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Adverbial clauses and adverbial concord

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This paper speculates that the merge site of an adverbial clause, i.e. its external syntax, is determined by its derivational history, i.e. its internal syntax. Starting from the distinction between central adverbial clauses and peripheral adverbial clauses, it is first shown that the degree of integration of an adverbial clause correlates with its internal syntax, i.e. the availability of left peripheral functional material. The correlation can be informally stated as follows “the more structure is manifested in the adverbial clause, the higher it is merged”. This paper develops a derivational account for this correlation. The proposal adopts the movement derivation of adverbial clauses, according to which, like relative clauses, adverbial clauses are derived by movement of a specialized IP-related operator (aspectual, temporal, modal, etc) to the left periphery. The paper explores observations drawn from the traditional literature on Japanese grammar (Minami 1974; Noda 1989; 2002) to the effect that the amount of TP-internal functional structure in an adverbial clause also correlates with the presence of specialized functional particles in the matrix clause with which the clause merges. Specifically, we explore Japanese data discussed in Endo (2011; 2012). It is proposed that the merger of an adverbial clause with the associated main clause is determined by the label of the adverbial clause, itself the result of the movement derivation.

Keywords: adverbial clause; concord; cartography; internal and external syntax

1 Central adverbial clauses vs. peripheral adverbial clauses (Haegeman 2012)

The present paper brings together two strands of work on adverbial clauses, one focusing on their external syntax, i.e. their distribution and their degree of integration with the clause they modify, and one focusing on their internal syntax, i.e. the degree to which adverbial clauses allow for the encoding of information structural concepts. The paper is programmatic and tentative: we outline a way of bringing these two strands together by proposing a unified analysis in which the internal syntax of the adverbial clause, i.e. its derivation, determines its external syntax.

It is well known that what are standardly labeled adverbial clauses do not constitute a homogeneous class. One distinction often discussed in the literature relates to the level of syntactic integration, where a binary distinction has been proposed between “central” adverbial clauses and “peripheral” adverbial clauses (Haegeman 2003; 2006a; b; 2012). While many conjunctions seem to be specialized to introduce either central adverbial clauses (*before*, *after*) or peripheral adverbial clauses (*whereas*, *although*), other subordinating conjunctions in fact may serve to introduce both types of clauses. We first illustrate this point with some examples.

The English conjunction *while* can introduce a temporal clause, modifying the temporal coordinates of the event expressed in the associated matrix clause, or it can introduce a contextually salient proposition which contrasts with the associated proposition, in which

case *while* introduces a concessive clause. In (1), both instances of *while* are illustrated. Temporal *while*₁ is equivalent to ‘during the time that’ and provides a temporal specification of the state of affairs expressed in the matrix clause. Haegeman (1991 and later work) has labeled this type of adverbial clause “central”. Concessive *while*₂ introduces a proposition that forms the privileged discourse context for the interpretation of the associated clause and is equivalent to ‘whereas’. Haegeman (1991 and later work) has labeled such clauses “peripheral”.

- (1) While₂ this ongoing lawsuit probably won’t stop the use of lethal injection, it will certainly delay its use while₁ the Supreme Court decides what to do.

Similar dual uses of conjunctions are found with the conjunctions *since* and *as*, which both may have either a tempo-aspectual reading (2a, 3a) and a rationale (2b, 3b) reading. Note that, as shown in (2), only the temporal reading of *since* is compatible with *ever*.

- (2) a. (Ever) since₁ I found these data online, I have been working on them.
 b. (*Ever) since₂ I found these data online, I have been working on them.
- (3) a. As₁ I was working on this, I uncovered some new data.
 b. As₂ I was working on this, I could understand his position.

While clauses introduced by *if* could always be labeled as “conditional”, the degree of integration is also relevant to their precise interpretation. A central adverbial clause introduced by *if* expresses an event condition; often, in such examples *if* can be extended to *if and when*. A peripheral adverbial clause introduces a privileged contextual assumption against which the proposition expressed in the associated clause is processed. The latter type of *if* clause is referred to as a “conditional assertion” by Kearns (2006). Peripheral conditional clauses are typically echoic, they pick up an assumption that is accessible in the context (Declerck & Reed 2001: 83).

- (4) a. If₁ (and when) he has finished the text, we’ll show it to the editor.
 b. If₂ (*and when) he has finished the text, why didn’t he show it to me?

Because clauses have also been reported to display two distinct readings (Hooper & Thompson 1973; Miyagawa 2012).

In a number of publications Haegeman (1991; 2003; 2006a; b; 2010a; b; 2012) interprets the difference in the degree of integration of central adverbial clauses (CAC) and peripheral adverbial clauses (PAC) in terms of their external syntax (For a different position on this, see Declerck & Reed 2001: 37–38). In addition, Haegeman (2003; 2006a; b; 2010a; b; 2012) has brought to the fore that the two types of adverbial clauses also systematically differ in internal syntax. The present paper addresses these two contrasts and we formulate a concrete proposal for correlating the external and the internal syntax of the adverbial clauses. In Haegeman’s original proposal the classification is based on the merge position of the adverbial clause and need not imply that the two types differ in terms of their category. The current proposal goes beyond this and envisages that different types of adverbial clauses may well carry different labels and that their labels determine their merge sites.

The core data of our proposal are drawn from work by Endo (2011a; b; 2012; 2014) on Japanese. These data will also lead to new insights into the internal and external syntax of adverbial clauses. One result to be reported on here is that, in the light of the Japanese

data, the binary opposition between CAC and PAC has to be reconsidered and that a more fine-grained typology is needed. Though we do not work this typology out in detail, we provide some suggestions concerning its ultimate formulation. The other result is that, again based mainly on data from Japanese, there is a matching relation between the internal syntax of adverbial clauses and their internal syntax and that this matching relation can be captured by an analysis like that developed by Endo (2011b; 2014), which ties the locus of merger of the adverbial clause, i.e. its external syntax, directly to its (internal) syntactic derivation.

The paper is organized as follows: In the remainder of this section we illustrate how adverbial clauses differ in terms of both their external syntax (Section 1.1) and their internal syntax (Section 1.2). Section 2 shows how the internal syntax of adverbial clauses can be understood once we adopt a derivation according to which they are derived by operator movement. Section 3 shows that adverbial clauses may also be derived by head movement. The data from Japanese, which form the core of this section, also show that the binary typology of central adverbial clauses vs. peripheral adverbial clauses must be replaced by a more fine-grained analysis with a gradience of clauses based on their internal composition. Section 4 shows how the movement derivation can be deployed to account for the external syntax of adverbial clauses: it is proposed that the launch site of the moved constituent that derives the adverbial clause determines the merger of that clause with the modified main clause. Section 5 is a short summary.

1.1 External syntax of adverbial clauses

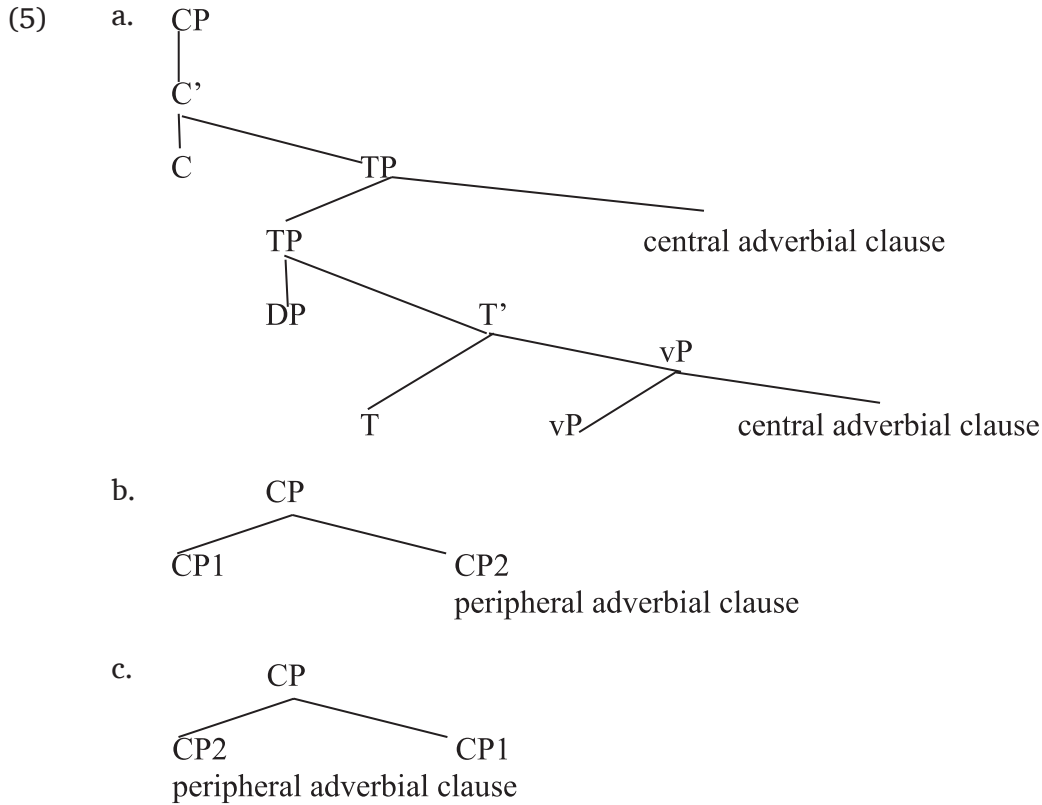
1.1.1 Coordination

One piece of suggestive evidence for the distinction in external syntax between CAC and PAC is coordination. This is already demonstrated on the basis of example (1a): while, informally speaking, both *while* clauses in this example are in effect related to the same main clause, they cannot be coordinated, regardless of whether the resulting coordination is initial (1b) or final (1c).

- (1) b. *While₂ this ongoing lawsuit probably won't stop the use of lethal injection and while₁ the Supreme Court decides what to do, it will certainly delay its use.
- c. *This ongoing lawsuit will certainly delay the use of lethal injection while₁ the supreme court decides what to do and while₂ it probably won't stop its use.

