [what-slaughter] culprit] did the police catch?'

A: Noraneko (da/desu).
stray.cat COP/COP.POL
'stray cat(s)'

(Kimura and Narita 2017: 142)

(13) Q: Kimi-wa nani-nabe-o kinoo tabeta-no?
you-TOP what-hot.pot-ACC yesterday ate-Q
'lit. You ate [what-hot.pot] yesterday?'

A: Kimuti-(nabe) da-yo.
Kimchi-hot.pot COP-SFP
'a Kimchi hotpot'

According to Kimura and Narita, the partial fragment answer in (12A) is derived through scattered in-situ deletion whereby everything undergoes deletion except for the focused constituent *noraneko* 'stray cat(s)' staying in its base-generated thematic position, as schematically shown in (14).

(14) ~~[Keisatu-wa~~ [[[$_{N1}$ noraneko] ~~[$_{N2}$ gorosi]-no~~ ~~hannin-o~~ ~~tukamaeta]~~
police-TOP stray.cat slaughter-LINK culprit-ACC caught
~~no~~ da/desu]
COMP COP/COP.POL

(Kimura and Narita 2017: 148)

Given Kimura and Narita's analysis, the grammaticality of the partial fragment answer in (12A) shows that whatever syntactic process is responsible for a *wh*-question interpretation (e.g., movement into an interrogative CP or agreement relationship with a Q-particle in the CP) has access to the internal structure of *wh*-compounds so that it may selectively pick up a *wh*-word embedded within them.

(13A) illustrates the same point. The *wh*-compound in the set-up question in (13Q) is *nani-nabe* 'what-hotpot', but one may answer the question by giving a value to the *wh*-constituent *nani* 'what' alone in addition to repeating the *wh*-part plus the head noun *nabe* 'hotpot', as indicated in (13A). This finding indicates that *wh*-compounds are penetrable by certain syntactic processes such as those responsible for the *wh*-interrogative interpretation.

One objection to the conclusion drawn above is that it assumes that the deletion involved in the derivation of partial fragment answers is some syntactic process or at least is tied to its prior application. However, one might argue that the deletion involved is morphological in nature. Indeed, the morphological literature (Chaves 2008; see also Booij 1985 and Nespor 1985) has

featured examples of what look like deletion below the word-level unit, such as *pre-and post-revolutionary France* and *pro-choice and -gun control*. However, this 'ellipsis' or coordination of sub-word parts cannot be held responsible for fragment answers to a *wh*-question as in (12A), for the deletion process involved in a question/answer pair cannot pick up a sub-word domain in the same way as sub-word-level coordination, as shown by the ill-formedness of the attempted truncated reply in (15A).[2]

(15) Q: Do you like bluebirds or blackbirds?
A: *Blue (intended: I like blue birds.)

Kimura and Narita (2023:200–204) further point out that the accent pattern of the truncated response word is different from that of the same word employed when it is pronounced as a part of a compound. Thus, the word *kimuti* 'Kimchi' has primary lexical accent on the first mora on its own (HLL), but loses its accent when it is pronounced as part of the compound, *kimuti-nabe* 'Kimchi hotpot' (LLL + HL). Importantly, the truncated short answer in (13A) has the accent pattern of the independent word, not of the compound. If the response were derived through deletion of the sub-word level unit as shown in [$_{N}$ [$_{N1}$ *kimuti*] [$_{N2}$ ~~*nabe*~~]], we would predict that the answer should lose its lexical accent, contrary to facts, for the lexicalist view assumes that lexical accent assignment of a word/morpheme is completed in the lexicon before it enters the syntactic derivation.

2.2.2 Movement Restrictions in Genuine and *Wh*-Compound Questions

We will now turn to the second type of argument for syntactic accessibility to *wh*-compound questions. We will demonstrate that this type of question exhibits standard movement restrictions characterizing genuine *wh*-questions in Japanese, such as island effects, intervention effects (Hoji 1985; Beck 1996; Beck and Kim 1997; Tomioka 2007, among others) and additional *wh*-effects (Watanabe 1992; Saito 1994). Since this result indicates that the formation of *wh*-compound questions follows the same syntactic rules as that of regular *wh*-questions, it lends further credence to our position that the former allows the syntactic derivation to peek into their internal syntactic structure.

Let us start with island effects, using (16a, b) as illustrative examples.

(16) a.(*)Kimi-wa [$_{CP}$ kono-ken-de dare-ga tokusita-kadooka] siritagatteiru-no?
you-TOP this-matter-in who-NOM benefited-whether want.to.know-Q
'*Who$_i$ do you want to know whether t_i benefited in this matter?'

b.(*)Kimi-wa [$_{CP}$ kono-ken-ga dare-toku-kadooka] siritagatteiru-no?
you-TOP this-matter-NOM who-benefiting-whether want.to.know-Q
'lit. Who$_i$ do you want to know whether this matter is [t_i-benefiting]?'

[2] Thanks to a reviewer for drawing our attention to this question and providing the example in (15Q/A).

(16a) illustrates the *wh*-island constraint. The *wh*-phrase *dare-ga* 'who-NOM' cannot yield the matrix scope *wh*-interpretation due to the intervention of the interrogative Q particle *kadooka* 'whether', which blocks association between the *wh*-phrase and the matrix Q particle *no*. (16b) differs from (16a) in that the former involves the *wh*-compound, *dare-toku* 'who-benefiting', Strikingly, (16b) remains ungrammatical on a par with (16a). This observation indicates that *wh*-compound questions are formed and interpreted in the syntax in the same way as regular *wh*-questions in Japanese.

An anonymous reviewer finds both (16a) and (16b) acceptable and notes that this is presumably due to the prosody effect long known since Deguchi and Kitagawa (2002) and much subsequent works. Deguchi and Kitagawa observe that standard examples illustrating the *wh*-island constraint as in (16a) can be uttered with two distinct prosodic contours – short Emphatic Prosody (EPD) and long EPD – as shown in (17a) and (17b).

(17) a. KI′mi-wa [$_{CP}$ KO′no-ken-de **DA′**re-ga ↓tokusita-kadooka] siritagatteiru-nO↑
b. KI′mi-wa [$_{CP}$ KO′no-ken-de **DA′**re-ga ↓tokusita-kadooka] siritagatteiru-nO↑

In short EPD, the eradication following the radically higher F_0 peak of the focused *wh*-phrase stops at the end of the embedded CP, and the lexical accent of the matrix verb is retained. In long EPD, by contrast, the eradication process extends to the end of the whole sentence so that the lexical accent of the matrix verb is suppressed. The domains of this eradication process in the two prosodic contours are shaded in (17a) and (17b).

Deguchi and Kitagawa point out that examples like (16a) are grammatical under the matrix *wh*-question reading when they are accompanied only with long EPD. They develop a computational system to capture this scope-prosody correspondence using a E-feature complex (E_{SEM}, E_{PHON}), which they hypothesize to induce E-agreement between a C head (endowed with the uninterpretable counterpart) and a *wh*-phrase (endowed with the interpretable counterpart) in both LF- and PF-computations. E-agreement at LF identifies a *wh*-phrase carrying the E_{SEM} as the focus and the maximal projection of the C head carrying the same feature as the domain of focus whereas E-agreement at PF identifies the *wh*-phrase carrying E_{PHON} as the starting point of focus prosody and the C head containing the same feature as its endpoint, a domain externalized as EPD.

It is important to note that the acceptability of the *wh*-compound question in (16b) is constrained by the same prosodic constraint as the acceptability of the regular *wh*-question in (16a). That is, (16b) is completely acceptable when it is accompanied not with short EPD, as depicted in (18a), but with long EPD, as depicted in (18b).

(18) a. KI′mi-wa [$_{CP}$ koNO KE′n-ga da**RE′**-toku-na-no-ka] siritagatteiru-nO↑
b. KI′mi-wa [$_{CP}$ koNO KE′n-ga da**RE′**-toku-na-no-ka] siritagatteiru-nO↑

Our point is thus that the presence vs. absence of the putative *wh*-island effect in (16a, b) is controlled by a focus-prosody correspondence in both regular *wh*-questions and *wh*-compound questions. To the extent that Deguchi and Kitagawa's formal implementation of the focus-prosody synchronization using the syntactic process of agreement of the E-feature complex between a C head and a *wh*-phrase within the computational system of language is tenable, the parallel acceptability judgement shared between the two types of question thus reinforces our current view that the formation and interpretation of *wh*-compound questions is indeed governed by archetypical syntactic principles.

Before leaving the current topic of the interrogative reading of *wh*-compounds and their syntactic constraints, it is worthwhile to point out that the scope-taking potentials of *wh*-compounds are sensitive to the type of matrix predicates involved.[3] Thus, some verbs like *wonder* require embedded scope for a *wh*-phrase whereas other verbs like *think* require matrix scope for the same *wh*-phrase (see also Aoun and Li 1993 for the same observation in Mandarin Chinese). Now, the examples in (19a, b) show that Japanese shares the same property, with *siritagatteiru* 'to wonder' and *omow* 'to think' requiring the embedded and matrix scope readings for the *wh*-phrase *nani-o* 'what-ACC' positioned within the complement clause selected by the verbs in question.

(19) a. Taroo-wa [$_{CP[+Q]}$ Hanako-ga nani-o tabeta-ka] siritagatteiru-no?
Taro-TOP Hanako-NOM what-ACC ate-Q want.to.know-Q
'Does Taro want to know what Hanako ate?' [*matrix; ^{ok} embedded]

b. Taroo-wa [$_{CP[-Q]}$ Hanako-ga nani-o tabeta-to] omotteiru-no?
Taro-TOP Hanako-NOM what-ACC ate-Q think -Q
'What$_i$ does Taro think that Hanako ate t_i?' [^{ok} matrix; *embedded]

Crucially, the same scope-taking pattern is inherited when we replace *nani-o* with a *wh*-compound, *nani-nabe-o* 'what-hotpot-ACC'.

