Weak Heads at the Interface: A View from Temporal Adverbial Clauses

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Abstract

This paper proposes that weak heads in Chomsky's (2015) sense are not only syntactically weak (i.e., unable to provide a label on their own), but also morpho-phonologically weak. To illustrate how this works, this paper examines temporal adverbial clauses (TACs) in Japanese, showing that the presence/absence of what we call Geis-ambiguity in Japanese TACs correlates with the presence/absence of *yori* 'than' in the clauses. Based on Miyamoto's (1996) argument that this ambiguity arises due to operator movement, we propose that there is a covert weak head which hosts the relevant operator in its specifier. Crucially, the weak head in question can only be present in the presence of its morpho-phonological host, i.e., *yori*. We further demonstrate that this covert weak head, unlike an overt noun, cannot be referred to by a null resumptive element, and suggest that the weakness in the labeling sense could potentially lead to weakness at LF.

Keywords: Weak head, Labeling, Temporal adverbial clause, Operator movement, Syntax-PF interface, Syntax-LF interface

1. Introduction

Labeling of syntactic objects has been one of the most important issues in recent minimalism. In particular, Chomsky (2013, 2015) dissociates labeling of a syntactic object (SO) from the SO *per se* or Merge, unlike in earlier syntactic theories. He proposes that the operation *Minimal Search*, which searches the syntactic structure from the highest node, determines labels of SOs. For instance, when a head (X) merges with a phrase (YP), the head projects and provides the label of the configuration {X, YP}, because it is the first head that Minimal Search finds in the structure. This is schematized in (1).

(1) a. *Merger of X and YP without the label* b. *X provides the label of the structure*

Interestingly, however, Chomsky (2015) suggests that there is a "weak" head, which cannot provide a label on its own despite being a head. For instance, English T is a weak head according

to Chomsky (2015); for the configuration {T, *v*P} to be labeled, T needs to undergo feature sharing of φ-features with a DP in its Spec, whereby it is "strengthened" and projects TP. The C head of wh-interrogatives in English can also be considered to be a weak head; it requires a wh-phrase to move to its specifier position (except for cases such as echo-questions), as exemplified by (2) (see Oda 2022, 2024 for a related discussion from a crosslinguistic perspective).[1]

(2) (What) [$_C$ **did**] you buy (*what)?

It should be pointed out here that weak heads are simply weak in the labeling sense for Chomsky (2015). Note, however, that Chomsky (2013) suggests that labels are required for interpretations at the interfaces. It is, then, not unreasonable to expect that the syntactic weakness in the labeling sense would be reflected at the interfaces.

In this study, we propose that weak heads are not only syntactically weak (i.e., unable to provide a label on their own), but also morpho-phonologically weak. Specifically, we propose (3) as a general property of weak heads (see Oda 2022, 2024 for a related discussion; see also Takita 2020 for a proposal regarding relevance of labeling to PF).

(3) Weak heads, which are essentially syntactically dependent on another element, are also morpho-phonologically dependent on another element.

To illustrate how this works, we examine temporal adverbial clauses (TACs) in Japanese. Specifically, we show that the presence/absence of what we call Geis-ambiguity in Japanese TACs correlates with the presence/absence of *yori* 'than' in the clauses. Based on Miyamoto's (1996) argument that this ambiguity arises due to operator movement, we propose that there is a covert weak head that hosts the relevant operator in its specifier. Crucially, the weak head in question can only be present in the presence of its morpho-phonological host, i.e., *yori*. We further demonstrate that this covert weak head, unlike an overt noun, cannot be referred to by a null resumptive element, and suggest that the weakness in the labeling sense could potentially lead to weakness at LF.

This paper is organized as follows. Section 2 presents the basic paradigm of the Geis-ambiguity in 'before'-clauses in English and Japanese, introducing the argument by Larson (1990) and Miyamoto (1996) that the relevant adverbial clauses involve null operator movement. Section 3 proposes that the relevant operator movement is available because of a covert weak head that hosts the null operator in its specifier, and that this weak head can be present only in the presence of its phonological host *yori*, due to the condition (3). Section 4 shows that a null resumptive pronoun, which circumvents island effects, is available only in the presence of an overt head noun in the temporal clauses. This leads us to suggest that a weak head is too weak to serve as a referent of a resumptive pronoun, and hence is weak at the C-I interface. Section 5 concludes the paper.

[1] Note that in (2) the relevant C requires *do*-support for the legitimate PF realization. As discussed below, this follows from the proposal on weak heads in this paper.

2. Geis-ambiguity and operator movement

Geis (1970) observes that TACs in English are ambiguous when there is more than one clause embedded under the subordinator. For instance, the *before*-clause in (4) has two possible interpretations. (5a) is what we call high reading, in which the temporal precedence relation is established between the time of the matrix clause and that of CP1 (Mary's making a claim). (5b) is, on the other hand, what we call low reading, in which the temporal precedence relation is established between the time of the matrix clause and that of CP2 (Mary's arrival). We refer to this ambiguity as Geis-ambiguity.

(4) I saw Mary in Ulaanbaatar before [$_{CP1}$ she claimed [$_{CP2}$ that she would arrive]].

