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Workspace, MERGE, and Labeling for Adjuncts*

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ABSTRACT

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This paper explores various syntactic challenges posed by adjuncts within the latest Chomskyan minimalistic assumptions related to Workspace, MERGE and Labeling. Specifically, we go into empirical and theoretical motivations behind the adjunct conditions such as no contribution to labelling, being opaque for extraction and late insertion à la Freidin-Lebeaux generalization. After presenting an array of recent proposals as for adjuncts, we attempt to put forward our own proposal by employing Uriageraka's (1999) and Sheehan's (2013) Multiple Spell-Out in a more dynamic fashion.

KEYWORDS

adjuncts, Workspace, MERGE, Labeling, Multiple Spell-Out

1. Introduction

The syntactic behaviors of adjuncts are often described in relation to the CED as in (1), which was originally proposed to account for the fact that subextraction of an XP out of a given phrase is available depending on its syntactic position.

(1) Condition on Extraction Domain (Huang 1982: 505)
A phrase A may be extracted out of a domain B only if B is properly governed.

Given this constraint, as contrastively illustrated in (2), an NP can be extracted out of complements of V, which are properly governed, whereas such subextraction is not allowed from specifiers, which are not properly governed.

(2) a. [Which star]$_i$ did you see several [$_{NP}$ pictures [$_{PP}$ of t_i]]?
b. *[Which star]$_i$ did several [$_{NP}$ pictures [$_{PP}$ of t_i]] disgust you? (Sheehan 2013: 136 (2))

Other than specifiers, a class of constituents that is not properly governed and does not allow subextraction includes (i) a Subject, (ii) a moved element, and (iii) an adjunct. As for the Subject position, there exists a contrast between moved and in-situ Subjects regarding subextraction as shown in (3). Specifically, subextraction is possible from in-situ Subjects as in (b) while it is not from moved ones as in (a):

(3) a. *Who$_i$ did [pictures of t_i] please you?
b. [Which candidate]$_i$ were there [posters of t_i] all over the town?

Likewise, an XP can be extracted from topicalized or moved phrases as in (4). In (a)-example, 'reviews of whose books' is topicalized within the embedded clause and then *wh*-XP 'whose books' is extracted from its containing NP, being internally merged at the matrix CP-Spec.

(4) a. *[Whose books]$_i$ do you think that [reviews of t_i]$_j$ John never reads t_j? (Corver 2014: 1)
b. ??/*[Whose book]$_i$ do you wonder [$_{CP}$ [how many reviews of t_i]$_j$ John read t_j? (Corver 2014: 9)

Adjuncts also seem to pattern with the aforementioned elements, i.e., they do not allow subextraction as in (5) since they are not properly governed:

(5) a. ?Who do you wonder if you should invite?
b. *?Who will you get into trouble if you invite? (Sheehan 2013: 136 (3))

Given that CED effects arise to moved Subjects as well as other moved constituents, it follows that movement or the operation 'Internal Merge' precludes an extraction from the derived constituents. An immediate question to raise is whether the same logic applies to adjuncts, that is, whether CED effects also arise to adjuncts, which apparently do not involve movement. This paper explores this question by going through canonical as well as non-canonical adjuncts. If we find a negative answer to this question, we can resolve 'classical' well-known issues bearing on adjuncts, particularly the problems raised in the framework of workspace, MERGE, and labeling for adjuncts.

This paper is structured as follows. Section 2 examines canonical/traditional vs. non-canonical adjuncts, based on the study of adjuncts in Truswell (2011). Section 3 presents several recent proposals that address the problems posed in the framework of workspace, MERGE, and labeling for adjuncts. In section 4, we put forward a proposal, another logical possibility that has been left unexplored thus far. Section 5 concludes.

2. Canonical and Non-canonical Adjuncts

As for adjuncts, the following syntactic properties have been identified thus far:

(6) a. Unlike arguments, adjuncts do not enter into theta-relations; they enter into modification.
b. Adjuncts do not provide a label, as dictated by the adjunction hypothesis.
c. Adjuncts are opaque domain for extraction (Adjunct Condition).
d. Adjuncts and arguments show reconstruction asymmetry (Freidin-Lebeaux generalization).

The first property in (6a) is readily found in examples like (7), where adjunct "in the garden" does not saturate the predicator, just placing a "meeting" event at a specific location.

(7) John met Mary in the garden.