(20) a. Taroo-wa [$_{CP[+Q]}$ Hanako-ga nani-nabe-o tabeta-ka] siritagatteiru-no?
Taro-TOP Hanako-NOM what-hotpot-ACC ate-Q want.to.know-Q
'Does Taro want to know what Hanako ate?' [*matrix; ^{ok} embedded]

b. Taroo-wa [$_{CP[-Q]}$ Hanako-ga nani-nabe-o tabeta-to] omotteiru-no?
Hanako-NOM Taro-TOP what-hotpot-ACC ate-Q think-Q
'What$_i$ does Taro think that Hanako ate t_i?' [^{ok} matrix; *embedded]

This parallel behavior thus gives further credence to our claim that *wh*-compound questions are governed by the same rules and principles as regular *wh*-questions.

[3] Thanks to an anonymous reviewer for encouraging us to check this observation.

Secondly, it is acknowledged in the literature that varying degrees of unacceptability result when a certain class of operators such as negative polarity items, universal quantifiers and disjunctive phrases c-command an in-situ *wh*-phrase. Furthermore, this intervention effect won't surface when the *wh*-phrase in question undergoes scrambling out of the c-command domain of these interveners. Consider (21a, b).

(21) a. (*)John-ka Bill-ga nani-o tabeta-no?
John-or Bill-NOM what-ACC ate-Q
'What did John or Bill eat?'

b. Nani-o$_i$ John-ka Bill-ga t_i tabeta-no?
what-ACC John-or Bill-NOM ate-Q
'What did John or Bill eat?'

(21a) is ungrammatical because the in-situ *wh*-phrase *nani-o* 'what-ACC' remains in the c-command domain of the disjunctive phrase *John-ka Bill* 'John or Bill' as the intervener. This example is to be contrasted with (21b), where the same *wh*-phrase is scrambled out of the c-command domain of the disjunctive phrase to the sentence-initial position. Significantly, the same distribution is observed when the *wh*-phrase in (21a, b) is replaced with a *wh*-compound, *nani-nabe* 'what-hotpot', as illustrated by the contrast in grammaticality between (22a) and (22b), which is parallel to that between (21a) and (21b).[4]

(22) a. (*)John-ka Bill-ga nani-nabe-o tabeta-no?
John-or Bill-NOM what-hotpot-ACC ate-Q
'lit. [What-hotpot] did John or Bill eat?'

b. Nani-nabe-o John-ka Bill-ga tabeta-no?
what-hotpot-ACC John-or Bill-NOM ate-Q
'lit. [What-hotpot] did John or Bill eat?'

[4] An anonymous reviewer points out that the role of prosody should be examined for the intervention effect as well. Kitagawa et al. (2013) argue that the effect in question arises due to implicit prosody assigning illicit multi-focus intonation involving both a *wh*-phrase and an intervener. In a regular *wh*-question, the *wh*-phrase is focused and the rest of the sentence belongs to the background. However, according to Tomioka (2007), the intervenor itself is also likely to be interpreted as information focus because of its anti-topic nature (diagnosed by its inability to be marked with the topic *-wa*) and hence cannot comfortably be housed within the background. Kitagawa et al. conduct an experiment to show that the intervention effect is significantly reduced when the extra F_0 boost is removed from the intervener so as to maintain the ideal single focus intonation needed for a regular *wh*-question.

We agree that the grammatical status of the intervention effect is subject to the information-structural/prosodic constraints along the lines suggested by Kitagawa et al. (2013). Again, our point here is that *wh*-compound questions are subject to the same constraints in such a way that the acceptability of (22a, b) tracks that of (21a, b). In other words, the acceptability of all these examples increases when the disjunction phrase is read/parsed without the heightened F_0 pitch boost, an overt signal of focus prominence.

The parallels between compound and regular *wh*-questions with respect to the intervention effect run deeper. The intervention effect is known to be ameliorated in embedded questions (Tomioka 2007). This is illustrated with a regular *wh*-phrase, *nani-o* 'what-ACC', in (23a). Again, (23b), an example which involves the *wh*-compound, *nani-nabe* 'what-hotpot', also lacks the intervention effect in the embedded context.

(23) a. Mary-wa [$_{CP}$ John-ka Bill-ga nani-o tabeta-ato] dekaketa-no?
Mary-TOP John-or Bill-NOM what-ACC ate-after left-Q
'*What$_i$ did Mary leave after John or Bill ate t_i?'

b. Mary-wa [$_{CP}$ John-ka Bill-ga nani-nabe-o tabeta-ato] dekaketa-no?
Mary-TOP John-or Bill-NOM what-hotpot-ACC ate-after left-Q
'lit. [What-hotpot]$_i$ did Mary leave after John or Bill ate t_i?'

Finally, novel data concerning the additional *wh*-effect (Watanabe 1992; Saito 1994) provide further support for our current position that *wh*-compound questions are formed and interpreted in the same way as regular *wh*-questions in Japanese. This effect is illustrated in (24a, b). (24a) is a baseline example illustrating the *wh*-island violation (recall (16a)). Saito points out that this violation is somewhat ameliorated when an extra *wh*-phrase is added to the matrix clause, as shown in (24b).[5]

(24) a. (*)John-wa [$_{CP}$ Mary-ga nani-o tabeta-kadooka] siritagatteiru-no?
John-TOP Mary-NOM what-ACC ate-whether want.to.know-Q
'lit. What$_i$ does John want to know whether Mary ate t_i?'

b. John-wa [$_{CP}$ Mary-ga nani-o tabeta-kadooka] dare-ni tazuneta-no?
John-TOP Mary-NOM what-ACC ate-whether who-DAT asked-Q
'lit. Who$_i$ did John ask t_i whether Mary ate what?'

Wh-compound questions also exhibit the additional *wh*-effect. Examples in (25a, b) both involve the *wh*-compound *nani-nabe* 'what-hotpot'. The ungrammaticality of (25a) (though it is no doubt subject to the prosodic constraint sketched in footnote 5) shows that this compound exhibits the *wh*-island effect. Given this, the improved acceptability of (25b) indicates that the effect is lessened when an additional *wh*-phrase is added to the matrix clause, closing mirroring the similar improvement observed in (24b).

[5] An anonymous reviewer points out that they don't have any contrast between (24a) and (24b). Again, according to Deguchi and Kitagawa (2002: 83–85), this is due to the long EPD intonation that was also held responsible for the lack of the *wh*-island effect in (16a). As stated earlier, to the extent that the prosody-focus correspondence is mediated through syntactic structure, as argued by Deguchi and Kitagawa, the grammatical status of (24a) is immaterial to our present purposes. What matters instead is that the status of (24a) mirrors that of (25a) with respect to this additional *wh*-effect, whether it is influenced by a distinct prosody or not.

(25) a. (*)John-wa [$_{CP}$ Mary-ga nani-nabe-o tabeta-kadooka] siritagatteiru-no?
John-TOP Mary-NOM what-hot.pot-ACC ate-whether want.to.know-Q
'lit. [What-hotpot]$_i$ does John want to know whether Mary ate t_i?'

b. John-wa [$_{CP}$ Mary-ga nani-nabe-o tabeta-kadooka] dare-ni tazuneta-no?
John-TOP Mary-NOM what-hot.pot-ACC ate-whether who-DAT asked-Q
'lit. Who$_i$ did John ask t_i whether Mary ate [what-hotpot]?'

Our final argument that *wh*-compounds are accessible to regular syntactic operations and constraints is based on non-interrogative readings of such compounds. It has been widely known since Kuroda (1965) that *wh*-words in Japanese are indeterminate pronouns whose meanings may vary among an interrogative pronoun, an existential quantifier, a universal quantifier and a negative polarity item, depending on the type of particles (e.g., *no*, *ka*, *mo*) locally associated with them. Thus, (26a) illustrates the negative polarity use of *dare* 'who' triggered by the particle *mo*. Interestingly, the *wh*-compound in (26b) allows the same usage with this particle.

(26) a. Boku-wa dare-no zemi-mo ukenakatta.
I-TOP who-GEN seminar-MO didn't.take
'I didn't take anyone's seminar.'

b. Kono kizi-wa dare-toku-ni-mo naranai.
this article-TOP who-benefit-to-MO not.become
'This article does not benefit anyone.'

Examples in (27a–c) illustrate the availability of the universal quantifier reading of some *wh*-compounds. Furthermore, (28b) shows that the *wh*-compound, *darekasan-zemi* 'someone-seminar', may be used as an existential quantifier in the same way as the regular *wh*-phrase, *darekasan-no zemi* 'someone's seminar' is, as shown in (28a).

(27) a. Boku-wa kyoo-wa nani-ryoori-de-mo ii-yo.
I-TOP today-TOP what-cuisine-COP-MO good-SFP
'I am okay with [any-cuisine] for today.'

b. Kare-wa Azia-no gengo-nara nani-go-de-mo hanaseru-yo.
he-TOP Asia-GEN language-if what-language-COP-MO can.speak-SFP
'He can speak [any-language] as long as it is an Asian language.'

c. Kinkyuusaigaizi-wa doko-zyoohoo-mo amari ateninaranai.
emergency.disaster-TOP where-information-MO that.much unreliable
'In case of emergency and disaster, no [anywhere-information] is that reliable.'

(28) a. Boku-wa dare-ka-san-no zemi-dake-wa sindemo uketakunai.
I-TOP who-KA-TIT-GEN seminar-only-TOP even.if.I.die would.not.take
'I would not like to take someone's seminar even if it costs me my life.'

b. Boku-wa dare-ka-san-zemi-dake-wa sindemo uketakunai.
I-TOP who-KA-TIT-seminar-only-TOP even.if.I.die would.not.take
'I would not like to take [someone-seminar] even if it costs me my life.'

We take these examples as our additional argument for the internal syntactic visibility of *wh*-compounds for the purposes of determining the interpretation of indeterminates.