(5) a. The speaker saw Mary before the time of her making a claim about her arrival time. (High reading)

b. The speaker saw Mary before her scheduled arrival time according to her. (Low reading)

Larson (1990) proposes that the Geis-ambiguity can be explained by null operator movement; we obtain the high reading when a null operator moves from the higher clause (i.e., CP1), whereas we obtain the low reading when the operator moves from the lower clause (i.e., CP2), as shown in (6).

(6) a. [$_{PP}$ before [$_{CP1}$ Op$_i$ she claimed t$_i$ [$_{CP2}$ that she would arrive]]] (High reading)

b. [$_{PP}$ before [$_{CP1}$ Op$_i$ she claimed [$_{CP2}$ that she would arrive t$_i$]]] (Low reading)

Larson (1990) argues that this analysis is supported by the observation that Geis-ambiguity disappears when the lower clause is embedded in an island as seen in (7).

(7) I saw Mary in Ulaanbaatar before she made [a claim that she would arrive]. (^{ok}High/ *Low)

According to Larson, the low reading is unavailable in (7) because the null operator cannot move out of the complex NP island.

Turning to Japanese, Miyamoto (1996) observes the Geis-ambiguity in the presence of *yori* 'than', as shown in (8). Crucially, Demirdache and Uribe-Etxebarria (2013) observe, quoting Yoichi Miyamoto, that when *yori* is absent, the Geis-ambiguity does not obtain, as seen in (9).

(8) [[Mary-ga [John-ga Mongoru-ni kur-u to] shutyoo-sur-u] **yori** mae]-ni
Mary-NOM John-NOM Mongolia-LOC come-PRES C claim-do-PRES than before-LOC
Taro-wa Mongoru-ni tsui-ta.
Taro-TOP Mongolia-LOC arrive-PAST
'Taro arrived in Mongolia before Mary claimed that John would come to Mongolia.' (^{ok}High / ^{ok}Low)

(9) [[Mary-ga [John-ga Mongoru-ni kur-u to] shutyoo-sur-u] mae]-ni
Mary-NOM John-NOM Mongolia-LOC come-PRES C claim-do-PRES before-LOC
Taro-wa Mongoru-ni tsui-ta.
Taro-TOP Mongolia-LOC arrive-PAST
'Taro arrived in Mongolia before Mary claimed that John would come to Mongolia.' (^{ok}High/ *Low)

Remarkably, the low reading is unavailable when the most deeply embedded clause is an island just as in English, as seen in (10), which is contrasted with (8). Miyamoto (1996) takes this island effect as indicating that Japanese TACs involve null operator movement just like English TACs.

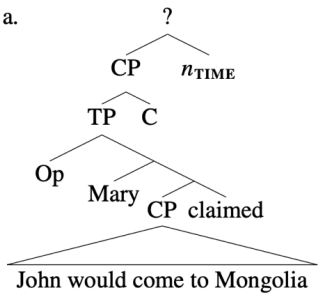
(10) [[Mary-ga [John-ga Mongoru-ni kur-u toiu] uwasa-o kik-u] yori
Mary-NOM John-NOM Mongolia-LOC come-PRES C rumor-ACC hear-PRES than
mae]-ni Taro-wa Mongoru-ni tsui-ta.
before-LOC Taro-TOP Mongolia-LOC arrive-PAST
'Taro arrived in Mongolia before Mary heard the rumor that John would come to Mongolia.'
(ok High / *Low)

Thus, Japanese TACs involve null operator movement responsible for the Geis-ambiguity, which is available only in the presence of *yori*.

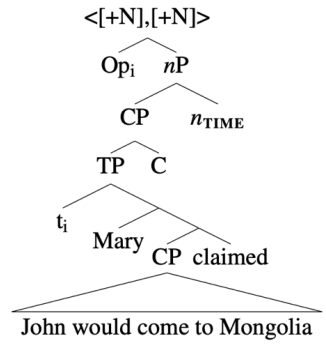
3. Covert time-nominal and Op-movement

A question that needs to be addressed is why the relevant operator movement is available only in the presence of *yori* 'than' in Japanese. We propose that this is due to a covert nominal head n_{TIME} in the presence of *yori*. More specifically, we propose that Japanese TACs exhibit the Geis-ambiguity when there is a covert nominal n_{TIME}, which is a weak head in Chomsky's (2015) sense. The weak head n_{TIME} cannot provide a label on its own and hence requires the null operator in its specifier position for strengthening via feature sharing, just like T in English. In addition, building on Sudo's (2015) argument that *yori* always takes a covert noun as its complement even in apparent clausal comparatives, we propose that in the case of TACs, *yori*, which is P, selects the covert time-denoting nominal head n_{TIME} (see also Demirdache and Uribe-Etxebarria 2004, 2013 for the presence of covert time-denoting elements in TACs). The relevant structures of TACs in Japanese are schematized in (11) and (12) for the high reading and the low reading, respectively.

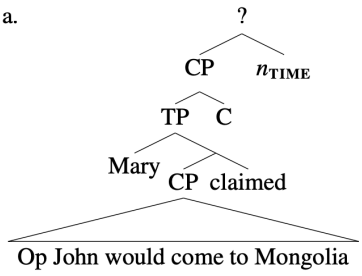
(11) a.