Haegeman (2012: 164–165) proposes that central adverbial clauses only coordinate with central adverbial clauses and that peripheral adverbial clauses only coordinate with peripheral adverbial clauses (cf. the work cited for more data). A full discussion of the syntax of coordination is not appropriate here but ultimately the ungrammaticality of (1b) and (1c) can be related to the external syntax. Coordination is subject to Williams' (1978) "Law of Coordination of Likes". Following a suggestion in Huddleston & Pullum (2006) "likeness" can be interpreted in structural terms as meaning that constituents merged in hierarchically distinct positions in the tree do not qualify as "like" and hence cannot coordinate. If CACs are merged within the TP layer, as shown in (5a),¹ and if PACs are merged TP-externally, as informally represented in (5b) and (5c), their inability to coordinate would follow.

¹ When the adverbial clause is clause-initial, we assume it occupies a left peripheral position, with reconstruction effects providing evidence for a movement derivation.



Observe that in terms of representations (5b) and (5c), the matrix clause CP1 and the associated PAC, CP2, which modifies it are hierarchically on near-equal footing, meaning that their structural relation is close to that found in coordination. Indeed, that PACs share properties of coordination has been observed independently by Hornstein (1993: 206, note 19), who writes:

There is a secondary conjunctive interpretation that all these connectives (*as, while, when*) shade into. They get an interpretation similar to *and* in these contexts. *And* is not a temporal connective, and these conjunctive interpretations do not tell against the theory [of temporal subordination and complex tense structures].

It should be pointed out, though, that PACs cannot simply be equated with coordinated *and* clauses (Haegeman 2012: 168). Typically, for instance, gapping is available in coordinated patterns but not in PACs (6). While coordination with *and* allows for subject ellipsis in the second conjunct (7a), this is not available in the majority of PACs (7b), though, for completeness' sake, it should be added here that *though* clauses allow subject ellipsis (7c). (7d) is attested and such examples are not infrequent in journalistic prose.

- (6) a. John reads the Guardian and Mary the Times.
 b. ??John reads the Guardian while Mary the Times.
- (7) a. John is doing a Ph.D. in Oxford but did his first degree in Cambridge.
 b. *John is doing a Ph.D. in Oxford while did his first degree in Cambridge.
 c. John is doing a Ph.D. in Oxford though did his first degree in Cambridge.
 d. Observer (02.09.2007, page 6, col. 2)
 Other holiday makers enjoying a late summer break in Kalamata, in the southern Peloponnese, and near Athens, reported seeing smoke and dashes in the air, though were not close enough to the fires to see the flames.

1.1.2 Scope

Various scope effects confirm the hierarchical difference represented tentatively in (5). Typically, as discussed, for instance, in Hornstein (1993), CACs are temporally subordinated in that their temporal interpretation is dependent on the encoding of temporal relations in the matrix clause. For English, this is perhaps most tellingly reflected in the encoding of futurity. In the CAC in (1a), repeated here in (8), futurity is not overtly encoded, the present tense form *decides* is assigned a future reading, and it cannot be replaced by a form that explicitly encodes futurity by means of the auxiliary *will*. In the PAC, on the contrary, futurity is overtly expressed by means of the future auxiliary *won't*; replacing *won't stop* by *doesn't stop* will shift the temporal interpretation from future to present time. As signaled above, Hornstein (1993: 206, note 19) already points out that PACs are not subject to temporal subordination.

- (8) While₂ this ongoing lawsuit probably won't/doesn't stop the use of lethal injection, it will certainly delay its use while₁ the Supreme Court decides/*will decide what to do.

Along the same lines, matrix focal operators can scope over CACs, though not over PACs. To illustrate this with one example: CACs can be clefted (9a), PACs cannot be clefted (9b). For additional illustrations see also Haegeman (2006; 2012: 155–172).

- (9) a. It's while₁ Bill Clinton was still president that the accusations were made.
b. *It is while₂ Bill Clinton won the election in 1992 that Hillary Clinton was defeated in 2016.

1.2 Internal syntax: Are central adverbial clauses “structurally impoverished”?

As reported in the literature, CACs and PACs differ in terms of their internal syntax: typically English CACs resist argument fronting, PACs allow it:

- (10) a. *We discovered something else while this paper we were writing.
b. Quirk et al. (1985: 1378)
His face not many admired, while his character still fewer felt they could praise.

Central conditional clauses have been reported to resist speaker-anchored modal expressions (Stowell 2004; Nilsen 2004; Zagana 2007; Ernst 2007; 2009; Haegeman 2005; 2006c; 2011). In particular, they are not easily compatible with the four topmost expressions of modality in Cinque's functional sequence (1999; 2004: 133) – speech act, evaluative, evidential and epistemic modality. PACs, on the other hand, allow such modal expressions. Consider the examples in (11) based on Nilsen (2004: 811). (11a) contains an event conditional, on which the actual realization of the main clause event is dependent; (11b) is a conditional assertion: it echoes a contextually accessible assumption, meaning something like “if, as you say, ...”. The CAC in (11a) is not compatible with an epistemic modal: (11c) is unacceptable. In contrast, Nilsen's (11d) shows that the conditional assertion, i.e. a PAC, is compatible with an epistemic modal.

- (11) a. If they arrive on time, we will be saved.
b. If Le Pen will win, Jospin must be disappointed.
c. *If they probably arrive on time, we will be saved.
d. Nilsen (2004: 811: note 5)
If Le Pen will probably win, Jospin must be disappointed.

The incompatibility of CACs with the encoding of speaker-related modal markers is related to the fact that CACs are taken to be presupposed (Hooper & Thompson 1973). As such, CACs lack independent illocutionary force, and are part of the speech act expressed in the superordinate clause. In contrast, PACs have illocutionary potential (cf. Declerck & Reed 2001: 131), as illustrated, for instance, by the fact that they can contain (rhetorical) questions or imperatives, as shown in the attested (12). On the assumption that speaker-anchored modal markers have to be anchored to speaker and/or to the speech time (cf. Ernst 2009), the availability of such markers in PACs (11d) correlates with their illocutionary potential. Relevant proposals can be found in the literature. Zagona (2007: 230) states: “epistemic modals should appear only in finite clauses that make statements relative to the speaker’s world of known propositions at the moment of speaking.” In a similar way, in their seminal paper, Hooper & Thompson (1973) relate the distribution of argument fronting in English to assertive illocutionary force.

- (12) a. Independent on Sunday (30.04.2006, page 4, col. 2)
Oil and electricity are useful, while gold – what’s the point of that?
- b. Observer, Review (23.11.2008, page 12, col. 4)
These assumptions can be irritating, since who is this naive, unquestioning, plural intelligence identified as “we”?
- c. Guardian, Review (25.08.2007, page 17, col. 1)
I have even heard someone develop the conceit that he was the first blogger, although don’t let that put you off.

1.3 Relating internal and external syntax

The generalization emerging from the discussion above seems to be then that the more structure is manifested within the adverbial clause (1.2), the higher it is merged (1.1). This leads to two (related) questions:

- (i) How can the observed impoverishment in the internal syntax of CACs be captured?
- (ii) How can the observed correlation between the internal impoverishment (1.2) and the external syntax (1.1) be captured?

We will deal with these two questions in turn. Section 2 develops a proposal to account for the “defectiveness” in CACs.

2 The movement derivation of adverbial clauses and restrictions on the left periphery

2.1 CACs are not incompatible with encoding information structure

As suggested above, one might relate the fact that CACs are incompatible with argument fronting and with expressions of speaker-related modality to their presupposed status (see Hooper & Thompson 1973). Referring to Güldemann (1996: 178), van der Wal (2014: 61), for instance, proposes that the backgrounded status of such clause types leads to a compact, largely unstructured presentation of the state of affairs. This “compact” format of presentation would then be incompatible with the availability of internal (information) structuring of the relevant clause, for instance, by focusing a constituent. From this reasoning, one might be tempted to deduce that CACs cannot encode information structural (IS) properties at all, but this conclusion would be too rash. CACs can encode IS effect, as also pointed out by Van der Wal. We provide some illustrative examples here.

In English, CACs are compatible with *in situ* focus (13a), with clefting (13b), and with heavy NP shift (13c), a pattern typically used for focusing objects.

- (13) a. He was always there ready with advice but when I needed MONEY he was nowhere to be found.
 b. He was always there ready with advice but when it was MONEY that I needed he was not to be found.
 c. Wallenberg (2009: 218, 14)
 I have two types of mosquito lotion...But I found that if you put in your pockets [DRYER SHEETS], ...it keeps them away.

In French, Stylistic Inversion, a syntactic configuration typically used for focusing a post-verbal subject, is available in CACs (Lahousse 2003a; b; 2010). Consider (14): (14a) represents the default word order; in (14b), an example of Stylistic Inversion, the subject nominal *les enfants* ‘the children’ occupies a sentence-final position, following the non-finite participle *arrivés* ‘arrived’.

- (14) a. Je voulais partir quand les enfants sont arrivés.
 I want.PAST.1SG leave when the children be.PRES.3PL arrive.PRT.PL
 ‘I wanted to leave when the children arrived.’
 b. Lahousse (2003b: 280)
 Je voulais partir quand sont arrivés les enfants.
 I want.PAST.1SG leave when be.PRES.3PL arrive.PRT.PL the children
 ‘I wanted to leave when the children arrived.’

These empirical data suffice to show that CACs are not categorically incompatible with the encoding of IS related concepts such as, for instance, focus marking. In view of the ungrammaticality of (10a), one might reformulate the restriction on the encoding of IS effects in CACs by proposing that IS effects cannot be encoded in the left periphery, possibly because CACs lack a left periphery. In the next section, we show that this revised hypothesis too would be inadequate.

2.2 Central adverbial clauses do not lack a left periphery

While argument fronting is indeed unavailable in English CACs (10a), clitic left dislocation (CLLD), which also deploys the left peripheral space is available in French CACs. (15) illustrates the pattern: the nominal *cette chanson* ‘this song’ is in a left peripheral position of the temporal CAC; it is resumed by the pronoun *le* ‘it’ in the matrix clause.

- (15) *French*
 Quand cette chanson je l’ai entendue, j’ai pensé à
 when that song I it have.1SG heard.FEM, I have.1SG think.PRT to
 mon premier amour.
 my first love
 ‘When I heard that song, I thought of my first love.’