2.3 The Janus-Faced Profile of *Wh*-Compound Questions and the Ordering Paradox

Let us take stock of our findings thus far. On one hand, we have presented data on sequential voicing, the Compound Accent Rule and the impossibility of word-internal modification to show that *wh*-compounds are to be recognized as a real word-level unit in the Lexicon according to the central tenets of the LH. On the other hand, we have shown that this type of compound not only gives rise to a genuine *wh*-question licensed by the interrogative C head, yielding partial fragment answers targeting the *wh*-part of the compound alone, but also exhibits robust movement-sensitive restrictions such as island effects, intervention effects and additional *wh*-effects (albeit directly influenced by distinct prosodies affecting the varying range of acceptability of the relevant cases).

It is clear now that *wh*-compound questions simultaneously exhibit lexical wordhood and syntactic accessibility. This mutually conflicting mixture of the various properties of this type of question poses a serious challenge to the lexicalist conception of the syntax-morphology interface. To see theoretical implications of the above findings more clearly, let us consider below a sample of some representative definitions of the Lexical Integrity Principle proposed in the lexicalist literature.

(29) Principle of Lexical Integrity (Anderson 1992: 84)
The syntax neither manipulates nor has access to the internal structure of words.

(30) The Lexical Integrity Principle (Bresnan and Mchombo 1995: 181–182)
Specifically, the morphological constituents of words are lexical and sublexical categories – stems and affixes – while the syntactic constituents of phrases have words as the minimal unanalyzable units.

(31) The Atomicity Thesis (Di Sciullo and Williams 1987: 48–49)
Words are 'atomic' at the level of phrasal syntax and phrasal semantics. The words have 'features' or properties, but these features have no structure, and the relation of these features to the internal composition of words cannot be relevant in the syntax.

Given what one may call the 'feed-forward' view of the morphology-syntax interface within which the LH is traditionally defined, the acceptability of partial fragment answers as illustrated in (12A) and (13A) would be unaccounted for in a lexicalist theory, for a *wh*-compound, being a word-level unit in the lexicalist sense, should be atomic for syntax, a point clearly shared in the

three definitions of the Lexical Integrity Principle above. For the same reason, the left member of a *wh*-compound with its interrogative/existential/universal/negative polarity reading licensed by its local quantificational particles should not be able to serve as input for compounding, for this word formation is a lexical process in the pre-syntactic lexicon, but our findings above indicate otherwise. For these reasons, *wh*-compounds raise a real architectural ordering paradox for any version of the LH-driven conception of the syntax-morphology interface.

Note that the paradox occurs because the Lexicon is postulated in the lexicalist framework as an independent pre-syntactic module specifically dedicated to certain types of word formation such as compounding, thereby maintaining some version of the LH as a trafficking condition on the syntax-morphology connection. Capitalizing on this point, in the next section, we will seek for an alternative analysis of *wh*-compound questions within the DM framework, which attempts to dispense with the lexicalist Lexicon as an autonomous module feeding the computational component of syntax.

3 Renumerating *Wh*-Compound Questions: Toward the Re-definition of 'Word'

Our analysis of *wh*-compound questions is modeled after a DM-based analysis of phrasal compounds proposed by Sato (2010) and Harley (2011) (see also Carnie 2000). The reason for this analytical decision is that phrasal compounds exhibit essentially the same ordering paradox for the lexicalist theory of the syntax-morphology interface as do *wh*-compound questions so that a plausible analysis of the former should be informative for the kind of analysis needed for the latter.

In phrasal compounds, the first member is clearly formed in the syntactic component because its well-formedness is subject to regular syntactic rules and may be accessible to phrase-level interpretation. To see these points, consider (32–33).

(32) a. She had that [I'm-so-proud-of-myself] look.
b. *She had that [myself-is-so-proud-of-me] look.

(Bruening 2018: 3)

(33) a. [Charles-and-Di syndrome] died when she died.
b. He baked me [a sweet I-love-you-cake], but I don't think he really does.

(Bruening 2018: 7)

(32a) contains a well-formed phrasal compound because the lefthand member of the compound, *I'm so proud of myself*, is itself well-formed. This is not the case in (32b) because the first constituent of the attempted phrasal compound, *Myself is proud of me*, is ungrammatical. The examples in (33a, b) show that a subpart of a phrasal compound is accessible by anaphoric processes. In (33a), the underlined part of the compound can be referred back to by the pronoun *she*. In (33b), the underlined part of the compound works as an antecedent for the verb phrase

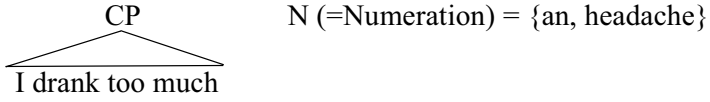
ellipsis in the subsequent clause to yield the sloppy reading that the speaker does not think that he really loves them.

3.1 Sato's (2010) DM-Based Analysis of Phrasal Compounds based on Renumeration

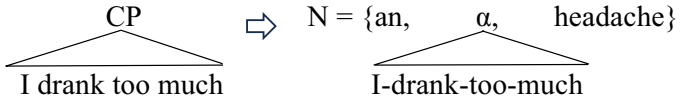
Sato (2010) proposes a syntactic analysis of phrasal compounds in line with the basic tenets of the DM framework which draws on a combination of Johnson's (2004) conception of renumeration with Uriagereka's (1999) multiple spell-out model of syntax. Sato proposes that a spelled-out structure is returned to the syntactic derivational workspace as a derived simplex lexical item or "giant lexical compound" (see section 3.2 for a more detailed exposition of Uriagereka's model). To see how his analysis works, consider his DM-style derivation of the phrasal compound, *an I-drank-too-much headache*, depicted in (34a–c).

(34) Deriving the Phrasal Compound, *[an-[[I-drank-too-much]] headache]]]*

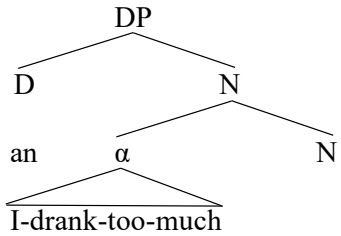
a. **Assemble CP:**



b. **Spell-Out & Renumerate CP:**



c. **Merge α with N and then with D:**

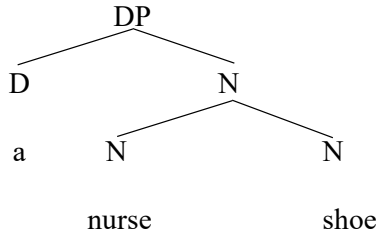


In (34a), the CP is assembled by successive applications of Merge (and Move). The CP so assembled then undergoes early spell-out and is returned to the numeration as a syntactic treelet, as show in (34b), following Johnson's (2004) theory of renumeration. We assume here that the Spell-Out operation in (34b) is triggered by the C phase head, as standardly assumed (Chomsky 2000; 2001; 2004; 2008).[6] The renumerated item is now plugged into the syntactic workspace

[6] An anonymous reviewer points out that our analysis predicts there to be examples of *v*P phasal compounds as well, given the standard assumption that *v*P is also a phase. This prediction seems to be borne out by cross-linguistically attested examples as in (ia–c).

as a derived lexical item – call it α – as depicted in (34c). The resulting syntactic object merges with N and D in that order to yield the phrasal compound, as desired, without causing any ordering paradox. It is crucial to note that this non-lexicalist 'single-engine' analysis allows for a unified treatment of phrasal compounds and regular nominal compounds such as *a nurse shoe*, as indicated in its syntactic derivation in (35).

(35) Deriving the Nominal Compound, *[a [nurse shoe]]*



Before closing this section, let us address a potential mechanical issue regarding our proposed approach to phrasal compounding. An anonymous reviewer observes that renumeration, as it is, is such a powerful mechanism that it has the risk of potential overgeneration. For example, the reviewer notes that examples like *I had a [This-is-a-damn-fucking-end-of-the-world][I-drank-too-much] headache]* would be freely generated by our system. As stated at the beginning of section 3, a phrasal compound is subject to regular syntactic rules in the sense that its non-head member itself must be a well-formed expression. The two clausal modifiers in the example above are grammatical expressions. We suspect that the example itself is grammatical, but is felt unacceptable due to independent extra-grammatical constraints imposed on phrasal compounds. One such constraint is that the non-head member of a phrasal compound typically has a quotative flavor (Wiese 1996; Harley 2011). This constraint presumably serves to ensure that only one quotative CP can be combined with a single compound head noun such as *headache*. This point is evidenced by the fact that the felt unacceptability of the original example can be removed in the modified version, *I had a [This-is-a-damn-fucking-end-of-the-world-so-I-drank-too-much] headache],* where the head noun is modified by a single clausal expression used as a quotative phrase. We will further show later in this paper that multiple spell-out and renumeration are

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(i) a. $[_{N}\ [_{VP}$ wait and see] attitude]]

b. $[_{N}\ [_{VP}$ qie cai] tao]]
cut vegetable knife
'vegetable knife' (Mandarin Chinese: Biberauer et al. 2009: 5, their (18))

c. $[_{N}\ [_{VP}$ in den Mund nehm] Spiel]
in the mouth take game
'take-into-the-mouth-game' (German: Wiese 1996: 184)

See also discussion below (37) and footnote 10 for an independent argument that the non-head member of a phrasal compound corresponds to a phasal unit (CP, *v*P and DP).

triggered by a phasal unit – CP, *v*P and DP. For these reasons, we contend that potential cases of overgeneration created by renumeration are to be excluded/disfavored by independently known syntactic conditions (e.g., phasehood of non-head elements of a phrasal compound) as well as extra-syntactic semantic/pragmatic restrictions (e.g., the quotative nature of those elements).

3.2 Renumerating *Wh*-Compound Questions in Japanese

Having outlined the DM-based solution to the ordering paradox raised by phrasal compounds, we are now in a position to develop our analysis of *wh*-compound question formation in Japanese. We will show how our analysis can successfully accommodate syntactic accessibility/penetrability of *wh*-compound questions through regular syntactic processes while at the same time deriving their "lexical" effects through early spell-out and renumeration.

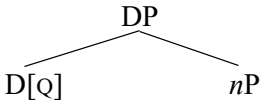
Consider the step-by-step derivation, shown in (37a–d), of the phrasal compound *nani-nabe* 'what-hotpot' in (13), repeated here as (36).