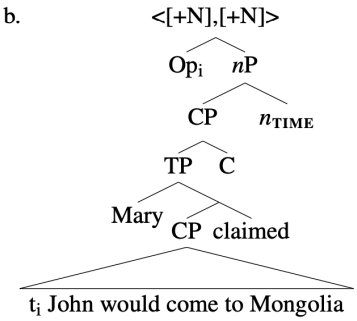
b.



(12) a.



b.



In (11a) and (12a), the weak head n_{TIME} merges with CP, but it cannot provide a label on its own. When the null operator Op moves to the specifier position of n_{TIME}, it undergoes feature sharing with n_{TIME}, whereby n_{TIME} is strengthened and provides the label of {CP, n_{TIME}}, as shown in (11b) and (12b). As for the label of {CP, n_{TIME}}, based on Sudo's argument that the complement of *yori* is generally nominal, we assume that the weak head n_{TIME} and the null operator Op share the categorial feature [+N] (cf. Citko 2011), and hence the label of {Op, *n*} is <[+N], [+N]>, which essentially states that the relevant structure is nominal (even though it is apparently clausal).[2,3]

Building on this, we propose to attribute the fact that Japanese TACs exhibit the Geis-ambiguity only in the presence of *yori* to the morpho-phonological condition of weak heads proposed above, which is repeated here as (13).

(13) Weak heads, which are essentially syntactically dependent on another element, are also mor pho-phonologically dependent on another element.

What (13) means is that a weak head can survive at PF only in the presence of a phonologically non-null element which can host it.[4] In Japanese TACs, the covert time-denoting nominal n_{TIME}, which is a weak head, requires a morpho-phonological host, hence can only be present in the presence of *yori*, which is phonologically non-null and can serve as its host.

Suppose now that the covert n_{TIME} appears without *yori*. In narrow syntax, n_{TIME} would undergo feature sharing with the null operator and provide the label of {CP, n_{TIME}}, as seen in (11b) and (12b). At PF, however, there would be no morpho-phonological host of n_{TIME}, which would violate (13). The only legitimate option in the absence of *yori* is, then, not to merge n_{TIME}, hence the lack of the null operator movement, which is responsible for the Geis-ambiguity. It should be added here that in this case, *mae* 'before' takes TP as its complement (see Arregui and Kusumoto 1998). This can be supported by the observation that the verb adjacent to *mae* can only have the non-past form, as seen in (14), whereas the verb next to *yori* can have the non-past and past forms, as seen in (15).

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[2] Note also that (apparent) clausal comparatives have been argued to involve operator movement (Kikuchi 1987; Watanabe 1992). Demirdache and Uribe-Etxebarria (2013), quoting Yoichi Miyamoto, point out that 'before'-clauses are essentially comparatives in Japanese (as well as in Basque). Thus, if our analysis is on the right track, we can offer a unified account of comparatives and TACs.

[3] A question raised by an *Acta Mongolica* reviewer is whether English *before* also involves a covert time-denoting nominal (n_{TIME}). Interestingly, Sharvit (2014) proposes that there are two types of *before*, one taking a nominal complement and the other taking a clausal complement. This is motivated by the observation that the NPI *ever* is licensed in the absence of the overt noun *time*, whereas NPI-licensing is blocked in its presence, as shown in (i). Note also that the low reading is impossible in the presence of *ever* but is possible in its absence.

(i) a. John watered the plant before it (ever) bloomed.
b. John watered the plant before the **time** at which it (*ever) bloomed.
c. John watered the plant before Sally ever said it bloomed. (^{ok}High / *Low)
d. John watered the plant before Sally said it ever bloomed. (^{ok}High / *Low)
e. John watered the plant before the **time** at which Sally (*ever) said it (*ever) bloomed. (^{ok}High / ^{ok}Low) (Sharvit 2014: 294)

Sharvit thus proposes that the English *before* clause does not involve a covert time-denoting nominal, which would block the NPI-licensing and make the low reading possible. Note that, abstractly, there are two types of TACs both in English and Japanese; one in which a nominal head is involved, and the other in which no such element is involved. See also Oda and Tatsumi (2017a,b) for related discussions.

[4] This could be considered to be an extension of Lasnik's (1981) general stranded affix constraint, by which a morpho-phonologically weak morpheme requires its host.

(14) [[Mary-ga [John-ga Mongoru-ni kur-u to] shutyoo-{**su-ru**/***shi-ta**}]
Mary-NOM John-NOM Mongolia-LOC come-PRES C claim-do-PRES/do-PAST
mae]-ni Taro-wa Mongoru-ni tsui-ta.
before-LOC Taro-TOP Mongolia-LOC arrive-PAST
'Taro rrived in Mongolia before Mary claimed that John would come to Mongolia.'

(15) [[Mary-ga [John-ga Mongoru-ni kur-u to] shutyoo-{**su-ru**/**shi-ta**}] yori
Mary-NOM John-NOM Mongolia-LOC come-PRES C claim-do-PRES/do-PAST than
mae]-ni Taro-wa Mongoru-ni tsui-ta.
before-LOC Taro-TOP Mongolia-LOC arrive-PAST
'Taro arrived in Mongolia before Mary claimed that John would come to Mongolia.'