This difference between English, which disallows argument fronting in CACs, and French, which allows CLLD, cannot be attributed to a parametric difference in the availability of the left periphery in CACs. The left periphery of French CACs displays restrictions on fronting operations reminiscent of those in English. For instance, in French root clauses, when a PP is fronted to the left periphery, the resumptive clitic, where available, is optional (as

noted in Rizzi 1997), but when a PP is fronted in a CAC, the resumptive clitic becomes obligatory. (16) provides examples of the latter restriction:²

(16) *French*

- a. Quand à Fred, tu *(lui) casses les pieds, il te tourne
when to Fred, you (to-him) break.2SG the feet, he to.you turns
le dos.
the back
'When you get on Fred's nerves, he walks away.'
- b. Quand de ses problèmes, on n'*(en) parle à personne, ils
when of one's problems, one NEG (of-them) talks to no one, they
semblent insurmontables.
seem.3PL insurmountable
'When you don't talk to anyone about your problems, they seem
insurmountable.'
- c. Et si à Paul, on *(lui) envoyait une carte, tu crois
And if to Paul, one (him) sent PAST.3SG a card, you think.2SG
qu'il serait content?
that he be.COND.3SG happy
'And if we sent Paul a card, do you think he'd be happy?'

Similar effects obtain with fronting of an infinitival complement (Authier & Haegeman 2015). While an infinitival complement can be fronted in a root clause without the need for clitic resumption (17a), fronting of an infinitival clause in a CAC without a resumptive clitic is not acceptable (17b); infinitival fronting with a resumptive clitic (17c) is acceptable.³

(17) *French*

- a. Fumer dans les bureaux, on ne pourra pas.
to.smoke in the offices, we NEG can.FUT.3SG not
- b. *Quand fumer dans les bureaux on pourra, ...
when to.smoke in the offices, one can. FUT.3SG
- c. Quand fumer dans les bureaux on pourra le faire en toute
when smoke in the offices one can.FUT.3SG it do in all
impunité, ...
impunity

In addition, while arguments cannot precede the subject in English CACs, adjuncts can be found to the left of the subject. In Section 3.2, we provide evidence that the adjunct is in a left-peripheral position.

(18) When last month she began to write her regular column again, ...

These data suggest that the left periphery of CACs is available for encoding IS effects, but that it is subject to some constraints.

2.3 Constraining the left periphery of adverbial clauses

2.3.1 The truncation analysis

From the preceding section it emerges that the left periphery of CACs displays a double asymmetry: on the one hand, there is an argument/adjunct asymmetry, illustrated for

² Judgments for French: Jean Marc Authier (personal communication).

³ Authier (2011), whose judgments the discussion is based on, argues that the fronting affects TP.

English in Section 2.2, in that arguments cannot and adjuncts can be fronted to the left periphery, and on the other hand, as shown for English and for French in Section 2.2, there is a difference between fronting of arguments without resumption, which is not licit, and that with resumption which is licit. Table 1 summarizes the asymmetries.

To capture this double asymmetry, it has been proposed that English clause types blocking argument fronting, such as CACs, are structurally defective in that the relevant layers of the left periphery which would host fronted arguments are not available (cf. Kuroda 1992; Haegeman 2003; 2006, etc). Various precise implementations have been elaborated, which we do not go into for reasons of space (see Haegeman 2012 for a critique). However, a truncation approach to the double asymmetry misses an important point: the double asymmetry is also manifested in contexts which, to the best of our knowledge, are not standardly analyzed in terms of truncation. Some of these contexts are illustrated in (19)–(22). Both in interrogative clauses and in relative clauses, short (19)–(20) and long (21)–(22) *wh*-movement give rise to the same asymmetry. We will not discuss these data in detail and refer to the papers cited for further illustration. Table 2 summarizes the asymmetries.

- (19) a. Culicover (1992: 5, 6c)
*Robin knows where, the birdseed, you are going to put.
- b. Culicover (1992: 9, 17d)
Lee forgot which dishes, under normal circumstances, you would put on the table.
- c. *French*
Je me demande ce qu' à Jean, on pourrait lui acheter.
I myself ask what that to Jean we can.COND.3SG him buy
'I wonder what we could buy for John.'
- (20) a. *These are the students to whom, your book, I will recommend in the next semester.
- b. These are the students to whom in the next semester I will recommend your book.
- c. *French*
Achète-moi ce qu' à Marie tu allais *(lui) acheter.
buy-me what that to Marie you go.PAST.2SG to-her buy
'Buy me what you were going to buy for Mary.'

Table 1: The double asymmetry in CACs.

	CLLD	Argument fronting	LP adjunct
Central adverbial clause	√	*	√

Table 2: The double asymmetry.

		CLLD	Argument fronting	LP adjunct	e.g.
(a)	Central adverbial clause	√	*	√	
(b)	Embedded <i>wh</i> -question	√	*	√	(19)
(c)	(Long) <i>wh</i> -question	√	*	√	(20)
(d)	<i>Wh</i> -relative	√	*	√	(21)
(e)	Long <i>wh</i> -relative	√	*	√	(22)

- (21) a. Rochemont (1986: 147); Breul (2004: 227, 359)
 *How did you say that the car Bill fixed?
 b. Collins (1998: his 11b)
 How did John say that if Mary bought the tools, Bill would fix the car?
 c. *French*
 J' aimerais savoir ce qu' il pense qu' à Jean on
 I like.COND.1SG know what that he thinks that to Jean one
 devrait lui acheter.
 must.COND.3SG him buy
 'I would like to know what he thinks that we should buy for Jean.'
- (22) a. *??These are the patients to whom Mary suggested that the cooked vegetables
 we should not give in the present circumstances.
 b. These are the patients to whom Marty suggested that in the present cir-
 cumstances we should not give the cooked vegetables.
 c. *French*
 Voi ci le cadeau
 this is the present
 qu' il pense qu' à Jean on devrait lui acheter.
 that he thinks that to Jean one must.COND.3SG him buy
 'This is the present that he thinks that we should buy for Jean.'

2.3.2 The movement derivation of CACs

Most accounts for the patterns in lines (b–e) in Table 2 are cast in terms of locality conditions on *wh*-movement: in a nutshell, fronted arguments without resumption create islands for movement, left peripheral adjuncts and CLLD do not. This is represented schematically in (23): in English (23a), the fronted argument gives rise to intervention, the adjunct in English (23b) and the CLLD constituent in French (23c) do not. If the degradations in lines (b–e) in Table 2 can be made to follow from a theory of locality, it is tempting to also try to capture the restrictions on CACs in line (a) in terms of locality.

- (23) a. * $[_{CP}$ to whom $[_{CP}$ $[_{TopP}$ the cooked vegetables ... $[_{TP}$... $t_{to\ who}$
 b. $[_{CP}$ to whom $[_{CP}$ $[_{Top/ModP}$ in the present circumstances ... $[_{TP}$... $t_{to\ who}$
 c. $[_{CP}$ ce que $[_{CP}$ $[_{TopP}$ à Marie ... $[_{TP}$... **lui**... $t_{ce\ que}$

Under this view: the apparent restricted availability of the left periphery in CACs is not due to “structural reduction” as such; rather, the reduced availability of the left peripheral space as a landing site for movement should be made to follow from intervention. Such an approach entails then that CACs should be derived by movement. By analogy with (23), the derivation of a temporal *when* clause would be schematically represented as in (24a), with the blocking effect of the argument in English being represented in (24b) and the availability of French CLLD in (24c):

- (24) a. When $[_{TP}$ she t_{when} began to write her regular column again ...
 b. *When $[_{TopP}$ her regular column_{ob} $[_{TP}$ she t_{when} began to write t_{ob} again ...
 c. When $[_{TopP}$ last month
 $[_{TP}$ she t_{when} began to write her regular column again, ...
 d. Quand $[_{TopP}$ cette chanson $[_{TP}$ je l'ai t_{quand} entendue, ...

This hypothesis is fully in line with proposals in the literature on the internal syntax of adverbial clauses. That temporal adverbial clauses are derived by movement of a TP-internal operator to the left periphery has been proposed among others by Geis (1970; cited in Ross 1967: 211), Reuland (1979), Larson (1985; 1987; 1990), Johnson (1988), Declerck (1997), Demirdache & Uribe-Etxebarria (2004; 2012), Stephens (2007), Zentz (2011). Similarly, a movement analysis for conditional clauses is developed in Haegeman (2010a; b) and builds on proposals by Lycan (2001), Bhatt & Pancheva (2006) and Arsenijević (2006; 2009a). Given a movement derivation of CACs, the restrictions on their left periphery follow: in order not to “hinder” the movement deriving these clauses, a number of positions in the left periphery must not be activated. The “structural reduction” in CACs results from the derivation. The left periphery remains available for those constituents (e.g. the left dislocated constituent of CLLD) that do not block movement. We refer to Haegeman (2010a; b; 2012) for more detailed discussion of the movement derivation.

2.3.3 The derivation of PACs

If the movement derivation of CACs is adopted to capture the restrictions on the availability of their left periphery, this raises the question of how PACs should be derived. If the unavailability of fronted arguments and speaker-anchored adverbials in CACs is interpreted as evidence for structural deficiency and is captured in terms of the movement derivation, then the availability of the same entities in PACs suggests that these are not structurally deficient. Two options can be envisaged: either PACs are not derived by movement, rather they are full clausal structures embedded under the relevant complementizer, or, alternatively, PACs are derived by movement of an operator launched from a high position in the PAC, which by virtue of its high location will not interfere with material located in a lower left peripheral position. The latter option would bring the derivation of PACs in line with Arsenijević’s (2009b) proposal for the derivation of finite complement clauses. This author treats finite complement clause as the result of the relativization of the Force projection “which is the highest projection of this type of clauses” (Arsenijević 2009b: 49). We refer to his work for motivation. If in PACs too, the operator is launched from a high Force projection, this will not impact on the articulation of IS values in what would be the lower layers of the left periphery.

3 Head movement and restrictions on the left periphery

3.1 Head movement to the left periphery and locality

In the discussion above, it is tacitly assumed that CACs are derived by the leftward movement of a maximal projection (e.g. *when* in 24a, b) and that this is compatible with the presence of adjuncts and CLLD constituents because, by hypothesis, these constituents do not give rise to intervention effects.