The second property in (6b) is just as it states, i.e., adjunction leaves the category label of the target intact. The adjunct condition in (6c) is demonstrated in (8), in which extraction of *wh*-XP 'who' out of its containing adjunct clause results in ungrammaticality:

(8) *Who$_i$ did they leave before speaking to t_i?

Reconstruction asymmetry in (6d) is observed between arguments and adjuncts:

(9) a. *[Which report that John$_i$ was incompetent]$_j$ did he$_i$ submit t_j ?
b. [Which report that John$_i$ made]$_j$ did he$_i$ submit t_j ? (Freidin 1986: 179)

Specifically, according to Freidin-Lebeaux generalization, adjuncts can be added late in the course of derivation. Given this generalization, in (a)-example of (9), coreference between 'John' and 'he' are prohibited due to violation of Principle C since 'that'-clause is an argument and cannot be merged late in the derivation. In (b)-example of (9), however, Principle C does not keep R-expression 'John' from being co-indexed with 'he' since the relative clause, as an adjunct clause, can be merged at a later time. To be specific, via late-merge, merging of an adjunct to a moved XP is possible as schematized in (10):

(10) [Which report that John$_i$ made] did he$_i$ submit [which report]?
Late-Merge of an adjunct

Crucially, as for the above generalizations, some exemptions have been noted from the expected adjunct condition violations: they are argued to arise by virtue of particular syntactic positions in movement out of adjunct islands:

(11) a. *What$_i$ does John dance [whistling t_i]? (Truswell 2007:1357, (4a))
b. *What$_i$ did John die [after he kicked t_i]? (Borgonovo and Neeleman 2000: 203, (12b))
c. *What$_i$ was John photographed [during t_i]? (Borgonovo and Neeleman 2000: 203, (12f))

(12) a. What$_i$ did John arrive [whistling t_i]? (Truswell 2007: 1357, (4b))
b. Who$_i$ did John get upset [after talking to t_i]? (Truswell 2011: 129, (1b))
c. %[Which play]$_i$ did John fall asleep [during t_i]? (Truswell 2011: 171, (83))

To be specific, the examples in (12) are acceptable while those in (11) are not despite the fact that those two sets of examples display extraction out of an adjunct clause. One suggested idea to account for the acceptability of (12a-b) is that adjuncts become transparent for extraction when the relevant adjuncts are in lower positions, i.e., L-marked positions or VP adjunction, not vP adjuction (Borgonovo Neeleman 2000, Narita 2014, Brown 2015, Brown 2017 and Bode 2020, inter alia). However, the account based on syntactic positions is not so clear. As exemplified in (13), extraction from an adjunct clause is banned although (b)-example of (13) appears to be parallel with that of (12).

(13) a. John didn't talk [after any of our meetings].
b. *[What meetings]$_i$ didn't John talk [after any of t_i]? (Boeckx 2012:146, fn14)

Also unclear is whether anti-locality is at work in the data concerned (Truswell 2011); it seems to work in (14), but it does not in (15).[1] Let us consider (14b) first, which shows that a *wh*-XP can be extracted out of the stacked bracketed phrases. Interestingly, (14b) becomes marginal under the removal of 'trying to' as indicated in (14a). Anti-locality thus seems to work here.

(14) a. ??What$_i$ did John drive Mary crazy [fixing t_i]?
b. What$_i$ did John drive Mary crazy [trying [to fix t_i]]? (Truswell 2011: 33, (56))
(cf. John drove Mary crazy fixing the plumbing.)

Note, however, that exactly the opposite is observed in (15) with respect to locality. Significantly, in (15b), a *wh*-XP cannot be extracted out of the stacked bracketed phrases. Once the predicator 'beginning' is eliminated as in (15a), the example becomes acceptable, contra anti-locality.

(15) a. What$_i$ did John drive Mary crazy [to fix t_i]?
b. *What$_i$ did John drive Mary crazy [beginning [to fix t_i]]? (Truswell 2011: 34, (58))

[1] An anti-locality constraint is well-known to ban movement which is "too short" (Pesetsky and Torrego 2001, Abels 2003, Grohmann 2011, Erlewine 2016, a.o.). For instance, movement from the embedded subject position to Spec of CP may be blocked as illustrated in (i). To be specific, movement from Spec of TP to Spec of CP is forbidden since it is "too short".