In (14), *mae* selects the verb (or T) and determines the form of the verb, so that only the non-past form is allowed. In (15), in contrast, the verb (or T) is contained in the CP structure in the complement of n_{TIME}, hence not directly selected by *mae*, as a consequence of which no restriction on the tense morphology is imposed on the verb.[5] Thus, the presence/absence of the Geis-ambiguity correlates with the restriction on the verbal morphology in Japanese TACs. This follows from our proposal that the presence/absence of the weak head n_{TIME}, which requires the null operator that is responsible for the Geis-ambiguity, correlates with the presence/absence of *yori* 'than' as its host.[6]

A question that remains here is why *mae* 'before' cannot host the weak head n_{TIME}, even though it is phonologically non-null. A tentative answer to this is that the weak n_{TIME} can only be hosted by an element in the same extended projections of a lexical domain (cf. Grimshaw 2000; Bošković 2014).[7] Note that *mae* 'before' in Japanese is nominal unlike English *before*. For instance, a case particle, which is generally attached to a noun, can be attached to *mae*, as shown in (16).

(16) Shiai-no **mae-ga** ichiban kinchoosur-u.
match-LINK before-NOM most get.nervous-PRES
'I get most nervous before a match.'

[5] The discussion in the text is intact if the complement of n_{TIME} is TP, given Murasugi's (1991) argument that relative clauses in Japanese are generally TPs; what is important is the presence/absence of n_{TIME}, which correlates with the presence/absence of the null operator and the restriction on verbal morphology.

[6] An *Acta Mongolica* reviewer asks whether there is other evidence for the structural difference between the presence and the absence of *yori*, such as possibility of extraction out of TACs. Miyamoto (1996) observes that there is no difference in extractability between the presence and absence of *yori* (Miyamoto 1996 in fact argues for absence of the operator movement in the case of the high reading). Note, however, that Japanese allows so-called large-scale pied-piping, by which island effects (except for wh-island effects) can be circumvented (see Nishigauchi 1990; Richards 2000; Morita 2009; and Oda 2024). Interestingly, though, Oda and Tatsumi (2017 a,b) observe that in certain cases where the Geis-ambiguity would arise, wh-in-situ inside TACs is degraded even with the high reading, arguing that operator movement is always involved in those cases. We will investigate the relationship between the structure and locality effects in TACs in future research.

[7] See also the notion of Affix Support developed by Richards (2016, to appear). Richards (2016) proposes that heads which are incapable of bearing stress must be associated prosodically with heads to which stress can be assigned, and that this prosodic requirement can trigger syntactic movement to provide 'support' for unstressable material. Richards (2016) applies this principle to affixes, which require Support in the direction of affixation; he offers an account of the distribution of classic EPP effects in terms of Support (in which the fact that languages like French require a phrase to occupy the specifier of TP, while languages like Spanish do not, is ultimately tied to differences in the rules for position of stress in French and Spanish verbs). Richards (to appear) further argues that any X in need of Affix Support should preferentially seek Support from elements with which X is in an Agree or selection relation. In the case under discussion, the null n_{TIME} (which surely cannot bear stress, since it is null, and should therefore be subject to Affix Support) should be expected to be able to receive Support from *yori*, which we can think of as taking n_{TIME} as its complement, but not from *mae*, which bears no such relation to n_{TIME}.

Given this, we suggest that *mae* and the weak n_{TIME} are in separate nominal domains. Recall that the weak n_{TIME} together with the null operator projects <+N, +N>, which is essentially a nominal phrase. *Mae* as a nominal element then constitutes another nominal domain. Thus, *mae* cannot be a host of the weak n_{TIME}. A question that immediately arises here is why *yori* can host the weak n_{TIME} under the current proposal. It has been proposed in the literature that P can be a functional element in the extended projections of a nominal domain (e.g., Grimshaw 2000; Zanon 2020; Oda 2022). We thus suggest that *yori*, which is P, is in the same extended projections of the weak n_{TIME}, hence can host it.

4. (Un)availability of resumptive *pro* and weakness of heads

In this section we suggest the possibility that the weak head n_{TIME} is not only syntactically and morpho-phonologically weak, but also semantically weak.

Murasugi (1991, 1992) observes that relativization of a temporal expression is not subject to island effects, as shown (17).

(17) [[[e_1 e_2 mensetsu-o uke-ta gakusei$_1$]-ga minna uka-ru] hi$_2$]
interview-ACC receive-PAST student-NOM everyone pass-PRES day
'the day when all of the students who received the job interview pass' (Murasugi 1991)

Murasugi (1991, 1992) and Ishii (1991) argue that there is a resumptive temporal *pro*, which refers to the head of the relative clause and circumvents the island effect.

Recall, however, from Section 2 that TACs in Japanese show island sensitivity, in the sense that the low reading, which is made available by the null operator movement, is unavailable in the presence of an island. The relevant example is repeated here as (18).