While CLLD constituents remain compatible with XP movement to the left periphery, it should be noted that they are not compatible with head movement to the left periphery. Cardinaletti (1997; 2004: 141) discusses the restrictions on the availability of the left periphery in the Italian Aux-to-Comp pattern, in which a non-finite verb moves to the C domain, inverting with the subject. The pattern is illustrated in (25), from Cardinaletti (2004: 141, her 96). Of interest for the current paper is the observation that while pre-verbal subjects are available in Aux-to-Comp configurations, as shown by acceptability of the pre-verbal DP *Gianni* and the weak pronominal subject *egli* in (25a), CLLD is not available in the same context (25b, c).

(25) Italian

- a. Avendo Gianni/ egli telefonato a Maria, ...
have.GER Gianni/ he phone.PRT to Maria ...
- b. *Avendolo {io} il libro {io} dato a Gianni ieri, ...
have.GER.it (I) the book (I) give.PRT to G. yesterday ...

Similarly, while adjuncts preceding the subject remain compatible with XP movement to the left periphery, they are not available in a configuration created by head movement. Rizzi (1997: 303, 57) shows that in Italian the adjunct *improvvisamente* ‘suddenly’ can be sentence-medial (26a) or sentence-initial (26b). In contrast, (26c) and (26d) illustrate the Aux-to-Comp environment: the non-finite auxiliary *essendo* ‘being’ has moved to C. (26c) shows that Aux-to-Comp, i.e. T to C movement, is compatible with the presence of an adjunct in a medial position; (26d) shows that Aux-to-Comp is not available when the adjunct precedes the subject.

(26) *Italian*

- a. Mario è improvvisamente tornato a casa.
Mario be.3SG suddenly turn.PRT to home
‘Mario came suddenly back home.’
- b. Improvvisamente, Mario è tornato a casa.
suddenly Mario be.3SG turn.PRT to home
‘Suddenly, Mario came back home.’
- c. Essendo egli improvvisamente tornato a casa...
be.GER he suddenly turn.PRT to home...
- d. *Essendo improvvisamente egli tornato a casa...
be.GER suddenly he turn.PRT to home

These patterns are replicated for English. In the embedded interrogative context (27a), the adverbial adjunct *at that time* may occupy a position between the fronted *wh*-phrase *which models* and the subject *they*. (27a) confirms that the adjunct does not constitute an intervener for leftward movement of the *wh*-phrase. In root contexts, the same adjunct may appear to the left of the fronted *wh*-phrase as shown in (27b). But crucially, the adjunct cannot follow the inverted auxiliary (27c). Thus, while the adjunct is compatible with XP movement to the left periphery, (27c) shows that it is incompatible with head movement to the left periphery. The data in (28) replicate the effect for *yes-no* questions:

- (27) a. I still wonder which models at that time they were selling best.
b. At that time, which models were they selling best?
c. *Which models were at that time they selling best?
- (28) a. I still wonder whether at that time they were selling the German models best.
b. At that time, were they selling the German models best?
c. *Were at that time they selling the German models best?

Rizzi (1997: 303) interprets the incompatibility of a left peripheral adjunct with T to C movement as a violation of the Head Movement Constraint (HMC) (Travis 1984). For him, the fronted adjunct occupies the specifier of a left peripheral TopP, whose head, Top, blocks head movement of the auxiliary. (28d) would represent the derivation of the illicit (28c):

- (28) d. * $[_{CP}$ were $[_{TopP}$ at that time $[_{Top}$... $[_{TP}$ they ~~were~~ selling....

Observe in passing that the incompatibility of adjuncts with T to C movement and their compatibility with XP movement militates against a simple adjunction analysis for adjuncts. If initial adjuncts were simply TP adjoined it is not clear why they should interact with head movement.

3.2 Head movement and the left periphery of English adverbial clauses

We have seen that T to C movement imposes more important restrictions on the left periphery than does XP movement. This leads to the prediction that in cases in which adverbial clauses are derived by head movement, their left periphery will appear to be more impoverished, in that, for instance, in such contexts adjuncts will also be banned. This is confirmed for English, the relevant data for which were already discussed by Rizzi (1997: 303), and which we will discuss in this section, and it also applies to Japanese, as shown in Endo (2011b; 2014). We discuss the Japanese data in Section 3.3.

3.2.1 Head movement in English adverbial clauses

In English, a subset of conditionals introduced by the conjunction *if* allow for a paraphrase in which the finite auxiliary moves to the left periphery. This option is available for conditionals with the irrealis modals *should* (29), *had* (30), *were to* (31). We do not go into these data in detail, for recent discussion see Biberauer & Roberts (2014).

- (29) a. If you should see her, call me.
b. Should you see her, call me.
- (30) a. If I had seen her, I would have told you.
b. Had I seen her, I would have told you.
- (31) a. If he were to call me again, I'll let you know.
b. Were he to call me again, I'll let you know.

As already discussed by Rizzi (1997), while the CAC with the non-inverted auxiliary in (32a) allows for an adverbial in the position to the left of the subject, the same adjunct is banned if the conditional is derived by subject auxiliary inversion as in (32b):

- (32) a. If tomorrow you should see her, call me.
b. *Should tomorrow you see her, call me.

Haegeman (2010a, 2012) proposes that conditional *if* clauses are derived by XP movement of an Irrealis operator (in terms of Cinque's 1999 hierarchy), which is taken to correspond to Bhatt & Pancheva's (2006) World operator. For the patterns with subject auxiliary inversion, we can then assume that the moved head is the head of the same Irrealis projection, as argued for extensively in relation to West Flemish in Haegeman (2010a).

3.2.2 Head movement and peripheral conditionals

A further observation is in order. The English conditional clauses derived by inversion illustrated in (29)–(32) are all CACs. This is not a coincidence: peripheral conditional clauses do not allow for the inversion strategy. This may be related to the fact that, while compatible with a wide range of modal auxiliaries, PACs are incompatible with the irrealis auxiliaries that typically trigger the inversion: in (33), in which the conditional clause is intended as a PAC, the auxiliary *had* cannot have an irrealis reading.

- (33) If [as you claim] you had seen her yesterday, why did you....?

Observe also that, for instance, even when PACs contain the modal *would* with an irrealis reading, inversion of this auxiliary still cannot derive a conditional clause (34). Nor is

inversion available with the irrealis use of *be to*.⁴ Similarly, subject auxiliary inversion is not available with a past tense form of *be to* (35):

- (34) a. If [as you say] you would have done it later that day, why didn't you tell me?
 b. *Would you have done it later that day, why didn't you tell me?
- (35) a. If [as you say] he was to have been present at the inauguration, why didn't he tell me?
 b. *Was he to have been present at the inauguration, why didn't he tell me?

That head movement of the irrealis modal is not available in PACs is also suggested by the Polish data discussed in Tomaszewicz (2009; 2012), who develops a head movement derivation of Polish counterfactual conditional clauses. In the matrix counterfactual clause (36a), the modal particle *by* follows the subject. In the conditional counterfactual clause (36b), a CAC, the same particle *by* is adjacent to the conjunction *gdy* 'when', which serves to introduce the conditional clause, and it precedes the subject. Tomaszewicz (2009; 2012) analyses the CAC in (36b) in terms of head movement. In contrast, she shows that in PACs, the modal particle *by* follows the subject, like it does in main clauses. For some additional discussion of Polish, see Section 4.4.

- (36) *Polish*
- a. Janek {kupił*by* /*by* kupił } Jaguara.
 Janek buy.PRF.PRT.*by*.3SG /*by*3SG buy.PRF.PRT Jaguar
 'Janek would buy a Jaguar.'
- b. Gdy*by* Janek kupił Jaguara, to ja *bym* kupił
 when+by John buy.PRF.PRT Jaguar then I *by*.1SG buy.PRF.PRT
 Mercedes.
 Mercedes
 'If Janek bought a Jaguar, then I would buy a Mercedes.'
- c. Skoro Janek kupił*by* Jaguara, to ja *bym* kupił
 since John buy.PRF.PRT+*by*.3SG Jaguar then I *by*.1SG buy.PRF.PRT
 Mercedes.
 Mercedes
 'Since John is willing to buy a Jaguar, then I would buy a Mercedes.'

3.3 A gradient typology of adverbial clauses

So far, we have been operating with a binary opposition between CACs and PACs. However, while this opposition can be used as a rough typology of adverbial clauses, it turns out that a more subtle approach is needed, as revealed by Endo's (2011a; b; 2012; 2014) work on Japanese adverbial clauses. In particular, exploring a body of descriptive work on Japanese grammar, Endo has shown that in terms of the availability of internal functional structure, i.e. the internal syntax, the typology of adverbial clauses must ultimately be recast in terms of a gradient system.

Endo's proposal is based on the distribution of post-verbal functional elements in adverbial clauses. Japanese (37a) illustrates the sequencing of functional elements and (37b) represents the corresponding functional hierarchy for the clause which will be adopted here. The labels S-mood and A-mood refer to two speech act related moods, with, as suggested by the abbreviation, S-mood being speaker-related and A-mood addressee related. The label A-mood refers to the locus for the encoding of the speech act. A-mood is also

⁴ Thanks to Andrew Radford for judgments and helpful discussion.

sometimes referred to as interpersonal mood. (See Endo 2007 for A-mood sentence-final particles and S-mood elements in Japanese.) In (37a): the element *rare* represents passive voice, the element *tei* represents progressive aspect, the element *na* represents negation and the element *i* represents present tense.

- (37) a. Narabe rare- tei- na- i- daroo- ne.
 arrange VOICE ASP NEG T S-MOOD A-MOOD
 ‘Things do not seem to have been arranged, do they?’
 b. Voice < Asp < Neg < T < S-Mood < A-Mood (= Speech-act)

Minami (1974) and Noda (1989; 2001) demonstrate that there is a “gradience” in the availability of post-verbal functional elements in adverbial clauses. Table 3 inventories the relevant gradience: at one extreme, aspectual *nagara* ‘while’ clauses only allow for a voice head to be present in their functional field, while, at the other extreme, *ga* ‘though’ clauses allow almost the full array of functional elements, and *ba* and *nara* clauses are somewhere in between.⁵

In Table 3, Noda uses the term “Pol” for “Polarity” to cover both the negation morpheme *na* and – by hypothesis – its non-overt counterpart, the affirmation morpheme ϕ .⁶

(39) illustrates the patterns. In the *nagara* clause in (39a), the aspectual element *tei* is not available. Note that the same element *tei* remains available in the associated main clause, a point to which we return in Section 4.2.⁷ In contrast in the *ga* clause in (39b),

Table 3: Noda’s typology of adverbial clauses (based on Endo 2012; 2014; Minami 1974).