(i) * … [$_{CP}$ XP$_i$ [$_{C'}$ C [$_{TP}$ t_i [$_{T'}$ T […]]

Note, though, that movement to Spec of CP from some lower position as in (ii) is allowed since it is "long enough":

(ii) √ ... [CP XP$_i$ [$_{C'}$ C [$_{TP}$ … [$_{T'}$ T […t_i …]]

Given the empirical facts that exhibit interesting grammatical contrasts between (14) and (15), an alternative idea to pursue is the one suggested by Truswell (2011), a single event condition in (16):

(16) Single Event Condition as a semantic condition (Truswell 2011: 232, (1), see also pp 157-158)
An instance of *wh*-movement is legitimate only if the minimal constituent containing the head and the foot of the chain can be construed as describing a single event.

Based on this condition, (a)-example of (17) is acceptable since 'arrive whistling something' is construed as a single event, which makes *wh*-movement legitimate. (b)-example of (17), however, is not acceptable since 'work whistling something' is taken to be two separate events, in which case *wh*-movement is illegitimate.

(17) a. What$_i$ did John arrive [whistling t_i]?
b. *What$_i$ did John work [whistling t_i]?[2]

Additional empirical aspects are concerned with the internal structure of adjuncts. First, finiteness (Michel and Goodall 2013) matters; extraction out of the infinitive adjunct clause is allowed, whereas extraction out of the finite counterpart is not. This is exemplified in (18). A *wh*-XP can marginally undergo movement out of the infinitival clause as in (a), but it cannot out of the finite clause as in (b):

(18) a. ??I wonder who$_i$ John went home [after kissing t_i].
b. *I wonder who$_i$ John went home [after he kissed t_i].

Second, a categorical distinction such as a PP vs. a CP exerts influence on *wh*-extraction; a *wh*-XP can be extracted out of a CP adjunct as in (a)-example while it cannot out of a PP adjunct as in (b)-example:[3]

(19) a. ?[Which book]$_i$ do you think that [$_{CP}$ if John reads t_i], he'll abandon linguistics?
(Etxepare (1996): 490, cf. Hornstein (2001))
b. *[Which book]$_i$ do you think that [$_{PP}$ after John reads t_i], he'll abandon linguistics?

To recap, as far as adjunct condition is concerned, there are two types of adjuncts, i.e., one type allows subextraction while the other does not. Following sections are dedicated to accounting for those adjunct properties by reviewing recent works and proposing an alternative possibility hitherto unexplored in the linguistic literature.

[2] Lexical aspects of a verb affect the 'single event' interpretation. Crucially, the main clause predicator 'arrive' in (i), as an achievement, is punctual while the one 'work' in (ii), as a process or activity, is durative. 'Arrive' in (ia), being punctual, is understood as a single event in combination with "whistling a tune" while 'work' in (iia), being durative, is not. This difference further accounts for (in)compatibility with a participial phrase like 'whistling a tune'. That is, only the lexical aspect of being punctual is compatible with 'whistling a tune'. Contrastively, accompanied by *while*-phrase, a process or an activity is acceptable as in (iib), whereas an achievement is marginal as in (ib).

(i) a. John arrived whistling a tune.
b. ?John arrived while whistling a tune.
(ii) a. *John worked whistling a tune.
b. John worked while whistling a tune.

[3] cf. *[Which book]$_i$ did you say that Ricardo would abandon linguistics [$_{CP}$ if he ever read t_i]?

3. Recent Ideas under the Framework of Workspace, MERGE, and Labeling

The recent ideas concentrate on the traditionally noted properties of canonical adjuncts. The common thread of the recent proposals on adjuncts is based on Chomsky's ideas of Workspace and capital MERGE along with Labeling. In the minimalistic model advanced by Chomsky (2004, 2013, 2015), syntactic structures are constructed by two types of Merge operations that are assumed to apply freely:

(20) a. (Set-)Merge (a, b) = {a, b}
b. Pair-Merge (a, b) = <a, b>

(20a) generates the unordered set, whereas (20b) yields the ordered pair, which guarantees the asymmetric nature of adjunction. In his later works (Chomsky 2019a, b, c), though, he demonstrated how freely Merge applies in his previous model and argued that Merge is not completely free. Chomsky then reformulates the traditional Merge into capital MERGE, proposing that it operates on syntactic objects placed in a workspace (WS), where WS refers to a set of syntactic objects at a point of derivation (2020a; 2020b; 2021). Specifically, MERGE maps WS onto WS′ in the following manner:

(21) For any accessible terms P, Q in WS, MERGE (P, Q, WS) = [{P, Q}, X_1,...,X_n] = WS', where
(i) Y $\in$ WS and Y $\neq$ P, Q $\rightarrow$ Y $\in$ {X_1,...,X_n}
(ii) accessible terms appear only once in WS'
(iii) {X_1,...,X_n} minimal, where "minimal" means n minimal and each X_i minimal
(Chomsky 2019a, b, c)

This reformulated MERGE eliminates Pair-Merge, which is, though conceptually adequate, empirically challenging, i.e., we still need to find a way to account for the asymmetric property of adjuncts.

A parallel derivation theory of adjuncts was proposed by Milway (2021), in which an adjunct is derived separately from its host, i.e., the adjunct is never merged into the clausal spine in the course of derivation. In his proposed theory, the syntactic representation of (22a) is offered as in (22b), with the adjunct-less sentence derived as the first element of the workspace (SO1), and the adjunct PP 'with gusto' derived as the second element of the workspace (SO2).

(22) a. Rosie sang the song with gusto.
b. {*Rosie*, {T, …{*sing*, {*the*, *song*}}}}$_{SO1}$, {*with*, *gusto*}$_{SO2}$>

Milway's (2021) proposal is reminiscent of Chomsky (2004) in that the structure built by Set-Merge, which is called Simple structure, is in a primary plane, whereas α attached to β by Pair-Merge is in a separate plane (cf. Uriagereka (1999) for Multiple Spell-Out).

In a different vein, Omune (2020) proposed Immediate-local MERGE as Pair-Merge. In his proposal, the asymmetric structure of an adjunct is canonically represented as <a, b> and is warranted by the set-theoretic output {a, {a, b}}, in which 'b' is the adjunct. Following the convention of deriving an ordered pair <a, b> from an unordered set {a/{a}, {a,b}}, Omune argues that "immediate-local application of MERGE, which is just the double application of MERGE, ensures the same effect as Pair-Merge", as represented in (23).

(23) Immediate-local MERGE as Pair-Merge (Omune 2020: 13 (4))
Yielding the asymmetric property of adjunction without Pair-Merge:
WS = [a, b, X_1, … X_n] (where P=a, Q=b)
MERGE (a, b, WS) = [{a, b}, X_1, … X_n] = WS′
MERGE (a, {a, b}, WS′) = [{a, {a, b}}, X_1, … X_n] = WS″

Again, this is in line with Chomsky (2004), in which for adjuncts to be interpreted at the interfaces, they must undergo the operation SIMPL, which converts a pair-merged structure <α, β> into a set-Merged structure {α, β} when <α, β> is transferred to the interfaces.

Another idea 'Asymmetric Merge' was proposed by Nakashima (2021), which assumes that MERGE is subject to Resource Restriction as stated in (26):

(26) Resource Restriction (RR)
MERGE increases the number of accessible objects by one.

According to MERGE and Resource Restriction (RR, henceforth), then, the following derivation in (27) converges:

(27) a. WS = [α, β] (n = 2)
b. WS' = [{α, β}] (n = 3)

Crucially, MERGE in combination with the principle of Determinacy potentially yields the following four types of WSs:

(28) WS = [α, β]
a. WS' = [{α, β}] (n = 3)
b. WS' = [{α, β}, α] (n = 5)
c. WS' = [{α, β}, β] (n = 5)
d. WS' = [{α, β}, α, β]

However, to allow (28b) and (28c), Nakashima further assumes Chomsky (2019b, c), which claims that RR includes both minimal search and the Phase Impenetrability Condition (PIC). He further argues that RR forces operations including MERGE to be subject to the Principle of Determinacy (29) (see Chomsky 2019a: 270 for Determinacy as a principle):

(29) The Principle of Determinacy (Minimal Yield)[4]
If the structural conditions for a rule holds for some workspace, then the structural change must be unique.
(Chomsky 2019a: 275)

> If you have this property (=RR), you infer determinacy; it turns out that if you think it through when you limit the resources available, you're also going to force determinacy, meaning (that) the operation will be uniquely determined by what it's looking at. (Chomsky 2019b)

[4] According to Chomsky (2021), Minimal Yield (MY), as a condition on Merge, manifests the nature of Merge as the simplest structure-building operation and specifies that "Merge can introduce at most one new accessible item in the workspace (WS)". (Saito 2022: 2)