(36) Q: Kimi-wa nani-nabe-o kinoo tabeta-no?
you-TOP what-hot.pot-ACC yesterday ate-Q
'lit. You ate [what-hot.pot] yesterday?'

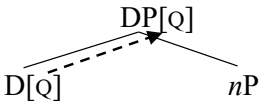
A: Kimuti-(nabe) da-yo.
Kimchi-hot.pot COP-SFP
'a Kimchi hotpot'

(37) Deriving the *Wh*-Compound Question in (35Q)

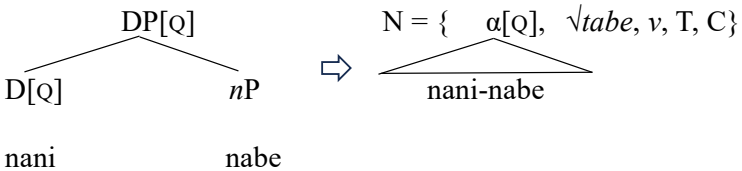
a. **Merge √*nabe* with *n* and D [Q] :**



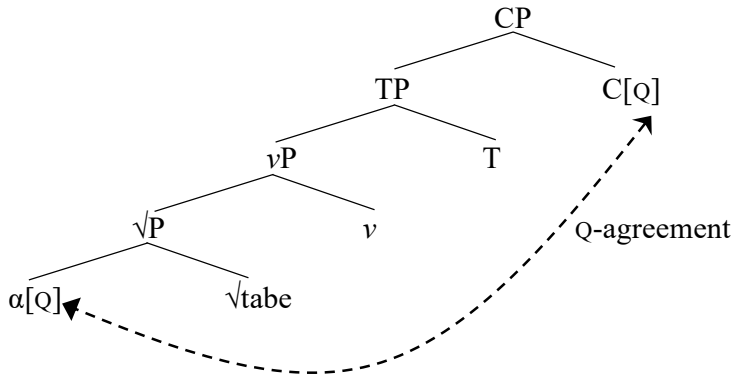
b. **Percolation of the [Q] feature onto the DP:**



c. **Spell-Out and Renumerate the DP:**



d. **Merge α with √*tabe*, *v*, T, and C plus agreement between α and C**



The DP *nani-nabe* 'what-hotpot' is assembled first, as shown in (37a). Suppose, following Kageyama (1993: 337, 338), that the [Q] feature optionally undergoes percolation from the original D head onto its dominating DP, as indicated in (37b). The DP structure is subsequently spelled-out early and renumerated, as depicted in (37c). In this example, the entire *wh*-compound is nominal. Thus, it is reasonable to assume that it forms a DP phase (Svenonius 2004; Chomsky 2008) and undergoes early spell-out and renumeration for this reason. After this renumeration process, the syntactic treelet is returned to the derivational workspace as a derived terminal node α with the [Q] feature and successively merged with √*tabe*, *v*, T, and C. This step is followed by Q-agreement between α and the interrogative C. This series of derivational steps thus yields the regular *wh*-interrogative reading for (36Q).[7]

As shown in (36A), it is possible to omit part of the compound as a grammatical reply to the *wh*-compound question. As noted by an anonymous reviewer, it is expected that early spell-out and renumeration should make the whole compound atomic and indivisible with the wrong outcome that the truncated response just answering the non-head *wh*-part of the compound should be inaccessible. We agree with the reviewer that our system only allows the full-fledged answer *kimuti-nabe* 'Kimchi hotpot' as part of the renumeration/atomization process. We maintain that the shorter answer is derived through left-peripheral string deletion, a PF-deletion process independently developed for Japanese/Korean by Mukai (2003), An (2016; 2019) and Sato and Maeda (2018; 2019) (see also Weir 2012) which deletes a non-constituent part of an XP under the condition of string identity: we will come back to a detailed discussion of this analysis when

[7] As pointed out by an anonymous reviewer, the concept of Numeration has been discarded at least since Chomsky (2004), so one may wonder how Renumeration fits in more contemporary minimalist theorizing. This is only a terminological choice, following the proposals developed by Johnson (2004) and Uriagereka (1999). The intuition that this operation is designed to capture is simply that a certain mid-derivational syntactic object such as DP is assembled first though multiple applications of Merge and Move in one derivational space before the resulting object participates in further computations in another separate derivational space. The notion of Numeration thus has no essential role to play in our present analysis.

we compare it with Kimura and Narita's (2021; 2023) analysis in section 4. According to this analysis, the partial answer is derived as shown in (38).

(38) Q: Kimi-wa nani-nabe-o kinoo tabeta-no?
you-TOP what-hot.pot-ACC yesterday ate-Q
'lit. You ate [what-hot.pot] yesterday?'

A: Kimuti-~~nabe~~ da-yo.
Kimchi-hot.pot COP-SFP
'a Kimchi hotpot'

Note that, as noted by Nishigauchi (1986; 1990), some such ellipsis process seems independently necessary to derive the shorter answer form in (39A2) from the basic response in (39A1) to the complex NP *wh*-question in (39Q), which Nishigauchi analyzes as involving large-scale pied-piping preceded by percolation of the Q-feature from the *wh*-word *nani* 'what' to the nominal layer dominating the relative clause.

(39) Q: Kimi-wa kinoo $[_{\mathbf{NP[+Q]}}$ $[_{CP}$ nani-$o_{[+Q]}$ tabeta]-hito]-ni atta-no?
you-TOP yesterday what-ACC ate-person-DAT met-Q
'intended: What is the thing x such that you met the person yesterday who ate x?'

A1: Kimti-nabe-o tabeta-hito da-yo.
Kimchi-hot.pot ate-person COP-SFP
'It is the person who ate Kimchi-hotpot.'

A2: Kimuti-nabe da-yo.
Kimchi-hot.pot COP-SFP
'It is Kimchi-hotpot'.

A defender of the lexicalist theory might say that a similar analysis like ours could be replicated in a pre-syntactic lexical component if certain properties of the components of a *wh*-compound could be inherited by the derived word through mechanisms like percolation. Such an analysis would work for simplex *wh*-compounds as in (36Q) whose constituent part consists of a word-level unit such as *nani-nabe* 'what-hotpot', but it would not work for complex *wh*-compounds which involve what is clearly the product of the syntactic derivation and hence cannot be analyzed as a word-level lexical expression. The expression marked by the wavy line in (40) is a case in point, for this structure involves not only a relative clause structure but also conjunction indicated by the continuative copula *de*. Multiple *wh*-compound questions as shown in (3Q), repeated here as (41), illustrate the same point.[8]

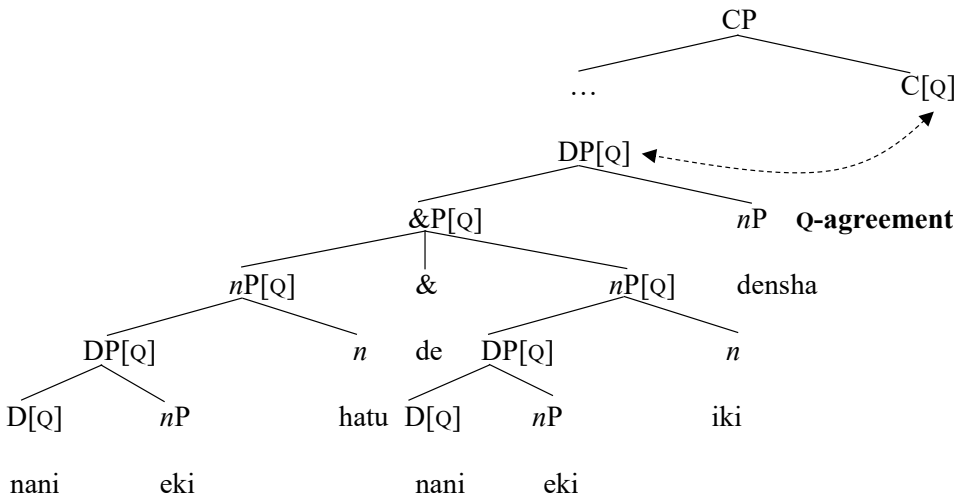
[8] As mentioned in section 2.2.1, Kimura and Narita (2023:200–204) develop another argument against the lexicalist analysis of *wh*-compound questions based on different accentuation patterns between the short answer (i.e., *Kimuti-nabe* 'Kimchi hotpot') and the shorter answer (*Kimuti* 'Kimchi') to the *wh*-compound question in (36Q). Such an

(40) Kore-tte [[nani-eki-hatu-de nani-eki-iki] densha] na-no?
this-TOP what.station-leaving-COP.CONJ what.station-going train COP-Q
'intended: Which station does this train depart from and leave for?'

(41) Rio-tyan-te Keio-daigaku nani-gakubu nani-gakka
Rio-TIT-TOP Keio-University what-faculty what-department
dare-zemi-kiboo-nan-da-kke? (=(3Q))
who-seminar-wish.for-Q-COP-SFP
'intended: Rio, [who-seminar] of [what-department] from [what-faculty] do you wish to get enrolled for at Keio University?'

Our current percolation-based system can be extended to account for multiple *wh*-compound questions like (40) and (41) as well. Consider the relevant part of the syntactic derivations for the complex *wh*-compound in (40), shown in (42).[9]

(42)



analysis would require that the compound accent initially associated with *Kimuti* (LLL) as part of the compound should later be overwritten with its original lexical accent (HLL), clearly an undesirable situation. They propose instead (see also Nishiyama 2017:169 and Kimura and Narita 2021:201), adopting the late insertion theory of ellipsis, that accent assignment applies after the syntactic derivation is completed: the short answer *Kimuti*, standing alone, receives its lexical accent (HLL) because the structural description for the Compound Accent Rule no longer applies with the deletion/non-realization of the head element *nabe*.

[9] I thank an anonymous reviewer for bringing this question up. The reviewer's original examples are shown in (ia, b), but we will just use (40) for illustration.