		Voice	Aspect	Pol	T	S-Mood	A-Mood
Group A	<i>nagara</i> ‘while’	+	–	–	–	–	–
Group B	<i>zuni</i> ‘without’	+	+	–	–	–	–
Group C	<i>ba</i> ‘if’	+	+	+	–	–	–
Group D	<i>toki</i> ‘when’	+	+	+	+/-	–	–
Group E	<i>node</i> ‘because’	+	+	+	+	–	–
Group F	<i>ga</i> ‘though’	+	+	+	+	+	–

⁵ A note of caution about Noda’s table is in order. The table simply expresses the pattern of functional elements that may appear in each type of adverbial clause, and does not make any commitment to the selectional properties of the functional head. Because the adverbial clause head is a bound morpheme, it seems reasonable to assume that each adverbial head carries a selectional specification, just like, for instance, the English bound morpheme *-ing* carries the specification that it merges with a verbal element. For instance, consider *nagara* ‘while’. Because *nagara* ‘while’ merges with a verbal element, it may follow a verbal stem like *tabe* ‘eat’, as in *tabe-nagara* ‘while eating’ but it cannot follow a non-verbal element like *mo* ‘also’, as in **tabe-mo-nagara* ‘eat-also-while’. The merger of the adverbial head is subject to phonological adjacency, just like the English bound morpheme *-ing* is required to be phonologically adjacent to a verbal element like *eat*, as in *also eat-ing* vs. **eat-also-ing*. (cf. Lasnik 2000; Harwood 2013 for discussion). In a similar way, an element like *mo* ‘also’ may not intervene between *nagara* ‘while’ and the verbal stem *tabe* ‘eat’, as we saw above.

⁶ An anonymous reviewer notes that *na* ‘not’ is an adjective. The categorial status of the elements of the functional spine is tangential to the analysis: in terms of the Cinque (1999), the functional heads in the clausal spine may be realized by a range of categories (bound morphemes, particles, auxiliaries, for instance). From this perspective, it might be proposed that *na* is a “functional” adjective in the same way that an auxiliary could be characterized as a functional verb.

⁷ As an anonymous reviewer notes, functional elements such as *tei* or *yooda* can be decomposed.

With respect to the former, *te* is originally a gerundive verb suffix and *i* is an independent verb. We assume that *tei* is the result of a grammaticalization process that has given rise to a complex word which occupies the head position, as shown by the fact that the two components *-te* and *i*, cannot be separated as in **te-mo-i* ‘te-also-i’. As for the categorial status of the complex element *tei*, as mentioned before, the categorial content of functional heads may vary (see note 5). See also Ogihara (1998) for the semantics of the element *tei*.

The S-mood element *yooda* can be decomposed into *yoo* and *da*. *Da* is a copula. The status of *yoo* is not clear: for the same reviewer *yoo* is a noun, but based on the observations by Miyagawa (1987) and Ohkado (1991), Baker (2003) identifies the element preceding *na* as adjective and Hisashi Noda (personal communication) pointed out to us that *yoo* can also be identified as an adjective or an element carrying the feature [+A].

not only the aspectual element *tei* but also the polarity element *na*, the tense element *ta* and the S-mood element *daroo* are available. *Ba* and *node* clauses in (39c) and (39d) are somewhere in the middle. In a *ba* adverbial clause in (39c), the aspectual element *tei* and the negation element *na* are available, but the tense element *i* is not. The *ba* adverbial clause in (39c) is minimally different from the *node* adverbial clause in (39d), in which the tense element *i* is available, while the S-mood element *daroo* is not.⁸

- (39) a. Neko-wa atama-o nade-rare- (*tei-) nagara zitto si- tei- ru.
 cat.TOP head.ACC pat.PASSIVE (*ASP) while still stay ASP NPST
 ‘While its head is patted, the cat stays still.’
- b. Neko-wa atama-o nade-rare- tei- na- i- daroo (*ne)
 cat.TOP head.ACC pat.PASSIVE ASP NEG- PRESENT S-MOOD (*A-MOOD)
 ga zitto si- tei ru.
 though still stay ASP NPST
 ‘Though its head does not seem to be patted, the cat stays still.’
- c. Neko-wa atama-o nade-rare- tei- na- (*i-) kere ba zitto
 cat.TOP head.ACC pat.PASSIVE- ASP NEG- (*PRESENT) INFL if still
 si- tei- ru.
 stay ASP NPST
 ‘If its head is not patted, the cat stays still.’
- d. Neko-wa atama-o nade-rare- tei- na- i- (*daroo) node
 cat.TOP head.ACC pat.PASSIVE ASP NEG- PRESENT (*S-MOOD) because
 zitto si- tei ru.
 still stay ASP NPST
 ‘Because its head is not patted, the cat stays still.’

Superficially, then, one might say that *nagara* ‘while’ clauses are highly defective in that only the voice element can be present, that *ga* ‘though’ clauses have an extended functional structure and that *node/ba* ‘when’/‘if’ clauses are somewhat less reduced than *nagara* clauses. This entails that we no longer have a binary opposition between CACs and PACs and that instead there is a more fine-grained cline of available functional structure with the different clauses displaying various degrees of reduction. The gradience observed for Japanese cuts across Haegeman’s binary opposition between CAC and PAC, with *nagara*, *zuni*, *ba* and *toki* plausibly seen as introducing CACs and *node* and *ga* introducing PACs.

⁸ In an earlier version of the paper, we noted that *node* ‘because’ cannot be preceded by the S-Mood head *yooda* ‘seem’ in the present tense form. An anonymous reviewer pointed out that *yoodatta*, the past tense form of the S-mood element, *can* appear in the *node*-adverbial clause. Based on Cinque’s (1999) hypothesis that present and past tense are encoded in different functional heads, with present tense higher than past tense, we propose that the adverbial head *node* ‘because’ is base-generated in a position between the two mood elements, with the hierarchy *yooda* ‘seem’ > *node* ‘because’ > *yoodatta* ‘seemed’. Because the higher mood element *yooda* ‘seem’ would be crossed by head movement of the adverbial head *node* ‘because’, it cannot appear in the *node* adverbial clause by HMC. In contrast, the lower mood element *yoodatta* ‘seemed’ is not crossed by head movement of the adverbial head *node* ‘because’, as a result of which it may appear in the *node* adverbial clause. (See Endo 2015; 2018 for reason expressions).

The same reviewer also notes that the mood element *yoona* in its prenominal form may also appear in the *node* adverbial clause. We suggest that the mood element *yoona* is base-generated in a syntactic position lower than the adverbial head *node* ‘because’, leading to the hierarchy *yooda* ‘seem’ > *node* ‘because’ > *yoodatta* ‘seemed’/ *yoona* ‘seem’. Because *yoona* ‘seem’ is not crossed by head movement of the adverbial head *node*, it may appear in the *node* adverbial clause. Needless to say, more work is required to motivate the proposed cartography of the mood elements: *yooda* ‘seem’ > *node* ‘because’ > *yoodatta* ‘seemed’/ *yoona* ‘seem’.

One might tie the different distributions of the mood elements *yooda*, *yoodatta* and *yoona* to interpretive differences, such as the difference between subjective and objective modality (Papafragou 2006), proposing, for instance, that *yooda* encodes subjective modality and hence must be speaker-anchored, thus precluding the past tense (cf. Zagana 2007; 2007). See also Cinque (2004) and Haegeman (2005; 2006c; 2011) on instantiations of ‘seem’ in Italian and in French, in which subtle semantic distinctions can be seen to have a syntactic (and distributional) reflex. For reasons of space we cannot go into this in more detail here.

For Japanese, the appearance of gradient structural reduction as reflected in the availability of functional elements can be made to follow if we assume with Endo (2011b; 2014) that adverbial clauses are derived by head movement. This is so because, as we have seen, in line with what has come to be known as the Head Movement Constraint (Travis 1984), head movement has more drastic effects on the available structure than XP movement (see Section 3.2). Assuming, for instance, with Endo (2011b; 2014) that the aspectual *nagara* clause is derived by the movement of the functional head Asp, and that intervening heads on the movement path constitute interveners for the movement of the head, it follows by the HMC that none of the hierarchically higher heads in the functional sequence (38b) will be available, mimicking a deep truncation effect. Also, *nagara* clauses will not host the aspectual element *tei* because *nagara* itself and the aspectual element compete for the single position of the Asp head. In Section 3.4, we develop the head movement analysis in more detail.

3.4 The head movement derivation of Japanese adverbial clauses

To capture the gradient clause-internal variation in the presence of functional material in Japanese adverbial clause, Endo (2011b; 2014) develops a head movement derivation. In his analysis, the observed gradience in the availability of the functional heads reflects the derivation of the adverbial clause.

Concretely, we have seen that adverbial clauses may show defectivity in the availability of the functional heads. Endo's proposal is based on the hypothesis that the lowest functional head that is missing in the adverbial clause corresponds to the head that has been moved to the left periphery. Due to the HMC, as a direct consequence of the movement of this head, all higher functional heads also become unavailable, i.e. must be missing. We illustrate the proposal with two concrete examples. Endo proposes that *nagara* 'while' clauses are derived by the movement of the aspectual head to the C domain. On the one hand, in line with the discussion of the English data in (32), and due to the HMC, head movement of Asp entails that the functional projections dominating Asp become unavailable, while the projections dominated by AspP (e.g. VoiceP) can be present. On the other hand, the proposal also entails that the features associated with the moved Asp head will end up on the C-head that is responsible for clause typing. Similarly, if *zuni* clauses are derived by movement of the Pol head, then this means that, while AspP can be projected, projections dominating PolP are unavailable. We refer to Endo's own work (2012b; 2014) for more details.

There remain a number of questions concerning the implementation of this derivation, which, though important, are somewhat tangential to our initial focus, namely that of the relation between internal syntax and external syntax of adverbial clauses.