While Chomsky's Determinacy applies to the output of MERGE, Goto and Ishii (2019, 2020) instead propose that the principle of Determinacy applies at the input of MERGE to avoid an ambiguous rule application. They further argue that an ambiguous application of MERGE yields a Determinacy violation. Thus, MERGE in (28b, c), repeated below in (30), is asymmetric in that either α or β is left in the WS, i.e., (b-c) of (28) above are derived from Asymmetric MERGE:

(30) a. WS' = [{α, β}, α] (n = 5) → (n = 2)
b. WS' = [{α, β}, β] (n = 5) → (n = 2)

According to Nakashima, α in (30a) and β in (30b) become inaccessible by virtue of the principle of Determinacy at the input of MERGE. Consequently, in both cases, n is not 5 but 2, satisfying RR. He further argues that Asymmetric MERGE (AM), as well as External MERGE (EM) and Internal MERGE (IM) instantiates MERGE. Those three types of MERGE follow from MERGE, among which AM introduces adjuncts.

To summarize, a variety of interesting ideas have recently been developed in order to account for the properties peculiar to adjuncts and resolve the potential empirical and theoretical problems, though we are not going into details in evaluating these latest proposals on adjuncts.

4. Proposal

This section attempts to put forward a proposal to deal with empirical and theoretical challenges that adjuncts pose. We first present some theoretical backgrounds and then show how our proposal accounts for some key properties of adjuncts.

4.1 Theoretical Backgrounds: MERGE (Chomsky 2021) and Multiple Spell-Out (Uriagereka 1999, Sheehan 2013) and a Proposal

Following Chomsky (2021), we propose that, as in the MERGE of [(a, b)] into [{a,b}], the copy of b (b = adjunct) or a is not left behind in the workspace, unlike its counterpart [{a,b}, b] in Nakashima (2021).[5] That is, in our proposed system, adjuncts are subject to (regular) MERGE.

(31) a. WS = [a, b, X_1, ... X_n] (where XP = a, YP = b (b = adjunct))
b. MERGE (a, b, X_1, ... X_n) = [{a, b}, X_1, ... X_n] = WS'

However, in (31), adjuncts (e.g., YP) undergo Immediate Transfer because their MERGE with XP gives rise to a labeling problem due to creation of the [XP-YP structure]. This is schematically represented in (32), where 𝕐ℙ is a representation posterior to Transfer.

(32) Given XP and YP in a workspace, and YP = adjunct,
{XP, 𝕐ℙ} = WS'

[5] Milway (2021) made a similar proposal, slightly diverging from Nakashima (2021) in that the former leaves a copy on a separate plane.

This view is grounded on Uriagereka (1999), which reformulates Kayne's (1994) Linear Correspondence Axiom (LCA) serving to derive the CED. Crucially, he argues that the LCA can be divided into two steps, a 'basic step' and an 'induction step':

(33) A rephrased version of Kayne's (1994) LCA
(a) Basic step: If α asymmetrically c-commands ß, then α precedes ß.
(b) Induction step: If α precedes ß and α dominates γ then γ precedes ß

As made explicit in Sheehan (2013), the 'induction step' (33b) certifies that all of the terminals dominated by the maximal projection of a specifier precede all the heads asymmetrically c-commanded by that maximal projection. Uriagereka's proposal is to allow Multiple Spell-Out, i.e., it makes Spell-Out available as many times as needed in the course of the derivation, in order to linearize structures by employing (33a) only. Multiple Spell-Out (MSO) together with Step (a) make sure that branching phrases are sent to Spell-Out before insertion in a specifier or adjunct position. Spell-Out makes a phrase into a complex word, i.e., atomization occurs in the sense of Uriagereka (1999), yielding a strong island due to lexical integrity (Sheehan 2013:136). Specifically, example (34) is ruled out due to atomization of a specifier.

(34) *Who$_i$ did [**a picture of t$_i$**] cause the problem? (Sheehan 2013:136 (5))

Given that, following Kayne (1994), there is no distinction between specifiers and adjuncts, adjuncts will also be assumed to undergo atomization prior to external merge, forming strong islands, hence no subextraction allowed.[6]

4.2 An account

With the theoretical backgrounds and a proposal discussed in 4.1, we suggest that we can handle the well-known properties of adjuncts by employing MERGE (Chomsky 2021) and Uriageraka's (1999) Multiple Spell-Out in a more dynamic fashion. Let us now see how to account for crucial properties of adjuncts with these theoretical tools.