(18) [[Mary-ga [John-ga Mongoru-ni kur-u toiu] uwasa-o kik-u] yori
Mary-NOM John-NOM Mongolia-LOC come-PRES C rumor-ACC hear-PRES than
mae]-ni Taro-wa Mongoru-ni tsui-ta.
before-LOC Taro-TOP Mongolia-LOC arrive-PAST
'Taro arrived in Mongolia before Mary heard the rumor that John would come to Mongolia.'
([ok]High / *Low)

In fact, Miyamoto (1996) observes that the overt version of the resumptive temporal pronoun is unavailable in TACs. As shown in (19), although the temporal pronominal expression *sono-hi-ni* 'that day' itself can occur in the clause inside the complex NP island, only the high reading is available, i.e., *sono-hi-ni* cannot circumvent the island effect for the null operator movement. Miyamoto (1996) thus concludes that the resumptive temporal *pro* is not available in TACs.

(19) boku-wa [[[John-ga [$_{NP}$ Mary-ga (sono-hi-ni) tsuku-daroo] toyuu] uwasa]-o
I-TOP John-NOM Mary-NOM that-day-on arrive-will C rumor-ACC
kiitei-ta] yori(-mo) mae-ni] kanojyo-o Asenzu-de mikake-ta.
hear-PAST than(-even) before-P her-ACC Athens-in see-PAST
'I saw Mary in Athens before John heard the rumor that Mary would arrive.' ([ok]High / *Low)
(Miyamoto 1996)

Why, then, is the resumptive *pro* strategy unavailable in TACs? Note that when there is an overt head noun in TACs, the resumptive *pro* strategy (forming a relative clause) becomes available, i.e., the low reading becomes possible, as shown in (20).

(20) boku-wa [[[[John-ga [$_{NP}$ Mary-ga (sono-hi-ni) tsuku-daroo] toyuu] uwasa]-o
I-TOP John-NOM Mary-NOM that-day-on arrive-will C rumor-ACC
kiitei-ta] **hi**] yori(-mo) mae-ni] kanojyo-o Asenzu-de mikake-ta.
hear-PAST day than(-even) before-P her-ACC Athens-in see-PAST
'I saw Mary in Athens before the day John heard the rumor that Mary would arrive.'
(^{ok}High / ^{ok}Low) (Miyamoto 1996)

Under the current proposal, in which TACs with *yori* involve a covert weak noun n_{TIME}, the crucial difference between (19) and (20) is whether the noun in the complement of *yori* is a weak head (n_{TIME}) or not (*hi* 'day'). This leads us to conjecture that weak heads are too weak to be referred to by a resumptive element; n_{TIME} alone cannot serve as a time-referring element. Given that reference relations are relevant to semantic interpretations at LF, this can in turn be taken as indicating that weak heads are weak at both PF and LF interfaces.

The suggestion that resumptive elements cannot refer to weak heads can be extended to relative clauses in Japanese in general. As is well-known, Kuno (1973) observes that head-external relativization out of a relative clause in Japanese does not show island effects, as shown in (21).

(21) [[e_1 e_2 kite-i-ru] yoohuku$_2$-ga yogore-tei-ru] shinshi$_1$
wear-PROG-PRES suit-NOM get.dirty-PROG-PRES gentleman
Lit. 'a gentleman who the suit that (he) is wearing is dirty' (Kuno 1973:239)

It has been proposed in the literature that head-external relative clauses of the sort in (21) involve a resumptive *pro* which refers to the head noun of the relative clause, whereby island effects are circumvented (e.g., Perlmutter 1972; Saito 1985; Ishii 1991).

Interestingly, Watanabe (1992) observes that head-internal relative clauses in Japanese exhibit island effects. (22a) shows that head-internal relativization can cross a clause boundary. In contrast, head-internal relativization out of an island is impossible, as shown in (22b), which is contrasted with (21).

(22) a. John-ga [[kaizoku-ga kaitei-ni takara$_1$-o sizume-ta to] iwa-rete
John-NOM pirate-NOM bottom.of.sea-LOC treasure-ACC sink-PAST C say-PASS
ita]-no$_1$-o hakkenshi-ta.
had-*n*-ACC discover-PAST
'John discovered the treasure which it had been said that the pirates had sunk into the bottom of the sea.'
b. *[John-ga [subarashii ronbun$_1$-o kai-ta hito]-o homete ita]-no$_1$-ga
John-NOM excellent paper-ACC write-PAST person-ACC praise had-*n*-NOM
shuppan-sare-ta.
publish-PASS-PAST]]
'An excellent paper which John had praised the person who wrote (it) was published.'

Remarkably, Watanabe (1992, 2003) proposes that head-internal relative clauses involve operator movement, which is responsible for the island sensitivity (see also Grosu 2010;

Grosu and Landman 2012; Grosu and Hoshi 2016; Landman 2016). It is also worth noting here that head-internal relative clauses are headed by *no*, which itself has no semantic content and cannot appear on its own.[8] We thus suggest that the light head *no* of head-internal relative clauses in Japanese is a weak head *n*, which cannot provide a label on its own and hence requires a null operator in its specifier for legitimate labeling. It then follows from the above suggestion that the resumptive *pro* cannot refer to the weak head *n*, so that the island effect cannot be circumvented as in (22b). Thus, the current analysis can offer a principled account of why head-internal relative clauses, but not head-external relative clauses, exhibit island effects. This can then be taken as another piece of evidence that a weak head cannot be referred to by a resumptive pronoun, hence relevance of a weak head to the LF interface.[9]

5. Concluding Remarks

We have shown that the so-called Geis-ambiguity in temporal adverbial clauses obtains in Japanese only in the presence of an additional element such as *yori* 'than'. We have proposed a labeling theoretical account of the Geis-ambiguity, in which a temporal operator that is responsible for the reference time undergoes feature sharing with a covert n_{TIME}, which is a weak head in Chomsky's (2015) sense. We have then proposed that weak heads are not only syntactically but also morpho-phonologically dependent on another element; in other words, weak heads are weak at the PF interface.