(i) a. Doko-hatu doko-iki-no densha-ni notta-no?
where-leaving where-going-GEN train-on took-Q
'lit. You took a [leaving-where and bound-for-where] train?'

b. Doko-doko-kan-no sinkansen-ni notta-no?
where-where-between-GEN bullet.train-on took-Q
'lit. You took a [between where and where] train?'

In this derivation, the whole compound headed by the noun *densha* 'train' takes the coordination structure as its lefthand member, which in turn is composed of two *wh*-compounds, *nani-eki hatu* 'leaving what-station' and *nani-eki iki* 'bound for what-station'. The [Q]-features originate in the respective interrogative D-heads and are pumped up successively from the heads all the way up to the upmost DP headed by *densha* 'train', as indicated in (42). The DP undergoes early spell-out and is returned to the main derivational workspace as a derived lexical item with the Q-feature as its topmost label. The multiple *wh*-interrogative reading is correctly obtained from this derivation when this item enters into Q-agreement with the interrogative C head *no*. The reader can verify that a similar analysis holds true for the triple *wh*-compound shown in (41) via successive Q-feature percolation.

3.3 The Janus-Faced Nature of *Wh*-Compound Questions

Let us now see how the hybrid nature of *wh*-compound question formation can be accommodated in our present system. On one hand, the cluster of syntactic properties noted in section 2.2 manifest themselves because this type of question is derived in the syntax in accordance with regular syntactic principles that also regulate regular *wh*-question formation, including island/intervention/additional *wh*-effects.

On the other hand, the 'lexical' or "word-like" properties associated with this type of question noted in section 2.1 can be derived as a side effect of the derivational step depicted in (37c) where the compound constituents undergo spell-out mid-derivationally and renumeration before they are returned to the computational workspace as a simple derived item. The set of syntactic objects generated this way, we argue, corresponds to the lexical notion of 'word'. Let us elaborate on this hypothesis below as it is directly relevant to our position on how to derive word-level effects from syntactic objects.

Within Uriagereka's (1999) conservative version of the multiple spell-out system, once a complex syntactic object is spelled-out, the internal structure of the object is destroyed with its terminal nodes already linearized, attaining the status akin to a 'giant lexical compound' by the time when it re-enters the syntactic derivation. The derivation thus manipulates it not as an internally complex object but as an atom, though its syntactic terms are interpretable at the semantic/phonological components.[10] To quote Uriagereka himself:

[10] As pointed out by an anonymous reviewer, Uriagereka's (1999) theory was based on his attempt to relate multiple spell-out to linearization in the sense of Linear Correspondence Axiom/LCA (Kayne 1994), but our analysis assumes right-headed head final order for Japanese *wh*-compound questions, contrary to the prediction of the LCA. This paper assumes that the application of renumeration is independent from LCA and is triggered by the introduction of a phase unit – CP, *v*P and DP. Indeed, as shown in (34), (37) and footnote 6, the non-head member of a phrasal compound corresponds to one of these units. Note furthermore that Johnson's theory of renumeration, designed to account for adjunct islands, is also independent from considerations of the LCA.

> The conservative proposal is based on the fact that the collapsed Merge structure is no longer phrasal, after Spell-Out; in essence, the phrase marker that has undergone Spell-Out is like a giant lexical compound, whose syntactic terms are obviously interpretable but are not accessible to movement, ellipsis, and so forth…
>
> In the conservative version, the spelled-out phrase marker behaves like a word, so that it can associate with the rest of the structure; this means it must keep its label after Spell-Out. Technically, if a phrase marker {α, {L, K}} collapses through Spell-Out, the result is {α, <L, K>}, which is mathematically equivalent to {α, {{L}, {L, K}}}. Since this object is not a syntactic object, it clearly can behave as a "frozen" compound. As a consequence, we need not add any further stipulations: the collapsing procedure of Spell-Out itself results in something akin to a word.
>
> (Uriagereka 1999: 256–257)

Our hypothesis is that the set of atoms derived through this spell-out + renumeration procedure form candidate input for a speaker's mental lexicon, a storage point that is unavoidable to postulate in some way regardless of whether we adopt some version of the lexicalist or non-lexicalist position of the syntax-morphology interface. Accordingly, all so-called 'lexical' effects associated with "word" observed in section 2 (sequential voicing, compound accent and the ban on word-internal modification: see section 3.4 for our clarification on the last profile) may be reanalyzed as the results of post-syntactic phonological processes applying to the renumerated atoms at the PF interface. This hypothesis is further substantiated by the observation that 'lexical' effects are always morphophonological; there is no such effect which would bring about changes in, say, word order or syntactic transformation, at the syntactic level. Take sequential voicing, for instance. Our current hypothesis leads to the view that this is a post-syntactic process that can apply to a spelled-out/renumerated items. Indeed, this view seems plausible, for a native Japanese speaker can correctly apply sequential voicing to the "off-the-cuff" type of *wh*-question compounds as in (43a, b) on the fly (see Kawahara 2012 for a relevant discussion on sequential voicing on nonce compounds), subject to known constrains on this morphophonological process, including Lyman's Law, which states that it is blocked by a voiced construent within the second element of a compound, as shown in (44a, b).[11]

[11] An anonymous reviewer wonders whether examples like (5a, b)/(44a, b) are also formed by spell-out and renumeration. As our focus is on the formation of *wh*-compounds, all we can say at this point is that those syntactic units created through spell-out and remuneration can be input for sequential voicing, but we are agnostic as to whether the archetypical compounds must also receive the same treatment. However, given our current view adopting Sato's (2010) insight that phrasal compounds and *wh*-compounds are both derived in the same way as regular word-level compounds (e.g., *nurse shoe*) strictly within the syntactic derivation, as per the DM's single-engine hypothesis, the null hypothesis should be that the examples in (5a, b)/(44a, b) are to be analyzed as a post-syntactic morphophonological phenomenon. We won't have anything more substantive to say about this question, and hence must leave this question open in this paper.

(43) Sequential voicing under *wh*-compound questions

a. Kimi-wa [dono-kuni-syussin-no donna-hito-**g**onomi] na-no?
you-TOP which-country-from-GEN what-person-taste COP-Q
'Lit. You have a [what-kind-of-person-from-which-country-taste]?'

b. Keisatu-wa [itu-no dono-hito-**g**orosi-no hannin-o] otteru-no?
police-TOP when-GEN which-person-killing-GEN culprit-ACC chasing-Q
'Lit. The police are searching for the [which-person-from-when-killing] culprit?'

(44) a. yama + **k**azi → yama**k**azi *yama**g**azi
'mountain' 'fire' 'mountain fire'

b. yama + **k**asi →* yama**k**asi, yama**g**asi
'mountain' 'rental' 'mountain rental'

More broadly, one implication of our proposal is that it launches a new DM-compatible system to derive 'wordhood' using technology of minimalist syntax without invoking the lexicalist notion of 'word'. There is no denying that there are some non-eliminable morphological/phonological processes such as sequential voicing, compound accent, but at least we do not need a lexical component dedicated for forming words in the lexicalist sense. This point cannot be emphasized enough, for, to the best of our knowledge, the issue how 'wordhood' arises in such a framework like the DM, which otherwise aims to dispense with an autonomous module for word formation, has not received attention in the DM literature (see also section 4 for a related discussion on this point, where we review Kimura and Narita's (2023) recent DM-analysis of *wh*-compound questions). According to our system, 'word' in a language *L* may be reconceptualized partially in terms of "possible spell-out domains" or phase units in *L* whereas 'wordhood' in L is an epiphenomenal consequence of certain characteristic morphophonological rules applying to renumerated items in *L* on a language-particular basis.

3.4 The Ban on Word-Internal Modification Revisited

In this section, we address one remaining question with our analysis of *wh*-compound question. Recall from section 2.1 that we have observed that *wh*-compounds obey the ban on word-internal modification, as illustrated in (11a–c), repeated here as (45a–c).

(45) a. dare-(*__tyoo__)-toku
who-exceedingly-benefiting
'intended: benefiting-who-exceedingly'

b. nani-(*__oo__)-nabe
what-big-hot.pot
'intended: what-big.hotpot'

c. doko-(*ura)-zyoohoo
where-secret-information
'intended: from-where secret information' (Harada 2014: 26)

The question facing us now, then, is how our theory should block such examples. For instance, nothing in our system appears to block the sequence of syntactic derivation where the noun *nabe* 'hotpot' merges with the adjective *oo* 'big' and the resulting syntactic object, in turn, merges with the interrogative D head *nani* 'what'. This sequence should yield *nani-oo-nabe* 'what-big.hotpot', a result that seems unacceptable as shown in (45b), as reported by Harada (2014).

We actually do not think that there is any need to block such examples from being freely generated in the present DM model, however. In fact, we venture that such examples are completely grammatical and that their alleged ban on word-internal modification are explained away by independent extra-grammatical encyclopedic knowledge of the roots involved in *wh*-compound formation. For example, *nabe* itself is ambiguous between a pan (a cooking utensil) and a cuisine (a type of food served), but once it is modified by some scaler adjectives such as *ookii* 'big', it may only yield the former reading because of its idiosyncratic selectional restriction on the type of its modifiees: a pan may or may not be big, but a cuisine certainly cannot. This observation is illustrated in (46a).

(46) a. oo-nabe 'big pot' (a pan; #a cuisine)
big-pot

b. #Kimuti-oo-nabe 'intended: Kimchi-big-hotpot'
Kimchi-big-pot

It follows then that merging *nani* 'what' and *oo-nabe* 'big pot' as a *wh*-compound and asking for the identity of the kind of cuisine results in semantic anomaly, as shown in (46b), though the compound itself is grammatical as far as its syntactic derivation goes.

Our position that the perceived unacceptability of (45b)/(46b) is due to encyclopedic knowledge of the lexically ambiguous root √*nabe* is further supported by the following observation. In a restricted range of cultural contexts, this root can actually be used exceptionally to specify the name of a local cuisine as long as the cuisine is widely known to be served using a large-sized pan. One such case is shown in (47), where *oo-nabe* 'big pot' combines with *imoni* 'taro and meat soup' to yield *imoni-oo-nabe* '[taro-and-meat-soup]-big-hotpot'.