First, the implementation of the head movement analysis as outlined here will ultimately be heavily dependent on the specific assumptions about the architecture of the clause and in particular about the granularity of the functional hierarchy. So, any decisions taken at that level will determine the labels of the functional hierarchy at play. A further question is whether, in a head movement derivation of adverbial clauses, the relevant head which undergoes movement to the left periphery, is associated with an operator and if so, what the fate of that operator is. A question of a different nature is whether the head movement analysis could in fact be reformulated in terms of XP movement in an account in which the final position of the post-verbal elements in Japanese results from leftward XP movement (in terms of Kayne's 1994 Antisymmetry approach). Under such a view, it is conceivable that the adverbial clauses be derived by a movement of the clause which smuggles (in the sense of Collins 2005) the relevant head/operator.⁹ Endo (2012) proposes a truncation analysis of adverbial clauses in Japanese. As discussed here, the effect of truncation follows from head movement.

⁹ We thank John Whitman (personal communication) for this suggestion.

3.5 Head movement and XP movement

The head movement analysis of adverbial clauses raises more general questions of comparative syntax. One question concerns cross-linguistic variation: we need to examine to what extent languages vary parametrically in the way that adverbial clauses are derived by head movement or by phrasal movement.

At first sight, it might have seemed natural and tempting to try to relate the fact that Japanese systematically implements head movement rather than operator movement to derive adverbial clauses to the fact that Japanese is a *wh* in situ language. However, a rigid classification according to which languages either deploy head movement or XP movement, depending on other properties of their syntax, is empirically incorrect. The variation (head movement vs. XP movement) is not absolute: we have already shown, for instance, that in English, head movement is available for a subset of conditional clauses, as shown in (29)–(32), see also Biberauer & Roberts (2014) on the parametrization of head movement.¹⁰ Similarly, West Flemish *by* and *large* can be argued to derive adverbial clauses by XP movement (see Reuland 1979 for arguments for the XP movement derivation in Dutch and Flemish), but a subset of conditional clauses can be derived either by XP movement or by head movement. These are illustrated in (40): in (40a), the conditional clause is introduced by the conjunction *oa* ‘als’, and the assumption is that this is derived by the movement of a null operator to the left periphery (see Haegeman 2012: 220 for arguments); in (40b) the adverbial clause is derived by movement of the finite irrealis auxiliary *moest* ‘should’ to the left periphery (see Haegeman 2010a for discussion and motivation).

¹⁰ A possible parameterization between English and Japanese might be that English may use an XP movement in the derivation of adverbial clauses while Japanese may not. This point is based on the well-known ambiguity of complex temporal clauses in (i) and (ii) (Geis 1970; 1975; 1985; Larson 1985; 1987, etc.):

- (i) I saw Mary in New York [before she claimed [that she would arrive]].
 (ii) I saw Mary in New York [before she asked how to fix the car].

English (i) is ambiguous: it may mean that I saw Mary before she made the claim (high reading) or before the time of her predicted arrival (low reading). Note that the latter interpretation is barred in (ii), where it is assumed that a temporal operator (=XP) moves from within the adjunct clause to the initial position of the clausal complement of *before*, violating Subjacency. In contrast to the temporal clause in English, Miyagawa (2012) shows that Japanese temporal clauses such as (iii), which corresponds to English (i), only have the high construal of the temporal conjunction. This can be taken as evidence that Japanese temporal adverbial clauses are derived without XP movement.

- (iii) John-wa [Sheila-ga [kare-ga dekakeru beki da to] itta] toki, dekaketa.
 John.TOP Sheila.NOM he.NOM leave should COP C said when left

One possible objection to the idea that there is no operator movement in (iii) is found in (iv), as noted by Miyagawa (2012: 102), who attributes the observation to Hiroki Maezawa (personal communication).

- (iv) John-wa [Sheila-ga [kare-ga dekakeru beki da to] itta] toki-ni, dekaketa.
 John.TOP Sheila.NOM he.NOM leave should COP C said when-at left

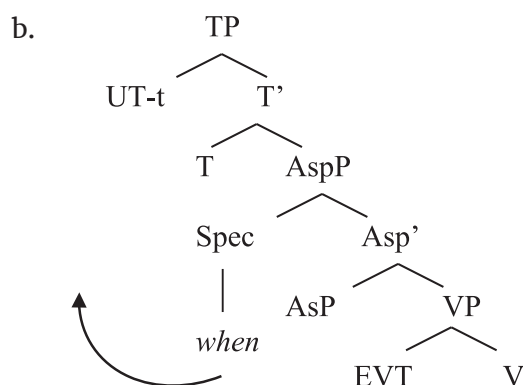
Here, the postposition *ni* appears with the *toki* ‘when’ phrase, and although the high reading is more natural, it is also possible to obtain the lower reading. This suggests that Japanese also has operator (=XP) movement within temporal clause in some environment. However, it is not necessary to have recourse to operator movement to obtain the low reading in (iv). Based on the fact that the low reading is naturally obtained when the postposition *-ni* and the predicate of the clause *dekakeru beki da* are read with focus intonation, one option is that the low reading is obtained by Agree relation between the postposition *-ni* and the predicate of the clause. We will not pursue the discussion on this point.

(40) *West Flemish*

- a. Oa-j em moest zien, zou'j 't em keunen zeggen.
if-you him should see, could.you it him can say
'If you should see him, you could tell him.'
- b. Moest-je em zien, zou'j 't em keunen zeggen.
should you him see, would you it him can say
'Should you see him, you could tell him.'

As discussed, the further implication of Endo's analysis is that we have to abandon the binary opposition between CACs and PACs. Concretely, if the functional hierarchy determines the internal structure of adverbial clauses in the case of head movement, as suggested above, and if, as also suggested, head movement and XP movement are alternative ways of deriving adverbial clauses, it follows that also in the case of XP movement, a more fine-grained approach is needed, in which the relevant operator that is extracted will vary depending on the type of adverbial clause. Though the complete gradience has yet to be determined and will depend on the granularity of the functional hierarchy, the idea that the binary opposition must be replaced by a more fine-grained approach taking into account the functional hierarchy of the clause is foreshadowed in the literature. We illustrate this point briefly here.

In Haegeman's original proposal (1991, etc) adopted here both temporal clauses and event conditionals are CACs. Adopting a minimalist functional hierarchy, Demirdache & Uribe-Etxebarria (2004; 2012) propose that temporal adverbial clauses introduced by *when* are derived by movement of temporal operator. In their proposal, the launch site of the operator that derives temporal clauses is SpecAspP, which hosts the reference time. (41) summarizes the analysis. We refer to their work for detailed motivation.

(41) a. Demirdache & Uribe Etxebarria (2012)
when Zooey left

In terms of a more fine-grained functional hierarchy such as Cinque (1999: 87–88), the relevant projection will have to be reinterpreted in terms of the specialized temporal projections.

Bhatt & Pancheva (2006) propose that conditional clauses are derived by the movement of the World operator, which, in terms of the Cinque hierarchy of functional projections, Haegeman (2010a; 2012) reinterprets as the Irrealis (mood) operator, which is associated with a projection that is dominated by the temporal projections (see Haegeman 2010a).

(42) Cinque (2004: 133, his 3)

MoodP_{speech act} > MoodP_{evaluative} > MoodP_{evidential} > ModP_{epistemic} > TP (Past) > TP
 (Future) > MoodP_{irrealis} > ModP_{alethic} > AspP_{habitual} > AspP_{repetitive} > AspP_{frequentative} >
 ModP_{volitional} > AspP_{celerative} > TP (Anterior) > AspP_{terminative} > AspP_{continuative} >
 AspP_{retrospective} > AspP_{proximative} > AspP_{durative} > AspP_{generic/progressive} > AspP_{prospective} >
 ModP_{obligation} > ModP_{permission/ability} > AspP_{completive} > VoiceP > AspP_{celerative} >
 AspP_{repetitive} > AspP_{frequentative}

Thus, while temporal adverbial clauses and conditional clauses are CACs and while both are derived by operator movement, the launch sites of the operators differ with the temporal operator originating in a higher position than that associated with conditional clauses.

If such a more fine-grained typology is called for, the question arises whether there is any need to maintain the binary opposition between CACs and PACs at all.¹¹ Though clearly of interest, we will not explore this point here and we return to the second research question which we have raised: how can one account for the correlation between the internal and the external syntax of adverbial clauses?

4 Relating the internal syntax and the external syntax of adverbial clauses

4.1 Introduction

In a nutshell, the correlation uncovered in relation to adverbial clauses is that PACs are merged in a higher position than CACs and that the higher the adverbial clause is merged (Section 1.1), the more structure is available within the adverbial clause (Section 1.2).

Building on Hooper & Thompson (1973) and Haegeman (2003: 6), Frey (2011) postulates that, being root like, PAC's host a Force projection and that, by virtue of this, PACs must be licensed through the matrix Force. We refer to his paper for details. Interestingly, Frey's analysis can be taken to entail that there is a "matching" condition on the merger of PACs in that a property of their internal structure, in particular, the PAC-internal presence of the projection ForceP, imposes restrictions on their licensing and as a result determines the level of merger with the matrix clause. Put informally, an adverbial clause which contains the Force head must merge at the level of Force in the matrix clause.

Similarly, in English, temporal clauses introduced by *since* impose restrictions on the temporal and aspectual coordinates of the matrix clause (Quirk et al. 1985: 1015–1018), as shown in (43): in British English, modification by a temporal *since* clause requires a main clause perfective aspect:

- (43) a. I have been living in London since I was a child.
 b. *I live in London since I was a child.
 c. *I am living in London since I was a child.

The intuition that there is a matching condition between the adverbial clause and the matrix clause which it modifies is fully exploited in Endo's work on Japanese adverbial clauses, which elaborates earlier work by Noda (1989), where a general algorithm is developed for the merger of adverbial clauses. Put informally, Endo's core proposal is that the functional make-up of the adverbial clause, which is itself a function of its internal syntax, determines the locus of merger in the matrix clause. As the functional make-up of the adverbial clause itself is a function of its derivation, as shown in Section 3.4, this

¹¹ Haegeman (2012: 165–166) argues that coordination of adverbial clauses is governed by the binary typology. This will have to be re-examined in the light of our finding that a more gradient typology is needed.

ultimately means that the derivation of the adverbial clause determines the merger with the main clause it modifies. In this section, we present Endo's proposals in some detail.

4.2 Adverbial concord

Noda (1989) was the first to discuss what he called the "concord" relation between the presence of a specific adverbial clause and the availability of functional heads in the clause it modifies. For instance, the presence of an aspectual *nagara* 'while' clause restricts the choice of the matrix aspectual element. This is illustrated in (44). Examples (44a) and (44b) illustrate two aspectual elements in root clauses: progressive *tei* and inceptive *hazime*. As shown by (44c) and (44d), a matrix clause modified by a *nagara* clause may contain the progressive aspectual element *tei*, and cannot contain the inceptive aspectual element *hazime*.