The proposed analysis of weak heads can actually be applied to Ts and Roots, which are assumed to be weak heads by Chomsky (2015). Note that these heads are morpho-phonologically dependent on another element. T can only be present in the presence of a verb or *do*-support in negative and interrogative sentences in English; see (23).[10] Root requires the presence of a categorizer such as *v* and *n* (cf. Embick and Marantz 2008).

(23) Mary *(do)-es not waste time.

In addition, Saito (2018, 2024) proposes that case particles in Japanese, which require the presence of a head noun, are weak heads (which he calls K(ase)), and Ochi (2019) proposes that

[8] In fact, crosslinguistically, head-internal relative clauses are typically marked with an element without lexical content (e.g., a determiner) or a relativization/nominalization marker affixed to the verb of the relative clause, or even have zero marking (see, e.g., Andrews 2007; Hiraiwa et al. 2017).

[9] An *Acta Mongolica* reviewer asks in what sense English T, which is a weak head according to Chomsky (2015), is weak in semantics, given that syntactic weakness, morpho-phonological weakness, and semantic weakness are always linked to each other. Note that English T is standardly assumed to bear uninterpretable phi-features, which by definition have no semantic content. We can then consider English T to be semantically weak in this sense.
Relatedly, the reviewer also wonders how Italian T, which Chomsky (2015) assumes is "strong" and responsible for the lack of EPP effects, can be treated under the current proposal. Note that Italian T is a bound morpheme and is standardly considered to bear unvalued phi-features, just like English T. Interestingly, Oda (2024) argues that Italian T should actually be treated as a weak head, just like English T, since it bears unvalued phi-features (Oda 2024 proposes that weak heads are those that have unvalued features at the point of External Merge). Unlike Chomsky (2015), who assumes *pro*-drop to be mere absence of a nominal element in Spec,TP and leaves post-verbal subjects unexplained, Oda (2024) argues that *pro* is actually a type of nominal element in Spec,TP (see, e.g., Barbosa 2019 and references therein), and that the availability of post-verbal subjects is attributed to focus (cf. Belletti 2001, 2004; Stjepanović 1999, 2003). Thus, both Italian T and English T can be treated as weak heads. See Oda (2024) for more discussions on this as well as weak heads.

[10] Likewise, as mentioned in footnote 1, the wh-C in English, which requires a wh-phrase in its specifier and can be considered to be a weak head, requires *do*-support (see also Oda 2024).

Japanese light nouns in Hiraiwa (2016) sense such as *no* 'one' are weak heads and hence require a prenominal modifier for strengthening. Thus, the proposal in the present paper is in accordance with the previous analyses of weak heads in English and Japanese. Arguably, the proposed hypothesis on the morpho-phonological condition on weak heads generally holds for various languages, which we would like to examine in future research (see also Oda 2022, 2024).

It would also be worth investigating whether our analysis of TACs in Japanese can be extended to other languages. For instance, Demirdache and Uribe-Etxebarria (2013) observe that the Geis-ambiguity is available only in the presence of 'than' in Basque, on a par with Japanese. Remarkably, as briefly mentioned above, Demirdache and Uribe-Etxebarria propose that TACs in Basque involve a covert time-referring nominal, which corresponds to our n_{TIME}. It may even be possible that TACs involve the covert nominal weak head n_{TIME} crosslinguistically, and apparent crosslinguistic variation regarding the properties of TACs arises from the difference in the nature of the subordinator (e.g., whether it is P that can host n_{TIME} or some other category that cannot host it). It would then mean that the syntax of TACs is essentially uniform, with parametric variation being lexical, which conforms to the concept of parameterization in the current linguistic theory (Baker 2008; Borer 1984; Fukui 1986, 1988; Chomsky 1995, 2020, 2021; Roberts 2019).

Another domain worth examining in the context of the current proposal is locative expressions. Murasugi (1991, 1992) shows that relativization of locative expressions in Japanese is not subject to island effects, and argues that a resumptive locative *pro* is available, on a par with the relativization of temporal expressions discussed in section 4. A question that arises is whether there is a counterpart of TACs in locative expressions, i.e., a type of ambiguity which obtains via operator movement and presence of a weak locative head, say, n_{PLACE}. We would like to investigate this issue in future research.

Acknowledgements

We would like to thank reviewers and audience of WAFL17, especially Shigeru Miyagawa and Mamoru Saito, and reviewers of *Acta Mongolica* for helpful comments and discussions. This work is supported by JSPS KAKENHI #23K12153, #23K12170 and JSPS Core-to-Core Program, A. Advanced Research Networks "International Research Network for the Human Language Faculty" #JPJSCCA20210001 (PI: Yoichi Miyamoto). All remaining errors are our own.