4.2.1 Adjunct Condition

In our account, the Adjunct Condition violation arises since movement out of a transferred domain is banned. For instance, in (35), once the adjunct [$_{PP}$ before speaking to who] is constructed, it has to undergo Immediate Transfer since its MERGE with vP generates a labeling problem due to generation of the [XP-YP structure]. Given that movement is blocked out of a transferred domain, example (35) is duly ruled out in our proposed system.[7]

[6] According to Sheehan (2013), atomization results in a complex word, which creates a strong island due to lexical integrity.

[7] One of the reviewers asked if our proposed analysis can account for the following data sets, pointing out that extraction is possible from some adjuncts and Subjects.

(i) Extraction from Subjects (Chaves (2012: 3 (4))
a. Of which cars were [the hoods __] damaged by the explosion?
b. They have eight children [of whom] I think [[five __] are still living at home].
c. What were [pictures of __] seen around the globe?

(35) *Who$_i$ did they {{[$_{vP}$ leave] [$_{PP}$ t'$_i$ before speaking to t$_i$]}}?

The Subject Condition violation can be accounted for in the same manner (Uriagereka 1999). As exemplified in (36), once the specifier [$_{DP}$ pictures of who] undergoes Immediate Transfer to avoid a labeling puzzle, it is atomized with the result that no subextraction out of it is allowed.

(36) a. *Who$_i$ did [$_{DP}$ pictures of t$_i$] please you?
b. [$_{TP}$ [$_{DP}$ pictures of who] T [$_{v*P}$ [$_{DP}$ pictures of who] v* …]]

4.2.2 Labeling

In our proposed system, the label of an SO is provided by a fixed algorithm, the Labeling Algorithm (LA) as illustrated in (37a-b) (Chomsky 2013; 2015).

(37) a. {H, XP} ===> H
b. (i) {XP, … {t$_{XP}$, YP}} ===> YP
(ii) {XP$_F$, YP$_F$} ===> <F, F>

When a head H (i.e., minimal projection) undergoes MERGE with a phrase XP (i.e., non-minimal projection), Minimal Search (MS) promptly locates the head as a labeling determinant, yielding (37a). However, when MERGE occurs between two phrases, constructing the {XP, YP} configuration, immediate labeling is not achievable. In

d. Who does [being able to bake ginger cookies for __] give her great pleasure?
e. Which president would [the impeachment of __] cause outrage?
f. Which book will [the author of __] never be known?
g. Which problem will [no solution to __] ever be found?
h. Which crime will [the punishment for __] never be carried out?
i. There are people in this world that [(for me) to describe __ as despicable] would be an understatement.

(ii) Extraction from tenseless adjuncts (Chaves (2012: 4 (5)))
a. That's the symphony that Schubert [died without finishing __].
b. Which report did Kim [go to lunch without reading __]?
c. A problem this important, I could never [go home without solving __ first].
d. What did he [fall asleep complaining about __]?
e. What did John [drive Mary crazy trying to fix __]?
f. Who did you [go to Girona in order to meet __]?
g. Who would you rather [sing with __]?

(iii) Extraction from tensed adjuncts (Chaves (2012: 4 (6)))
a. Which email account would you be in trouble if someone broke into __?
b. Which problem would you be devastated if someone had already solved __?
c. This is the formula that I would be devastated if someone had already discovered __.

First, we suggest that the grammatical judgements about the above be closely scrutinized, i.e., we need to examine how systematically grammatical the examples are. Then, a plausible line of analysis to pursue within our proposed system is to allow the integration of some Subjects and adjuncts into the existing clausal spine, depending on the clausal structure. Once the integration occurs, Transfer is delayed, which makes extraction out of the relevant domains possible. This conjecture, of course, deserves further investigation and verification in our future work.

such a case, labeling is determined by the two different mechanisms. One is via movement under the assumption that traces are irrelevant in the determination of labeling; thus, the Labeling Algorithm determines the relevant labeling as YP, an element that has stayed in its base-generated position as in (37bi).[8] When no movement is involved, the labeling of the syntactic object is achieved via feature sharing. In other words, the Labeling Algorithm looks into each phrase and locates the shared feature that resides in both phrases. Suppose that this feature is F. The labeling of (37bii) then becomes <F, F>, the prominent shared feature in both phrases.[9] Overall, in Chomsky's proposed system there are three ways of labeling the syntactic object created by MERGE. In our proposed analysis, we add to them one more option where in place of movement, Transfer feeds labeling:

(38) Given XP and YP in a workspace, and YP = adjunct,
a. WS = [a, b, Z1, ... Zn] (where XP = a, YP = b (b = adjunct))
b. MERGE (a, b, Z1, ... Zn) = [{a, b}, Z1, ... Zn] = WS'

Labeling is critical to our proposal on adjuncts, since the labeling problem triggers their Immediate Transfer upon their external MERGE. When YP is Transferred out of the XP-YP structure that does not enter into relevant feature sharing, the copy left behind by the Transfer of YP is not "in the domain" of {XP, YP}.[10] In this case, the Transferred YP does not provide a label, since not every occurrence of YP is in the domain of {XP, YP}. Thus, the XP-YP structure is labeled XP, which corroborates the adjunct hypothesis that Adjuncts do not play a role in labelling a syntactic construct.

4.2.3 The Freidin-Lebeaux Generalization

The Binding Principle C violation can be obviated by assuming late-insertion of adjuncts in the sense of Freidin-Lebeaux. As discussed above in Section 2, in accordance with Freidin-Lebeaux Generalization, the grammaticality of (b)-example of (39) is accounted for by the assumption that the adjunct clause [that John made] is inserted or merged late in the course of derivation, nullifying Principle C violation.

(39) a. *[Which report that John$_i$ was incompetent]$_j$ did he$_i$ submit t$_j$?
b. [Which [report] [that John$_i$ made]]$_j$ did he$_i$ submit t$_j$?

The noun complement clause in (39a) cannot be Merged at the landing site of 'which report' owing to the Extension Condition, originally formulated in Chomsky (1995b: 190-191). The Extension Condition dictates the

[8] The construction concerned with this discussion is "copula small clause" in the form of [XP, YP], e.g., [be [lightning, the cause of the fire]] (Moro 2000).

[9] An illustration of this point is indirect interrogatives:

(i) they wondered [$_\alpha$ in which Texas city [$_\beta$ C [JFK was assassinated]]] (Chomsky 2013: 45(22))

Here, α is of the form {XP, YP}. Without assuming XP raising, Chomsky (2013) suggests that "the most prominent feature of α and of β is shared, namely the interrogative feature Q, a feature of C and the head of α if we adopt a plausible analysis of interrogative *wh*-phrases that takes Q to be the most prominent element." This Q feature is taken to be the label of α.

[10] α is ''in the domain D'' if and only if every occurrence of α is a term of D (adapted from Chomsky 2013: 44).

cyclicity of the operation Merge, thereby requiring Merge to apply at the root of the syntactic object.[11]

In our analysis, it follows that adjuncts or relative clauses to be Transferred upon their External Merge can take either early or late merge (Lebeaux 2000). Kitahara and Seely (2021) particularly note that in the process of late merge, WS=[{K, L}, {M, N}] is mapped via MERGE(K, {M, N}, WS) onto WS'=[{K, {M, N}}, {K, L}]. The output WS' will have two new accessible items, which will apparently violate the Principle of Determinacy/Minimal Yield in (29). But since upon its late MERGE the item K is Transferred and thus does not enter into labelling the existing syntactic construct, the number of accessible objects does not increase, eventually satisfying the Principle of Determinacy/Minimal Yield.

4.2.4 Single Event Condition

Finally, we consider how the proposed system deals with interesting empirical facts related to 'single event condition' (cf. (17) above). We suggest that the single event structure for an adjunct is derived via an operation like 'complex verb formation' or restructuring (cf. Choe 1988), or theta-identification (Higginbotham 1985):[12]

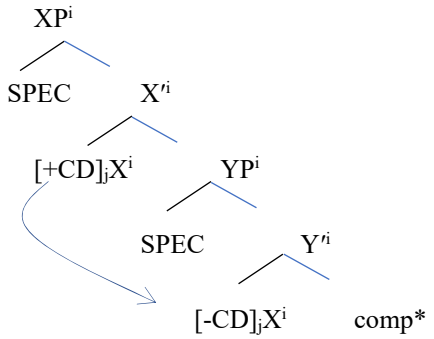
(40) The Restructuring Rule (RR) from Choe (1988)
a. Superscript X-heads that are under a categorial dependency link (top to bottom)
b. Index (superscript) (syntactic) percolation within RRed projections
(due to X-bar conventions/feature percolation conventions)

Here, RR establishes a link between X^1 and Y^1, which indicates categorial dependency. Choe (1988) further proposes that (40) be modified as (41) since X always governs YP^0 when X and Y are linked by RR.