(47) Kinoo Yamagata-de [imoni-oo-nabe]-o itadaki-masi-ta.
Yesterday Yamagata-in taro.and.meat.soup-big-hotpot-ACC eat-POL-PST
'Yesterday, I enjoyed a [[taro-and-meat-soup] big hotpot] in Yamagata.'

A similar characterization applies to (45a) and (45c). Consider (48a, b).

(48) a. Sore-tte ittai [doko-soosu-zyoohoo] na-no?
that-TOP on.earth where-source-information COP-Q
'intended: That is [[where-is-the-source] information]?'

b. Kappuru-metya-toku tabi-puran
couple-exceedingly-benefitting travel-plan
'intended: a [[couple-exceedingly-benefitting] travel plan]'

(48a) illustrates a *wh*-compound headed by *zyoohoo* 'information' separated from a *wh*-word by an intervening modifier, *soosu* 'source'. We did not manage to find a *wh*-compound akin to (45a), but there are some attested examples as in (48b), where the two members of the compound, *kappuru* 'couple' and *toku* 'benefit', are disrupted by a degree modifier, *mettya* 'exceedingly', but the result is completely acceptable.

4 Kimura and Narita's (2023) DM-Analysis of *Wh*-Compound Questions

In this section, we will compare our proposed analysis of *wh*-compound questions with Kimura and Narita's (2023) analysis, which builds itself upon the focus-inclusive in-situ deletion approach to this question originally developed by Kimura and Narita (2021). They observe that the *wh*-compound question in (49A) can be answered with the fragment answer shown in (49A1), but not that shown in (49A2).

(49) Q: Minna-wa interia-o [[$_{N1}$ dare]-[$_{N2}$ gonomi]]-no soosyoku-ni sita no?
everyone-TOP interior-ACC who taste-GEN decoration-DAT did Q
'lit. [Who-taste] decorations did everyone put up in the/their interior?'

A1: Hito-ri-musume (da/desu).
one-CLF-daughter COP/COP.POL
'(The/their) only daughter(s).'

A2:* Musume hito-ri (da/desu).
daughter one-CLF COP/COP.POL
'One (of the/their) daughter(s).'

(Kimura and Narita 2021: 195, 196)

Their crucial observation here is that the availability/relative acceptability of the fragment answer option mirrors that of the full-fledged non-elliptical compound answer. Thus, (49A1) is acceptable as a truncated reply to (49Q) because (50A1) is; conversely, (49A2) is not acceptable in the same context because (50A2) isn't.[12]

[12] Kimura and Narita (2021:197, cf. 2023:191) attribute the ungrammaticality of (50A2) to a lexical integrity effect, namely, "the general tendency to avoid phrasal constituents within compounds (e.g., Di Sciullo and Williams 1987)." We will come back to this proposal later in this section.

(50) A1: … [[hito-ri-musume]-gonomi]-no soosyoku-ni sita (no da/desu).
one-CLF-daughter-taste-GEN decoration-DAT did COMP COP/COP.POL
'lit. Everyone put up [[only-daughter]-taste] decorations in the/their interior.'

A2:* …[[musume hito-ri]-gonomi]-no soosyoku-ni sita (no da/desu).
daughter one-CLF-taste-GEN decoration-DAT did COMP COP/COP.POL
'lit. Everyone put up [[one of the/their daughter(s)]-taste] decorations in the/their interior.'

(Kimura and Narita 2021: 196)

They claim that this correspondence between the truncated fragment response and its full-fledged variant to the same *wh*-compound question supports the generalization in (51).

(51) Kimura and Narita's (2021: 198; 2023: 190) Generalization
For *wh*-questions with a compound $[_N$ W-Y$]/[_N$ Y-W], W a *wh*-word and Y a N(oun), the felicity of the fragment answer X (*da/desu*) correlates with the availability of a compound $[_N$ X-Y$]/[_N$ Y-X].

Kimura and Narita argue that this generalization is straightforwardly captured if the fragment answer replies as in (49A1, 49A2) are derived from the structurally isomorphic non-elliptical sources as in (50A1, 50A2) through the in-situ deletion analysis, whereby all nonfocused (and hence recoverable) materials undergo ellipsis except the focused fragment, as schematically represented in (52a, b), respectively.

(52) a. …[$[_F$ hito-ri-musume]-~~gonomi]-no~~ ~~soosyoku-ni~~ ~~sita~~ ~~(no~~ ~~da/desu).~~
one-CLF-daughter-taste-GEN decoration-DAT did COMP COP/COP.POL

b.*…[$[_F$ musume hito-ri]-~~gonomi]-no~~ ~~soosyoku-ni~~ ~~sita~~ ~~(no~~ ~~da/desu).~~
daughter one-CLF-taste-GEN decoration-DAT did COMP COP/COP.POL

Updating their 2021 analysis within the DM model through the Non-insertion Hypothesis for Ellipsis (Wilder 1997; Saab and Lipták 2016; Sailor 2021; Saab 2022), according to which ellipsis/deletion amounts to non-insertion of any vocabulary item/exponent on the terminal nodes of an ellipsis site, Kimura and Narita (2023) further show that their DM-based analysis correctly captures the preservation of the lexical, not the compound, accent of the fragment answer as pointed out in section 2.2.1 and footnote 8 (i.e., *Kimuti* 'Kimchi' as the fragment answer has the lexical accent, not the compound accent.).

As two anonymous reviewers independently point out, there are non-trivial similarities between our proposed analysis and Kimura and Narita's analysis of *wh*-compound questions. They both frame their analyses within the DM framework and assume that the fragment answer is derived though some version of the in-situ-deletion with reference to optional feature percolation. However, our analysis does provide a novel perspective on two important issues revolving around this construction related to a) the technical mode of ellipsis/deletion involved

and b) the origin of so-called wordhood/lexicality and its compatibility with the basic tenets of the DM model. We will elaborate on these issues in the rest of this section.

4.1 The Adequacy of Generalization (51) and the Nature of In-Situ Deletion

The first issue concerns the empirical robustness of the generalization in (51) and its implications for the exact nature of the in-situ deletion process involved in deriving a fragment answer to a *wh*-compound question. Example (53) from Kimura and Narita (2021) shows that the *wh*-compound question *nani-ya* 'what-store' cannot be answered with *hana* 'flower' without the accompanying morpheme *-ya* 'store'.

(53) Q: Sore, nani-ya-(san)-de katta no?
that what-store-HON-LOC bought Q
'lit. At the [what-store] did you buy that?'

A: Hana-*(ya-(san)) (da/desu).
flower-store-HON COP/COP.POL
'A flower shop'

(Kimura and Narita 2021: 198)

This pattern runs counter to (51) because the felicity of the fragment answer does not correlate with the availability of its full-fledged base compound. Kimura and Narita (2021:197) qualify regarding (51) that X cannot stand alone as a fragment answer when Y is a bound morpheme presumably because Y is morphologically too dependent on X so that focus marking on X must percolate onto the entire compound. Note, however, that the building blocks of compounds, being a bound root, are always bound morphemes by definition. Thus, *konomi/gonomi* 'taste' is treated as a bound root when positioned in a compound structure in the same way that *ya* 'shop' is. Thus, this bound-morpheme proviso cannot correctly capture the contrast between (49A1) and (53A) with respect to the grammaticality of the fragment answer option.

The same constraint is also called into question by the impossibility of the fragment answer in (54A2).

(54) Q: Hanako-tte nani-zyoozu na-no?
Hanko-TOP what-good.at COP-Q
'lit. Hanako is [good at-what]?'

A1: Home-zyoozu desu-ka-ne.
praise-good.at COP.POL-SFP-SFP
'lit. Hanako is [good at-praising].'

A2: *Home desu-ka-ne.
praise COP.POL-SFP-SFP
'intended: Hanako is [good at-praising].'

The question in (54Q) involves the *wh*-compound *nani-zyoozu* ‘good at-what’; its compound status can be verified by the fact that it exhibits a compound stress pattern with a single accent pitch, as opposed to two lexical accents. The examples in (54A1, 54A2) show that the fragment response *home* ‘praising’ is ill-formed even though the full-fledged compound answer, *home-zyoozu* ‘good at-praising’, is well-formed. Again, one might argue that *zyoozu* in a compound structure is a bound morpheme, but we counter that *konomi/gonomi* must be one by the same token.

Suppose, then, for the sake of argument that there is some well-defined criterion of “bound morpheme” that we can use in non-compound environments by which morphemes such as *ya* ‘shop’ and *zyoozu* ‘good at’ are bound whereas morphemes such as *konomi* ‘taste’ are not. Indeed, the former cannot stand on their own (e.g., **dare-no ya* ‘intended: whose shop’) but the latter, in principle, can elsewhere (e.g., *dare-no konomi* ‘whose taste’). However, this view of boundedness is doomed to failure, considering the ungrammaticality of the fragment answer in (55A2), which involves *daigaku* ‘university’, a free morpheme in a non-compound context (e.g., *dare-no daigaku* ‘whose university’).[13]

(55) Q: Kimi-tte nani-daigaku-sotu da-kke?
you-TOP what-university-graduate COP-SFP
‘lit. [Which-university-graduate] are you? Can you remind me?’

A1: Hiroshima-daigaku desu.
Hiroshima-university COP.POL
‘I am a graduate from Hiroshima University.’

A2:*?Hiroshima desu.
Hiroshima COP.POL
‘intended: I am a graduate from Hiroshima University.’

[13] Our report here reflects the acceptability judgements of 30 Japanese native speakers we have consulted in December 2024. 12 of them did note that (55A2) can be felt only slightly marginal, but we suspect that it is not because it is derived through the full compound answer in (55A1), but instead that they interpret the short response as Hiroshima University through synecdoche (with the hypernym *Hiroshima* including *Hiroshima University* as one of its hyponyms). Indeed, when we use a university name for which this sort of part-whole relation is impossible to come up with, e.g., *Ryukyu-daigaku* ‘University of the Ryukyus’ as one of the hyponyms of Okinawa, the short answer is deemed completely ill-formed even by those 12 speakers, as shown in (iA2):

(i) Q: same as (55Q)
A1: Ryukyuu-daigaku desu.
University.of.the Ryukyus COP.POL
‘I am a graduate from the University of the Ryukyus.’