References

Andrews, Avery. 2007. Relative clauses. In *Language typology and syntactic description*, ed. by Timothy Shopen, Vol. II, 206–236. Cambridge: Cambridge University Press.

Arregui, Ana, and Kiyomi Kusumoto. 1998. Tense in temporal adjunct clauses. In *Proceedings of SALT VIII*, ed. by Devon Strolovitch and Aaron Lawson, 1–18. Cornell University, Ithaca, NY: CLC Publications.

Baker, Mark C. 2008. The macroparameters in a microparametric world. In *The limits of syntactic variation*, ed. by Theresa Biberauer, 351–374. Amsterdam: John Benjamins.

Barbosa, Pilar P. 2019. *Pro* as a minimal nP: Toward a unified approach to pro-drop. *Linguistic Inquiry* 50: 487–526.

Belletti, Adriana. 2001. 'Inversion' as focalization. In *Inversion in Romance and the theory of universal grammar*, ed. by Aafke Hulk and Jean-Yves Pollock, 60–90. Oxford: Oxford University Press.

Belletti, Adriana. 2004. Aspects of the low IP area. In *The structure of CP and IP: The cartography of syntactic structures, volume 2*, ed. by Luigi Rizzi, 16–51. Oxford: Oxford University Press.

Borer, Hagit. 1984. *Parametric syntax*. Dordrecht, Holland: Foris Publications.

Bošković, Željko. 2014. Now I'm a phase, now I'm not a phase: On the variability of phases with extraction and ellipsis. *Linguistic Inquiry* 45: 27–89.

Chomsky, Noam. 1995. *The minimalist program*. Cambridge, MA: MIT Press.

Chomsky, Noam. 2013. Problems of projection. *Lingua* 130: 33–49.

Chomsky, Noam. 2015. Problems of projection: Extensions. In *Structures, strategies and beyond: Studies in honour of Adriana Belletti*, ed. by Elisa Di Domenico, Cornelia Hamann, and Simona Matteini, 3–16. Amsterdam: John Benjamins.

Chomsky, Noam. 2020. The UCLA lectures: With an introduction by Robert Freidin. https://lingbuzz.net/lingbuzz/005485.

Chomsky, Noam. 2021. Minimalism: Where are we now, and where can we hope to go. *Gengo Kenkyu* 160: 1–41.

Citko, Barbara. 2011. *Symmetry in syntax: Merge, Move, and Labels*. Cambridge: Cambridge University Press.

Demirdache, Hamida, and Myriam Uribe-Etxebarria. 2004. The syntax of time adverbs. In *The syntax of time*, ed. by Jacqueline Guéron and Jacqueline Lecarme, 143–179. Cambridge, MA: MIT Press.

Demirdache, Hamida, and Myriam Uribe-Etxebarria. 2013. The structure of spatial PPs and temporal interpretation. Talk given at 23rd Colloquium on Generative Grammar, Facultad de Filología, Universidad Complutense, Madrid. May 9-11.

Embick, David, and Alec Marantz. 2008. Architecture and blocking. *Linguistic Inquiry* 39: 1–53.

Fukui, Naoki. 1986. A theory of category projection and its application. Doctoral Dissertation, Massachusetts Institute of Technology, Cambridge, MA.

Fukui, Naoki. 1988. Deriving the differences between English and Japanese: A case study in parametric syntax. *English Linguistics* 5: 249–270.

Geis, Michael. 1970. Adverbial subordinate clauses in English. Doctoral Dissertation, Massachusetts Institute of Technology, Cambridge, MA.

Grimshaw, Jane. 2000. Locality and extended projections. In *Lexical specification and insertion*, ed. by Peter Coopmans, Martin Everaert, and Jane Grimshaw, 183–207. Amsterdam: John Benjamins.

Grosu, Alexander. 2010. The status of internally-headed relatives of Japanese/Korean within the typology of *definite* relatives. *Journal of East Asian Linguistics* 19:231–274.

Grosu, Alexander, and Hiroto Hoshi. 2016. Japanese internally headed relatives: Their distinctness from potentially homophonous constructions. *Glossa: A Journal of General Linguistics* 1:1–31.

Grosu, Alexander, and Fred Landman. 2012. A quantificational disclosure approach to Japanese and Korean internally headed relatives. *Journal of East Asian Linguistics* 21:159–196.

Hiraiwa, Ken. 2016. NP-ellipsis: A comparative syntax of Japanese and Okinawan. *Natural Language & Linguistic Theory* 34: 1345–1387.

Hiraiwa, Ken, George Akanlig-Pare, Samuel Atintono, Adams Bodomo, Komlan Essizewa, and Fusheini Hudu. 2017. A comparative syntax of internally-headed relative clauses in Gur. *Glossa: A Journal of General Linguistics* 2: 1–30.

Ishii, Yasuo. 1991. Operators and empty categories in Japanese. Doctoral Dissertation, University of Connecticut, Storrs.

Kikuchi, Akira. 1987. Comparative deletion in Japanese. Ms., Yamagata University.

Kuno, Susumu. 1973. *The structure of the Japanese language*. Cambridge, MA: MIT Press.