- (44) a. Gohan-o tabe-tei-ru.¹²
 rice.ACC eat.PROG.NPST
 'I am eating rice.'
- b. Gohan-o tabe-hazime-ru.
 rice.ACC eat.INCEPT.NPST
 'I begin to eat rice.'
- c. Noda (1989: 92)
 [TV-o mi nagara] gohan-o tabe-tei-ru.
 [TV.ACC watch while] rice.ACC eat.PROG.NPST
 'I am eating rice while watching TV.'
- d. Noda (1989: 92)
 *[TV-o mi nagara] gohan-o tabe-hazime-ru.
 [TV.ACC watch while] rice.ACC eat.INCEPT.NPST
 'I begin to eat rice while watching TV.'

One might claim that Noda's proposal simply expresses certain semantic compatibility conditions between the matrix clause and the adverbial clause. However, Noda's proposal is also syntactic in nature, because he claims that the point of attachment of an adverbial is determined by concord with a functional element in the matrix. This raises the question

¹² Two anonymous reviewers for *Glossa* note that (44d) improves if the present particle *-ru* is replaced with the past particle *ta*, just like the English example *while watching TV, I began to eat rice*. However, As Hisashi Noda (personal communication) pointed out to us, the use of the English *while* clauses and Japanese *nagara* clauses are not entirely the same in that the event time of the main clause and the *nagara* clause are typically interpreted to be identical, which is not the case in English. Thus, in our example *TV-o mi nagara gohan-o tabe-hazime-ru* 'I start eating rice while watching TV', the rice eating event and the TV-watching event are to be interpreted to start and end at the same period, like starting from 5:30 and ending at 6:30. In this interpretation, the sentence in (44d) sounds unnatural or ungrammatical. In contrast, the English sentence *while watching TV, I began to eat rice* is not restricted in this way. Thus, the TV-watching event may start, say at 5:30, and then the rice-eating event may start later, say at 5:45, and the TV watching event may continue after the rice-eating event is completed. This interpretation is expressed in Japanese with another type of subordinator *tamama*, which is less integrated into a main clause and is richer in the internal structure than *nagara* clauses, as in *TV-o tuketa mama gohan-o tabe hazimeru* 'I start eating rice while leaving the TV on'. We suspect that the reviewers might interpret the *nagara* clause in (44d) like *tamama* clause/English *while* clause or may allow for *while*-like interpretation with *nagara* clauses. To see the validity of Noda's point, we asked six native speakers of Japanese about the status of the sentences in (44) along with *tamama* adverbial clause where the exposition of the event interpretation we mentioned above is also made. The result is that the six speakers agreed that, irrespective of whether the matrix clause is suffixed by the present tense element *ru* or the past element *ta*, they found a contrast in (44) with the intended interpretation and found (44d) much worse than the *tamama* clause; for one speaker the *nagara* clause might allow for the same interpretation as the *tamama* clause and the sentence in (44d) sounds not so bad, if not natural. In view of this fact, we take the contrast in (44) to be real but we note that there is inter-speaker variation, leaving the issue of the inter-speaker variation for our future research. See Endo (2018) for inter-speaker variation.

of what underlies this concept *concord*. Noda's (1989) idea is that each adverbial clause is associated with a functional element such as Aspect, Tense, etc. and that it restricts the choice of the matrix functional element that it modifies rather than selecting a specific lexical item in the main clause. Noda labels this matching restriction "koou" in Japanese, which is usually translated as "concord" into English. Another way of expressing this relation might be to use the term "correlation" as in Iori (2017: 377), in which the contrast between (44c) and (44d) is characterized as follows: "Since, [reference omitted, lh & ye] a *nagara* clause showing ancillary state fits well with a stative aspect but not so well with a non-stative aspect, it can be said to correlate with stative aspect".¹³

The syntactic nature of Noda's concord relation can be seen in the case where two adverbial clauses appear at the same time. If, as suggested above, the matrix functional head signals the timing of the merger of the adverbial clause, this would lead to the prediction that the higher an adverbial clause is situated in the clause (i.e. the lower its position in Table 3), the later it will be merged with the associated clause and the further from V on its left it will appear. This prediction is largely borne out, as illustrated below. In (45) the matrix clause combines with a conditional *ba* clause and with a *zuni* 'without' clause. As can be seen, the highly-preferred order is that according to which the *zuni* clause is to the right of the *ba* clause. This corresponds to their merge order, the *zuni* clause being merged before the *ba* clause. Similarly, in (46) the *node* clause is merged later, hence it is structurally higher, than the *nagara* clause and precedes it.

- (45) a. Ame-ga fure-ba soto-ni ika zuni, ie-ni iru.
rain.NOM fall-if outside go without home-at stay
'If it rains, without going out, I stay home.'
- b. ??Soto-ni ika zuni ame-ga fure-ba ie-ni iru.
outside go without rain.NOM fall-if home-at stay
- (46) a. Kyuukoo-ni natta-node tosyokan-de hon-o yomi nagara sugosita.
cancel.class get-because library-in book.ACC read while spent.time
'Since the class was canceled, with reading books in the library, I spent time.'
- b. ??Tosyokan-de hon-o yomi nagara kyuukoo-ni natta-node sugosita.
library-in book.ACC read while cancel.class get-because spent.time

Noda (2013) discusses such co-occurring adverbial clauses in detail: he examines the combinations of two adverbial clauses of each type in Noda (1989) to show that the structurally higher adverbial clause precedes the structurally lower adverbial clause, while the reversed word order of the two adverbial clauses is unnatural or ungrammatical. (See also Endo 2012 on this point).

Returning to other types of adverbials, the concord relation between a *zuni* 'without' adverbial clause and the matrix clause is reflected in the availability of polarity elements: a matrix clause modified by a *zuni* clause is incompatible with the negative polarity element *na*. We assume that it must instantiate the non-overt positive element.

¹³ Iori's paper was translated by John Haig, who used the Japanese manuscript prepared by Iori.

¹⁴ Hisashi Noda (personal communication) points out that the Japanese subordinator *zuni* should not be fully assimilated to the English subordinator *without*. Moreover, the situation intended by the *zuni* clause in (47c) can also be rendered by a *naide* clause, which is less integrated into the main clause and which is richer in the internal structure than *zuni* clauses, as exemplified by (i), in which the main clause contains the negative element *na* and which is more acceptable than (47c), if not completely natural.

(i) Yoku mi naide e-o kawa-na-ka-ta.
carefully examine not.PRESENT.suffix portrait.ACC buy.NEG.INFL.PAST
'I didn't buy a portrait without examining it carefully.'

- (47) a. E-o kat- ϕ -ta.
 portrait.ACC buy.POSITIVE.PAST
 ‘I bought a portrait.’
- b. E-o kawa- na- kat-ta.
 portrait.ACC buy. NEG. INFL.PAST
 ‘I did not buy a portrait.’
- c. *[Yoku mi zuni] e-o kawa-na-kat-ta.¹⁴
 carefully examine without portrait.ACC buy.NEG.INFL.PAST
 ‘I didn’t buy a portrait without examining it carefully.’
- d. [Yoku mi zuni] e-o kat- ϕ -ta.
 carefully examine without portrait.ACC buy.POSITIVE.PAST
 ‘I bought a portrait without examining it carefully.’

For *node* ‘because’ clauses, the selection of mood markers in the matrix is constrained:

- (48) a. Kore-o ka-itai.
 this.ACC buy-want
 ‘I want to buy this.’
- b. Kore-o ka-oo.
 this.ACC buy-will
 ‘I will buy this.’
- c. ??[Yasu-i node] kore-o ka-oo.
 inexpensive.PRESENT because this.ACC buy-will
 ‘Because it is inexpensive, I will buy this.’
- d. Hisahi Noda (personal communication)
 [Yasu-i node] kore-o ka-itai.
 inexpensive.PRESENT because this.ACC buy-want
 ‘Because they are inexpensive, I want to buy this.’

Finally, PACs introduced by *ga* ‘although’ only impose restrictions at the level of the top-most layer, which encodes A-mood. When modified by a *ga* clause, the matrix proposition must be associated with the (non overt) neutral A-mood ($=\phi$) and it is incompatible with overt A-mood element such as the question marker *ka*. As illustrated in (49), all other functional heads are instantiated: (49a) and (49b) illustrate root speech act elements; (49c) shows that the neutral mood is available in a root clause modified by a *ga* clause, while (49d) shows that the question marker *ka* is not available.

- (49) a. Sono basyo-wa huben desu- ϕ .
 that place.TOP inconvenient COP
 ‘The place is inconveniently located.’
- b. Sono basyo-wa huben desu-ka.
 that place.TOP inconvenient COP-Q
 ‘Is the place inconveniently located?’
- c. Kankyoo-wa waruku na- i- daroo ga, sono
 environment.TOP bad NEG PRESENT A-MOOD although that
 basyo-wa huben desu- ϕ .
 place.TOP inconvenient COP
 ‘Although the place might not be bad, it is inconveniently located.’

We asked six Japanese native speakers to evaluate the *zuni* clauses in (47) and the *naide* clause in (i). All the speakers found a clear contrast in (47) and for all the *naide* clause (i) was felt to be more acceptable than the *zuni* clause.

- d. *Kankyoo-wa waruku- na- i- daroo ga, sono
 environment.TOP bad NEG PRESENT A-MOOD although that
 basyo-wa huben desu- ka.
 place.TOP inconvenient COP Q
 ‘‘Though the place might not be bad, is it inconveniently located?’’