A2: *Ryukyu desu.
Ryukyu COP.POL
‘intended: I am a graduate from the University of the Ryukyus.’

These considerations suggest that the correspondence between the (un-)availability of a fragment answer and that of its full-fledged variant to a *wh*-compound question is not as robust as claimed by (51). This result, in turn, undermines Kimura and Narita's version of the in-situ deletion analysis based on focus marking which is based on the generalization.

We hypothesize instead that the availability of the fragment answer X based on the [X-Y] compound is better predicted by whether X can grammatically occur in a gapped clause. Of significance here is that the acceptability/relative degree of the acceptability of the fragment answer option in (49A1), (53A), (54A2) and (55A2) corresponds to that of the surviving part of the compound after gapping has taken place in the initial clause in (56A), (57A), (58A) and (59A), in that order. For instance, the fragment answer option in (49A1) is grammatical when the non-head member of the compound can survive gapping as in (56A). Conversely, the fragment answer option in (54A2) is degraded when the non-head member of the compound cannot survive gapping as in (58A).

(56) Q: Kimitati-wa interia-o dare-gonomi-no soosyoku-ni sita no?
you.guys-TOP interior-ACC who-taste-GEN decoration-DAT did Q
'lit. [Who-taste] decorations did you guys put up in the/their interior?'

A: Boku-wa hito-ri-musume, kare-wa hahaoya-gonomi-no decoration-DAT sita yo.
I-TOP one-CLF-daughter he-TOP mother-taste-GEN soosyoku-ni did SFP
'I decorated my interior to the only daughter's taste, and he decorated his interior to the mother's taste.'

(57) Q: Kimitati-wa kinoo nani-ya-(san)-de kaimono-o sita no?
you.guys-TOP yesterday what-store-HON-LOC shopping-ACC ate Q
'At [what-shop] did you do shopping?'

A: *Boku-wa hana, kare-wa zakka-ya-de kaimono-o sita-yo.
I-TOP flower he-TOP variety-store-at shopping-ACC did-SFP
'I did shopping at a flower shop, and he did shopping at a variety store.'

(58) Q: Hanako-to Miki-tte nani-zyoozu na-no?
Hanko-and Miki-TOP what-good.at COP-Q
'lit. Hanako and Miki are [good at-what]?'

A: *Hanako-wa home, Miki-wa hanasi-zyoozu desu-ka-ne.
Hanako-TOP praise Miki-TOP talk-good.at COP.POL-SFP-SFP
'lit. Hanako is [good at-praising], and Miki is [good at-talking].'

(59) Q: Kimi-tati-tte nani-daigaku-sotu da-kke?
You-PL-TOP what-university-graduate COP-SFP
'lit. [Which-university-graduate] are you guys? Can you remind me?'

A:*?Boku-wa Hiroshima, kare-wa Kobe-daigaku desu.
I-TOP Hiroshima he-TOP Kobe-university COP.POL
'intended: I am a graduate from Hiroshima University, and he is a graduate from Kobe University.'

The new gapping/fragment answer correspondence above is exactly what we predict if the deletion process responsible for the short reply to a compound question is string-deletion, a process independently motivated for Japanese/Korean gapping (Mukai 2003; An 2016; 2019; Sato and Maeda 2018; 2019). String Deletion is a PF deletion operation that applies to a contiguous phonetic string in a phonological representation under identity with another occurrence of the same string. According to this analysis, the aforementioned correspondence is obtained because this process is involved in the generation of the fragment in both gapping and fragment answer contexts, as schematically represented in (60a, b) for the examples in (54A2) and (58A).

(60) a. *Home~~-zyoozu~~ desu-ka-ne.
praise-good.at COP.POL-SFP-SFP

b. *Hanako-wa home~~-zyoozu~~, Miki-wa …
Hanako-TOP praise-good.at Miki-TOP

Our analysis highlights two discoveries regarding the nature of the in-situ deletion process involved in a fragment answer to a *wh*-compound question. Firstly, the deletion process involved is string-deletion. We believe this is an improvement, for Kimura and Narita (2021) do not make explicit what the deletion process is, except mentioning that it targets all given materials except for a focus-marked phrase within an ellipsis site; the same question remains even with their updated view of ellipsis as no-vocabulary-insertion within the DM model in Kimura and Narita (2023).[14] Secondly, this new perspective, in turn, calls into question the validity of (51),

[14] Kimura and Narita (2021:203) point out that An's (2016) Extra Deletion, a version of String Deletion, cannot be extended to the following example. The response in (iA) should be ill-formed because this PF operation is defined as targeting only those materials that are adjacent to the target of ordinary deletion, so the pre-deletion base form in (ii) does not meet the structural description for this operation.

(i) Q: [[anti]-[nani]]-no dantai-ni haitta no?
anti-what-GEN group-DAT enrolled Q
'lit. An [[anti]-[what]] group have you enrolled in?'

A: [Zyuu-kisei-hooan] (da/desu)
gun-control-bill COP/COP.HON
'intended: I have enrolled in the anti-gun control bill group.'

(Kimura and Narita 2021: 203)

(ii) [~~Anti~~-[zyuu-kisei-hooan]-~~no~~ ~~dantai]-ni~~$_i$ [$_{XP}$ *pro* t_i haitta] (no da/desu)
anti-gun-control-bill-GEN group-DAT enrolled COMP COP/COP.HON

which attempts to establish the link between the felicity of the fragment answer and that of the compound structure. We have argued that the right correlation must be sought instead between the availability of the fragment answer and the survivability of the non-head member of a compound in a gapped clause, that is, the clause derived through String Deletion.

4.2 The Origin of Lexicality/Wordhood within the DM Model

The second issue to be explored here related to comparison of our analysis with Kimura and Narita's (2021; 2023) pertains to lexicality/wordhood and its origin. Recall that Kimura and Narita attribute the ungrammaticality of (50A2), repeated here as (61A2), to a lexical integrity effect.

(61) A1: … [[hito-ri-musume]-gonomi]-no soosyoku-ni sita (no da/desu).
one-CLF-daughter-taste-GEN decoration-DAT did COMP COP/COP.POL
'lit. Everyone put up [[only-daughter]-taste] decorations in the/their interior.'

A2:*…[[musume hito-ri]-gonomi]-no soosyoku-ni sita (no da/desu).
daughter one-CLF-taste-GEN decoration-DAT did COMP COP/COP.POL
'lit. Everyone put up [[one of the/their daughter(s)]-taste] decorations in the/their interior.'

(Kimura and Narita 2021: 196)

However, one of the foundational assumptions of the DM framework is that there is no lexical component specifically dedicated for word formation processes such as compounding, to start with. In other words, to the extent that they adhere to the basic precepts of the non-lexicalist theory, there seems to be no way to block the generation of the answer form in (61A2) as well as (49A2), which is derived through it. This consideration indicates that there is actually no way to guarantee (51) (though it must be recalled that the generalization is inaccurate on empirical grounds as well, as we have already shown in the previous subsection). In fact, quite the opposite holds true; the phrasal compound structure as in (61A2) is actually grammatical, and the perceived ill-formedness is caused by some extraneous variable. Take the compound *X-gonomi* 'X's taste', for instance. As its encyclopedic entry, this compound requires X to denote people with some salient individual level/kind denotation, such as *hitori-musume* 'only daughter', *hahaoya* 'mother', *kodomo* 'child', and *dokusindansee* 'single man'. Thus, (61A2) can be rejected

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This counterargument against An's theory of String Deletion does not apply to our proposal advanced in this section because it does not include string adjacency as the precondition for String Deletion. In our analysis, the prefix *anti-* and the rest of the dative phrase except the focused fragment undergo ellipsis independently from each other under the condition of identical phonetic string, as schematically depicted in (iii) (note that we don't assume the movement of the dative phrase).

(iii) *pro* [~~anti~~-[zyuu-kisei-hooan]-~~no~~ ~~dantai]-ni~~ ~~haitta~~ (no da/desu)
anti-gun-control-bill-GEN group-DAT enrolled COMP COP/COP.HON

as easily by the non-kind denotation of the floating quantifier configuration underlying *musume hitori* independently of its underlying syntactic structure. Indeed, if we use a different compound head such as *kurasi* 'living', which does not impose this usage restriction, we can easily find acceptable cases of phrasal compounds as in (62a, b).

(62) a. [musume hito-ri]-gurasi setai
daughter one-CLF-living household
'intended: a household where a daughter lives on her own'

b. [haha musume san-nin]-gurasi-no hazimari
mother daughter one-CLF-living-GEN beginning
'intended: the beginning of a new life led by the mother and their three daughters'

Kimura and Narita (2021:197, 2023:190) state that the phrasal compound structure as in (49A2)/(61A2) is ill-formed because of the lexical integrity effect or the opaqueness of the word unit to phrase-level syntactic derivations including quantifier floating. However, it is to be emphasized that such a statement is informulable in the DM framework, to begin with, which proposes to dispense with any pre-syntactic module responsible for word formations independent from phrases/sentences. There is no way to yield lexicality/wordhood in this single engine model.

By contrast, as we have argued in section 3.1., our proposal analysis, based as it is on renumeration and spell-out, advances a specific vision of the very origin of lexicality/wordhood by incorporating Uriagereka's (1999) hypothesis that an internally complex phrase structure is periodically flattened for atomization before it is returned to the main derivational cascade as a derived terminal item. The second contribution of our analysis thus lies in our distinct perspective on the very origin of lexicality/wordhood. This point remains unaddressed in Kimura and Narita, which, on one hand, maintains a kind of the lexicalist stance on compound formation (to block the allegedly ungrammatical examples as in (61A2) as well as (49A2)) while, on the other hand, adhering to the DM view of the syntax-morphology elsewhere (to let ellipsis/deletion apply to an internal constituent of a compound). Relatedly, our perspective is important in that it leads one to question the robustness of their empirical generalization in (51).