Landman, Fred. 2016. Japanese internally headed relatives: A hybrid analysis with Kuroda Functions. *Glossa: A Journal of General Linguistics* 1: 1–35.

Larson, Richard K. 1990. Extraction and multiple selection in PP. *The Linguistic Review* 7: 169–182.

Lasnik, Howard. 1981. Restricting the theory of transformations: A case study. In *Explanation in linguistics*, ed. by Norbert Hornstein and David Lightfoot, 152–173. London: Longmans.

Miyamoto, Yoichi. 1996. More on temporal adverbial clauses. In *University of Connecticut working papers in linguistics 7: Papers in honor of Mamoru Saito*, 185–197. Cambridge, MA: MITWPL.

Morita, Hisashi. 2009. Covert pied-piping in Japanese wh-questions. *English Linguistics* 26: 374–393.

Murasugi, Keiko. 1991. Noun phrases in Japanese and English: A study in syntax, learnability and acquisition. Doctoral Dissertation, University of Connecticut, Storrs.

Murasugi, Keiko. 1992. Locative/temporal vs. manner/reason phrases. In *Kinjo Gakuin Daigaku Ronshu: Papers in English linguistics and literature*, 233–242. Nagoya: Kinjo Gakuin University.

Nishigauchi, Taisuke. 1990. *Quantification in the theory of grammar*. Dordrecht: Kluwer.

Ochi, Masao. 2019. Labeling Algorithm, agreement, and pro-form *no* in Japanese. In *Proceedings of WECOL 30*, ed. by Trevor Driscoll, 151–161. Fresno, CA: Department of Linguistics, California State University.

Oda, Hiromune. 2022. The NP/DP-language distinction as a scale and parameters in minimalism. Doctoral Dissertation, University of Connecticut, Storrs.

Oda, Hiromune. 2024. Large-scale pied-piping in the labeling theory and conditions on weak heads. *The Linguistic Review* 41: 153-185.

Oda, Hiromune and Yuta Tatsumi. 2017a. Two types of Japanese “before” clauses. In *Proceedings of Formal Approaches to Japanese Linguistics* 8, ed. by Ayaka Sugawara, Shintaro Hayashi and Satoshi Ito, 87–96. Cambridge, MA: MITWPL.

Oda, Hiromune and Yuta Tatsumi. 2017b. A non-unified analysis of “before” clauses in Japanese. In *Proceedings of Workshop on Altaic Formal Linguistics* 12, ed. by Leyla Zidani-Eroğlu, Matthew Ciscel, and Elena Koulidobrova, 243–254. Cambridge, MA: MITWPL.

Perlmutter, David M. 1972. Evidence for shadow pronouns in French relativization. In *The Chicago Which Hunt: Papers from the Relative Clause Festival*, ed. by Paul M. Peranteau, Judith N. Levi, and Gloria C. Phrares, 73–105. Chicago Linguistics Society, Chicago, Illinois: University of Chicago.

Richards, Norvin. 2000. An island effect in Japanese. *Journal of East Asian Linguistics* 9: 187–205.

Richards, Norvin. 2016. *Contiguity Theory*. Cambridge, MA: MIT Press.

Richards, Norvin. To appear. Finding something to lean on. *Language*.

Roberts, Ian. 2019. *Parameter hierarchy and Universal Grammar*. Oxford: Oxford University Press.

Saito, Mamoru. 1985. Some asymmetries in Japanese and their theoretical implications. Doctoral Dissertation, Massachusetts Institute of Technology, Cambridge, MA.

Saito, Mamoru. 2018. Kase as a weak head. In *Heading in the right direction: Linguistic treats for Lisa Travis, McGill working papers in linguistics 25.1*, ed. by Laura Kalin, Ileana Paul, and Jozina Vander Klok, 382–390. Montreal: McGill University.

Saito, Mamoru. 2024. Null arguments in EA languages revisited: Ellipsis or pronouns. In *Proceedings of the 17th Workshop on Altaic Formal Linguistics*, ed. by Erdene-Ochir Tumen-Ochir, Julia Sinitsyna, and Shigeru Miyagawa, 1–16. Cambridge, MA; MITWPL.

Sharvit, Yael. 2014. On the universal principles of tense embedding: The lesson from *before*. *Journal of Semantics* 31: 263–313.

Stjepanović, Sandra. 1999. What do second position cliticization, scrambling, and multiple wh-fronting have in common? Doctoral Dissertation, University of Connecticut, Storrs.

Stjepanović, Sandra. 2003. A word order paradox resolved by copy deletion at PF. *Linguistic Variation Yearbook* 3: 139–177.

Sudo, Yasutada. 2015. Hidden nominal structures in Japanese clausal comparatives. *Journal of East Asian Linguistics* 24: 1–51.

Takita, Kensuke. 2020. Labeling for linearization. *The Linguistic Review* 37: 75–116.

Watanabe, Akira. 1992. Subjacency and S-structure movement of *wh*-in-situ. *Journal of East Asian Linguistics* 1: 255–291.

Watanabe, Akira. 2003. Wh and operator constructions in Japanese. *Lingua* 113: 519–558.

Zanon, Ksenia. 2020. Focus association with ONLY in Russian, Chinese, and English. Talk given at the Cambridge Linguistics Society.