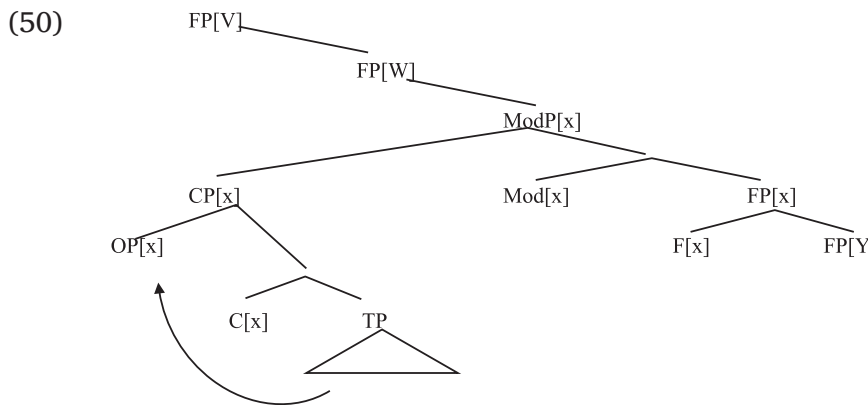
The concord effect, i.e. the correspondence between the adverbial clause and the functional material of the clause which it modifies, is interpreted then as the outcome of a matching relation between the internal syntax of the adverbial clause, the launch site of the head movement that derives the clause, and its external syntax, i.e. the point in functional sequence of the matrix clause where the clause merges. In the next section, we tentatively formalise this matching relation.

4.3 Adverbial concord as a reflex of merge

Let us assume that adverbial clauses are merged as modifiers of the matrix clause by the intermediary of a functional head Mod (cf. Bowers 1993; Rubin 1994; 2003; Rizzi 2004): specifically, we propose that the adverbial clause is merged as a specifier of the functional head Mod. Alternatively, assuming a less articulated structure, the adverbial clause could also be taken to adjoin to the relevant matrix functional projection. We will not examine the difference between these two implementations. The observed ‘‘concord’’ effect in adverbial clauses is a reflex of the matching condition on the external merge of the adverbial clause: to be more precise, there is a featural matching condition on the specifier of Mod and the complement of Mod. Concretely, our analysis rests on two hypotheses.

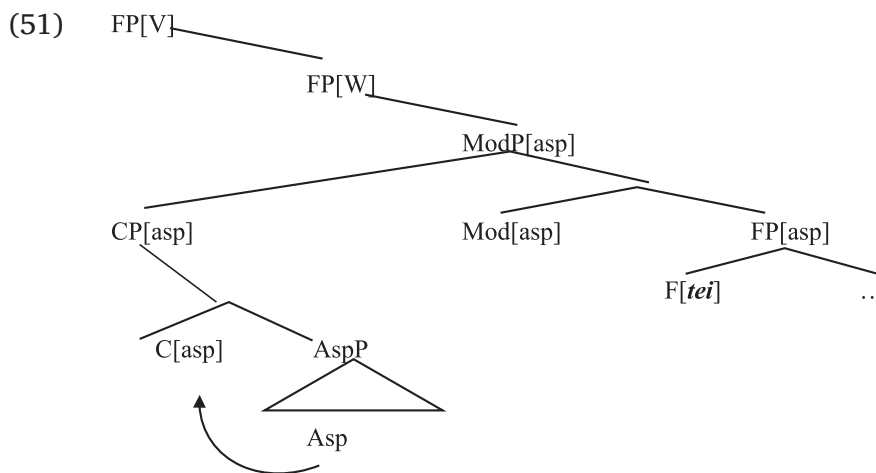
- (i) An adverbial clause is derived by operator movement or by head movement, and the features of the moved operator or the moved head are instantiated as a clause typing feature at the C layer of the adverbial clause. For instance, if *nagara* clauses are derived by head movement of an aspectual head, then the feature [ASP] or [+stative aspect] will be instantiated as a clause typing feature of the adverbial clause.
- (ii) The matching condition on the merger of adverbial clauses requires that an adverbial clause with the clause typing feature [x] merge with a head Mod that selects the functional layer instantiating the (‘‘concording’’) feature [x].¹⁵

This is schematically represented in (50). We assume that the matched feature [x] is also instantiated on Mod.



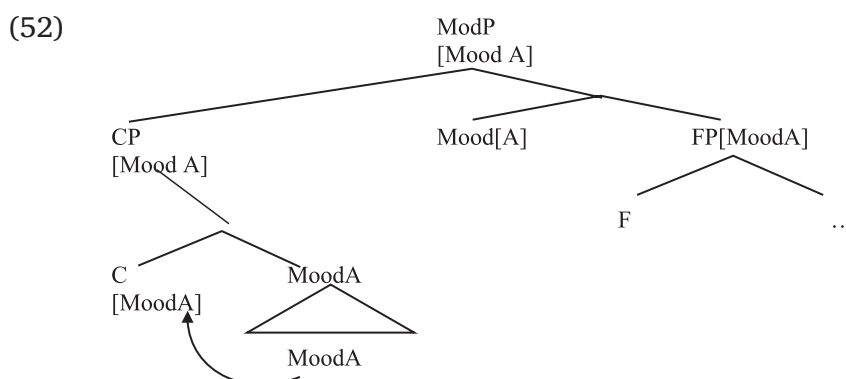
¹⁵ For a similar idea of merging ‘‘parallel’’ clause types: see the ‘‘Level embedding regime’’ of Williams (2003; 2009). For adverbial modifiers see also Bhatt’s (2003) analysis of correlatives, the correlative analysis of conditional clauses in Arsenijević (2009a), and see also the concept of modal concord in Geurts & Huitink (2006) and Zeijlstra (2007).

Concretely: a *nagara* clause will be merged as the specifier of a Mod head, which selects the matrix aspectual projection whose head is spelt out as *tei* (or has the feature [+stative aspect]).



Depending on the relative position that the adverbial clause takes in the gradience scale in Table 3, then, the launch site of the head that moves to derive the clause will vary in height and its launch site will in turn determine both the internal functional structure of the adverbial clause and its external merge in the matrix domain. Observe that *ga* ‘though’ clauses retain almost all functional structure (see 49c). On the assumption that they are derived by head movement, the moved heads must then be topmost in the functional hierarchy. This hypothesis would tie in with the hypothesis formulated in Section 2.3.3, inspired by Arsenijević’s (2009b) work on finite complement clauses, according to which the operator that moves to derive PACs is launched in the speech act projection.

The schematic representation (52) is in line with existing proposals in the literature. (52c) is very close to Haegeman’s representation (5b), and for (52) we can also take the matching of the [Mood A] feature on the PAC with that on the associated clause to correspond to the licencing condition on Force that was discussed in Frey (2011).



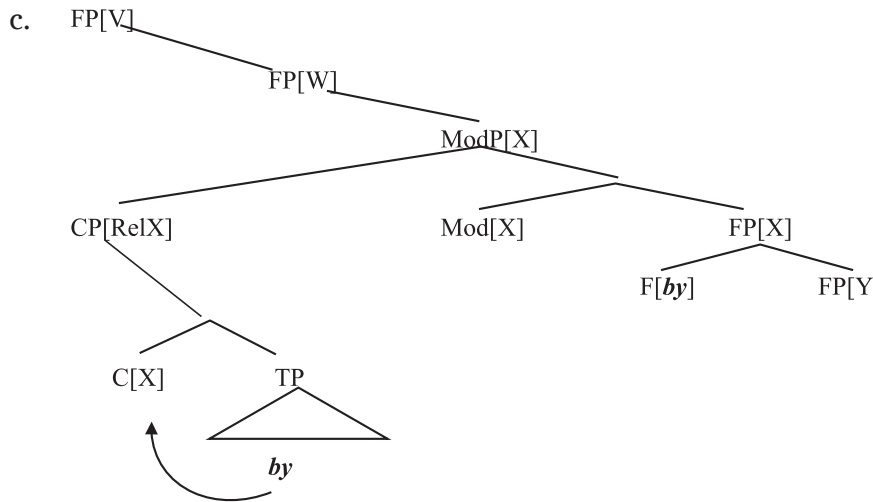
4.4 Polish: By concord in counterfactuals

Tomaszewicz (2009; 2012) develops a head movement derivation of Polish counterfactual conditional clauses. Effects of the matching condition are manifested there too. In the matrix counterfactual clause (53a), the modal particle *by* appears to the right of the subject. In the counterfactual conditional antecedent of (53b), the particle *by* is adjacent to the conjunction *gdy* ‘when’, which serves to introduce the conditional

clause, and it precedes the subject. (53c) shows how the derivation meets the matching condition:

(53) *Polish*

- a. Janek {kupił**by** /**by** kupił} Jaguara.
 Janek buy.PRF.PRT.**by**.3SG /**by**.3SG buy.PRF.PRT Jaguar
 ‘Janek would buy a Jaguar’
- b. Gdy**by** Janek kupił Jaguara, to ja **bym** kupił
 when+**by**.3SG John buy.PRT Jaguar then I **by**.1SG buy.PRF.PRT
 Mercedes.
 Mercedes
 ‘If Janek bought a Jaguar, then I would buy a Mercedes.’



For completeness’ sake, we add that in PACs, *by* follows the subject, like it does in main clauses. This is expected since if PACs are derived by movement, the moved constituent will originate in a higher position.

(54) *Polish*

- Skoro** Janek kupił**by** Jaguara, to ja **bym** kupił Mercedes.
since John buy.PRT+**by** Jaguar then I **by**.1SG buy.PRT Mercedes
 ‘Since John is willing to buy a Jaguar, then I would buy a Mercedes.’

5 Summary

Based on data from a range of languages and exploring the movement analysis of adverbial clauses independently developed in earlier work (Haegeman 2012; Endo 2011b; 2014), the present paper formulates proposals to account for the correlation between the external syntax and the internal syntax of adverbial clauses. We offer a tentative analysis according to which the merge site of an adverbial clause, i.e. its external syntax, is determined by the launch site of the moved constituent, i.e. its internal syntax. This relation is reflected in what has been labeled “adverbial concord” in the descriptive literature on Japanese. One consequence of the study of the Japanese data is that Haegeman’s original binary opposition between CACs and PACs must be reconsidered in terms of a fine-grained gradient system that cuts across the binary opposition.

Abbreviations

A-Mood = addressee mood, ASP = aspect, AUX = auxiliary, COP = copula, DAT = dative, F = feminine, GEN = genitive, GER = gerund, INCEPT = inceptive aspect, INFL = inflection, M = masculine, N = neuter, NEG = negation, NOM = nominative, NPST = non-past tense, PRT = participle, PAST = past tense, PL = plural, POSITIVE = positive polarity, POSS = possessive, PRESENT = present tense, PRF = perfect, PROG = progressive aspect, SG = singular, S-Mood = speaker mood, T = tense, ϕ = neutral addressee mood

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Competing Interests

The authors have no competing interests to declare.

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