(41) Coindex a [+CD] X-head with its governed [-CD] X-head to form an R-complex multi X-head projection.

Given her proposal, the derivational process of restructuring can be depicted as follows:

(42) How restructuring arises:



[11] The Extension Condition (Chomsky 1993, 1995) requires that syntactic operations extend the tree at the root. This holds for both substitution and adjunction operations.

[12] Also, see Ernst (2022) for English and Yoshida (2006) for Japanese.

The superscript 'i' denotes the categorical dependency relation between X and Y; an arrow indicates the direction of categorical dependency relation.

Now, based on Choe's (1988) Restructuring Rule, let us consider the following grammatical sentence:

(43) What$_i$ did John arrive [whistling t_i]?

Though grammatical as it stands, example (43) becomes unacceptable after movement of the bracketed adjunct part as demonstrated in (44). This unacceptability is accounted for by the fact that moving around an adjunct disrupts the structure of 'single event':

(44) a. *What$_i$ did John, [whistling t_i], arrive?
b. *What$_i$ did John arrive already [whistling t_i]?

Leftward or rightward movement ultimately prohibits restructuring of the modifier with the modifyee. Note that restructuring is successful when an adjunct stays in-situ:

(45) (= (43)) Adjunct in-situ
What$_i$ did John [[$_{vP}$ arrive] [$_{vP}$ whistling t_i]]?[13]

Other than these configurational matters, argument structures and lexical aspects of a verb are closely related with transparency for extraction. Significantly, as discussed in Truswell (2007), *-ing* clause in (a)-example of (46) is transparent in the presence of telic accusatives like 'arrive' since those two are construed as a single event. On the contrary, *-ing* clause in (b)-example of (46) is opaque in the presence of unergatives like 'work' since those two are not construed as a single event.

(46) (= (17a-b) reintroduced) Extraction out of an adjunct
a. What$_i$ did John arrive [whistling t_i]?
b. *What$_i$ did John work [whistling t_i]?

One final issue concerns the movement of simple adverbial *wh*-items such as 'how' and 'why' as in (47).

(47) a. How/Why did John leave?
{ { leave, how/why} }
b. How/Why do you believe that John left t?

Recall that Spell-Out or Transfer makes a phrase into a complex word, i.e., atomization occurs in the sense of

[13] The following examples represent exceptions to the Coordinate Structure Constraint:

(i) a. [This is the loot]$_1$ that Big Louie sees you with t_1 and puts a contract on you.
(see Culicover 1997 for analogous examples)
b. [Which room]$_1$ did the police enter t_1 and everyone swallowed their cigarettes?
(see Culicover 1972 for analogous examples)
c. What$_1$ did John go to the store and buy t_1? (Lakoff 1986)
d. What$_1$ will John go and read t_1? (see DeVos 2005 for analogous examples)

Uriagereka (1999). Still, atomization subsequent to Transfer does not necessarily entail that the atomized elements undergo head movement, which is verified by the fact that 'how'/'why' can undergo long-distance movement. Rather, their Transfer prompts their immediate exit to linearization, but they keep their phrasal status intact, thereby undergoing phrasal movement in (47).

5. Conclusion

So far we have examined a variety of recent proposals advanced as for adjunct constituents and attempted to offer a novel analysis by resorting to Chomsky's (2020) MERGE operation and Uriageraka's (1999) Multiple Spell-Out. Our main claim is twofold: [1] Adjuncts are derived by (regular) MERGE that maps a workspace WS = [α, β] onto WS' = [{α, β}], where β is an adjunct. [2] Adjuncts undergo Immediate Transfer on their external Merge since otherwise their Merge induces a labeling problem stemming from the [XP-YP] structure. Though work remains, this proposal could deal with some of the theoretical and empirical challenges such as the island sensitivity of adjuncts, labeling, Binding Condition (C) obviation effects, and single event condition.

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Examples in: English
Applicable Languages: English
Applicable Level: Tertiary