5 An Alternative Analysis: *Wh*-Compound Questions as W^+ Expressions?

In this section, we will examine an alternative analysis of *wh*-compound questions in Japanese based on the notion of Word Plus (hereafter, W^+) proposed by Kageyama (1993; 2001; 2016). We will present novel data drawing on Yashima's (2021) recent study to argue against the extension of this analysis to *wh*-compounds.

Kageyama's theory of W^+ is conceptualized in the following schema.

(63)

syntactic categories	XP	phrasal accent	
	X′	anaphoric reference	
	W^+		
Morphological categories	$Word/X^0$	lexical accent	
	Root		

(adopted from Kageyama 2016: 501)

According to (63), W^+ is a category that is larger than words, but smaller than phrases. This ambiguity, Kageyama argues, allows elements of this category to exhibit certain syntactic properties even though they belong in the morphological component.

Capitalizing on this hybrid nature of W^+, one may argue that Kageyama's theory could present a suitable alternative analysis of *wh*-compounds because the major finding in this paper has been that they simultaneously exhibit syntactic and word-level/lexical properties. In this rest of this section, however, we will show that this analysis is to be rejected on the basis of Yashima's (2023) recent observations on morphosyntactic behavior of the Japanese prefix, *mai-* 'one's (own)', which has its origin in the English first-person possessive determiner.

Yashima compares the Japanese prefix *dóo-* 'the same/aforementioned', which Kageyama analyzes as a W^+ item, with the English-derived prefix *mai-* 'one's (own)', and takes their divergent behavior to show that the latter does not belong to the W^+ class. Yashima's findings are tabulated in (64).

(64) *dóo-* (W^+) vs. *mai-* (non-W^+)

	inbound anaphora	phrasal inclusion	accentuation pattern	internal coordination
dóo- (W^+)	OK (65a)	*(66a)	non-lexical (67a)	OK (68a)
mai- (not W^+)	OK (65b)	*(66b)	lexical (67b)	*(68b)

(adopted from Yashima 2021: 63, with minor modifications)

The two prefixes in question show identical behavior with respect to inbound anaphora and phrasal inclusion. These observations are illustrated in (65a, b) and (66a, b). The (a)-examples involve the W^+ prefix *dóo-* and the (b)-examples the non-W^+ prefix *mai-*.

(65) a. Daitooryoo-wa asu yuukoo-zyooyaku$_i$-ni tyooin-suru.
president-TOP tomorrow amity-treaty-DAT sign-do
[Dóo-zyooyaku$_i$ saisyuuan] niyoruto …
said-treaty final.version according.to
'The President is going to sign the amity treaty. According to the final version of the said treaty, …'

(Kageyama 2001: 258)

b. Taroo$_i$-ga Hanako-o mai$_i$-hoomu-de karakatta.
Taro-NOM Hanako-ACC one's-home-at teased
'Taro teased Hanako at his own home.'

(Yashima 2021: 58)

(66) a. *dóo [$_{NP}$ tihoo-no tosi]
said province-GEN city
'the said provincial city'

b. *mai [$_{NP}$ hurui kasa]
one's old umbrella
'one's own old umbrella'

((66a) from Yashima 2021: 57)

In (65a), the NP *doo-zyooyaku* 'the said treaty' is anaphorically related to *yuukoo-zyooyaku* 'amid treaty' in the preceding clause. Similarly, in (65b), the NP *mai-hoomu* 'one's (own) home' refers to Taro's home. Thus, the two prefixes show identical behavior with respect to the inbound anaphor diagnostics. The ungrammaticality of (66a, b) is intended to show that neither *dóo-* nor *mai-* allows any phrasal category to occur as their base, another commonality shared by the two prefixes with respect to the phrasal inclusion test.

Importantly, Yashima shows that two other key diagnostics – accentuation pattern and internal coordination – tell apart the two prefixes in question. Firstly, W^+ items, *dóo–* included, exhibit non-lexical accent: they have their own accent so that the resulting expression containing such an item is associated with two accent peaks. Kageyama (2016:499), in fact, takes this two-peak accentuation pattern to be the "defining feature of W^+". By contrast, an expression prefixed with *mai-* has only one accent peak. This contrast is illustrated by the difference in accentuation between (67a) and (67b).

(67) a. dóo gíin
said lawmaker
'the said lawmaker'

b. mai béntoo
one's box.lunch
'one's own box lunch'

(Yashima 2021: 57, 60)

Secondly, W$^+$ items allow, but non-W$^+$ items, disallow, word-internal coordination. In (68a), the two nouns, *kaityoo* 'chairman' and *hukukaityoo* 'vice-chairman', are coordinated under the single W$^+$ prefix *dóo* so that the prefix modifies both nouns to yield the reading 'the current chairman and the current vice chairman'. This coordination pattern is not available with *mai-*, however, as shown in (68b): the phrase here is grammatical by itself, but it cannot be interpreted as 'my chopsticks and my pillow', a reading that would be possible were the prefix construed as modifying both nouns.

(68) a. Dóo-kaityoo-to hukukaityoo
said-chairman-and vice.chairman
'intended: the said chairman and the said vice-chairman
(cf. Kageyama 1993: 339)

b. *Mai-hasi-to makura
one's-chopsticks-and pillow
'intended: one's own chopsticks and pillow'
(Yashima 2021: 57)

Now, let us see what behavior *wh*-compounds show in terms of their accent pattern and word-internal modification. If they exhibit lexical accent and block word-internal coordination, like the non-W$^+$ prefix *mai-*, but unlike the W$^+$ prefix *dóo-*, we can conclude that *wh*-compounds do not belong to the W$^+$ class. The data in (69–70) are cases in point.

(69) Lexical accent pattern
a. *nani-nábe* 'what-hotpot'
what-hotpot
b. doko-zyóohoo 'where-from information'
where-information

(70) Word-internal coordination blocked
a. *Kinoo nani-nabe-to kayu-o tabeta-no?
yesterday what-hotpot-and porridge-ACC ate-Q
'intended: [What-hotpot] and [what-porridge] did you eat yesterday?'
b. *Nani-daigaku-to gakka-de benkyoositeiru-no?
what-university-and department-at studying-Q
'intended: [What-department] and [what-university] are you studying at?'

In these examples, the *wh*-compounds show lexical accent and block word-internal coordination. Our investigation above thus conclusively shows that Kageyama's (1993; 2001; 2016) W$^+$ theory, despite its initial appeal, cannot provide a suitable alternative analysis for *wh*-compound question formation.

6 Conclusion

In this paper, we have shown that *wh*-compound questions in Japanese transcend the traditional "word" vs. "phrase/sentence" boundary drawn by the lexicalist model of the syntax-morphology interface, and have argued that this intermodular nature of this type of question poses an empirical challenge for the architectural design it postulates.

We have proposed instead that their lexicality/wordhood and internal syntactic accessibility fall out naturally if they are formed exclusively within the syntactic derivation along the lines of a non-lexicalist, single-engine word formation framework such as the DM. One implication of our analysis is that one may eliminate the notion of 'word' from the theory of grammar in favor of the syntactic re-definition of "the set of possible spell-out domains" or phase units in a multiple spell-out model of syntax, with "wordhood" being reduced to an epiphenomenal consequence of the renumeration process applied iteratively in syntax.

In a DM-based model with no clear morphology-syntax divide, it is expected that more and more phenomena should be brought to light from Japanese (and other languages, for that matter) that blur the distinction between word and phrase/sentence. We will only mention two such cases in Japanese below. Firstly, Ogawa (2022) shows that certain formal nouns may take a complex syntactic object as their complement, as shown in (71). Note that the formal noun here, *kiri*, undergoes sequential voicing, suggestive of the inclusion of a syntactic phrase within an ostensively 'word' domain.

(71) Taroo-to-wa [$_{TP/CP}$ getuyoobini wakareta] {kiri/giri} atteinai.
Taroo-with-TOP on.Monday left after have.not.seen
'We have not seen Taro since we left him on Monday.'
(Ogawa 2022: 3)

Secondly, (72) illustrates off-the-cuff phrasal compounds in casual Japanese speech.

(72) [$_{CP}$ Getuyoobi itigen-ni-wa zettai derenai] zoku
Monday first.period-on-top absolutely cannot.make.it tribe
'a tribe (of university students) who absolutely cannot attend a first period class on Mondays'

This type of compound is freely generatable on the spot, taking the output of fully combinatorial syntax as its input for compounding: see also Ackema and Neeleman (2004) and Carnie (2000) for related observations on such compounds from Dutch and English, respectively.

Abbreviations

The glosses in this paper follow the Leipzig Glossing Rules (https://www.eva.mpg.de/lingua/pdf/Glossing-Rules.pdf). Below is the list of additional abbreviations used in the data section of this paper: CONJ, conjunction; HON, honorification; LINK, linker; POL, politeness marker; SFP, sentence-final particle; TIT, title.

Funding information

The research reported here was supported by JSPS KAKENHI Grant Numbers 19K00560 and 25K04102.

Acknowledgements

An earlier version of this paper was presented at the Research Workshop of the ILCAA Joint Research Project "Exploration into the Mechanism of Language Change and Variation through the Dialogue between Theoretical Linguistics, Linguistic Typology, and Quantitative Linguistics" (July 2021) and at GLOW in Asia XIII held at the Chinese University of Hong Kong (August 2022). We thank Hee-Don Ahn, Andrew Carnie, Anna Maria Di Sciullo, Takuya Goro, Heidi Harley, Richard Larson, Tommy Tsz-Ming Lee, Akiko Nagano, Taichi Nakamura, Hiro Oda, Yoshiki Ogawa, Satoshi Oku, Myung Kwan Park, Rio Sato, Ken Takita, Juan Uriagereka, Martina Wiltschko and Dwi Hesti Yuliani for discussions. We also thank anonymous reviewers for their questions and suggestions, all of which we have incorporated in this paper. All remaining errors are our own.

Competing interests

The authors have no competing interests to declare.

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