

what time のいわゆる「副詞的」用法に関する統語的分析

—前置詞 *at* の先導, 残留そして削除—

(イッティージャパンウエスト株式会社) 蔦川 響子

(英語教育講座) 秋山 正宏

The syntax of *what time* in its "adverbial" use¹

—Pied-piping, stranding and deletion of *at*—

Kyoko TSUTAGAWA and Masahiro AKIYAMA

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1. Introduction

This paper studies the English wh-expression *what time* in its "adverbial" use: the use in which *what time* is used to ask (or express) the time at which the event or state expressed by the predicate holds or occurs (e.g. *What time did you get up?*). We focus mainly on wh-questions headed by "adverbial" *what time*, but we sometimes examine the behavior of free relatives headed by *whatever time*. Our discussions are based partly on examples that are gleaned from the Corpus of Contemporary American English (COCA, <https://www.english-corpora.org/coca/>).

As far as we know, *what time* can be used in three different ways. First, *what time* can be used as a predicate to ask the time ((1)).

- (1) a. What time is it?
b. I don't know what time it is.

¹ Sections 1, 2 and 3 of this paper are based on and have been developed from Tsutagawa (2019). Section 4 contains the second author's speculations about the issues raised by Tsutagawa's (2019) analysis of "adverbial" *what(ever) time*.

In this usage, *what time* functions as the nominal predicate of the sentence that occurs with the copula *be*. Second, *what time* can be used to ask the time at which the event or state expressed by the predicate occurs or holds ((2)).

- (2) a. What time did you get up?
b. I don't know what time you got up.

In this "adverbial" usage, *what time* functions as an adverbial modifier of the sentence. Third, *what time* can be used as the subject or the object of the sentence ((3) and (4)) and thus can function as an argument of the predicate.

- (3) a. What time is good for you? (COCA)
b. We'll meet tomorrow, at whatever time is convenient for you. (COCA)
(4) What time would you like as the time for your departure?

In (3a), *what time* is used as the subject. Similarly, *whatever time* (the counterpart of *what time* in free relatives) is used as the subject of a free relative in (3b). In (4), *what time* is used as the object of the transitive verb *like*.

This study focuses on the "adverbial" use of *what time* that is exemplified by (2). Although we do not thoroughly discuss the use of *what(ever) time* as a predicate ((1)) or their use as arguments ((3)), our proposal about the categorial status of *what(ever) time* (i.e. a DP) is compatible with it.

This paper is organized as follows. In Section 2, some assumptions on which the analysis in this study depends will be introduced. In Section 3, we will propose an analysis of *what(ever) time* in its "adverbial" use. More specifically, we propose that, in its "adverbial" use, (i) *what(ever) time*, which is a DP, is introduced as the complement of the preposition *at*; (ii) an occurrence of *at* that takes an overt occurrence of *what(ever) time* as its complement is optionally deleted in PF (*At*-deletion before *what(ever) time*, ADBWT for short); (iii) ADBWT and Copy Deletion, which is applied to delete the lower copy/copies in a chain yielded by movement, are freely ordered. Section 4 concludes this paper, offering speculations about the question of why ADBWT is possible without any "antecedent" of *at* in the first place and about the question of why ADBWT is optional.

Our proposal, especially (ii) and (iii) above, will correctly predict that, in (interrogative) sentences with "adverbial" *what time*, (a) the PP *at what time* can appear in the clause-initial position (e.g. *At what time did you come here?*), (b) *what time* alone can appear in the clause-initial position **without** *at* appearing in its original position (e.g. *What time did you come here?*), or (c) *what time* alone can occur in the clause-initial position **with** *at* appearing in its original position (e.g. *?What time did you come here at?*).

Furthermore, our analysis will predict that the case (b) above (i.e. *What time did you come here?*) is derivationally and thus structurally ambiguous: *what time* in the clause-initial position can be either (α) a PP with deleted *at* or (β) a DP that has been extracted from the PP headed by *at* (to be deleted by ADBWT). The case (c) (i.e. *?What time did you come here at?*) is rare and less acceptable than (a) and (b), but it clearly shows that "adverbial" *what time* that occurs alone in the clause-initial position is associated with the preposition *at*. The rarity and the low acceptability of the case (c) arise because it involves extraction of *what time* from an adjunct

at-PP (i.e. a violation of the Adjunct Condition). The surprising fact that the case (β) above is perfectly acceptable in spite of the violation of the Adjunct Condition will be attributed to the deletion of *at*.

2. The Basic Assumptions

Considerations and analyses in this paper are based on the assumptions that are introduced in the following subsections.

2.1. The Copy Theory of Movement

We assume the copy theory of movement: so-called "movement" consists of (a) the process of making a copy of the element to be "moved" (e.g. *which book* in (5)), (b) the process of merging the new copy generated by (a) at the landing site ((5a)), and (c) the process of deleting the copy of the "moved" element at its original position in PF ((5b), Chomsky 1995; Nunes 1999, 2004, 2011). Hereafter we refer to the process (c) as Copy Deletion (CD for short).

- (5) I wonder which book John bought.
- a. ... [CP [DP which book] [C' C [IP John [I' I [VP bought [DP which book]]]]]]
- b. ... [CP [DP which book] [C' C [IP John [I' I [VP bought [~~DP which book~~]]]]]]

2.2. Preposition-Stranding and Pied-Piping

We assume that in English a *wh*-DP that appears as the complement of a preposition can be either *wh*-moved alone (P-stranding, (6a)) or moved together with the preposition (Pied-piping, (6b)).

- (6) a. I wonder [DP which boy] you gave a book [PP to _].
- b. I wonder [PP to [DP which boy]] you gave a book _.

2.3. *What time* as a DP

We assume that *what time* is a noun phrase, more precisely a DP. A piece of evidence for this assumption is provided by the following examples that have already been discussed in the last section.

- (3) a. What time is good for you? (COCA)
- b. We'll meet tomorrow, at whatever time is convenient for you. (COCA)
- (4) What time would you like as the time for your departure?

In (3a, b), *what(ever) time* is used as the subject. In (4), *what time* is used as the object of a transitive verb. Because the subject and the object are restricted to DPs in English (at least in unmarked cases), these examples show that *what(ever) time* should be considered to be a DP.

One might think that it is very obvious that *what(ever) time* is a DP because it consists of a determiner (i.e. *what(ever)*) and a noun (i.e. *time*), which are ordinary components of a DP. For this reason, one might think that it is not necessary to emphasize the "DP-hood" or the nominal nature of *what(ever) time*. However, occurrences of *what(ever) time* that we focus on in this paper are used as "adverbial" modifiers. An ordinary DP like *the man*, *which man* etc. is not used as an adverbial modifier (without being accompanied by a preposition). Here we emphasize the evidence for the "DP-hood" of *what(ever) time*, because the fact that it is used as an "adverbial" modifier might make it difficult for us to recognize it as a DP and lead us to incorrectly conclude that it is not a DP. Pieces of evidence that shows that *what(ever) time* in its "adverbial" use is actually a DP will be offered in the following section (i.e. examples (27), (28) and (31)). Finally, it should be noticed that the claim that *what(ever) time* is a DP is compatible with its predicative use too, because a DP can be used as a predicate when it occurs with the copula *be*.

3. A Proposal

This section proposes a particular analysis of the "adverbial" use of *what(ever) time* that maintains the assumption that it is categorially a DP.

3.1. *At-Deletion before What(ever) Time (ADBWT)*

First, we propose that, in its "adverbial" use, *what(ever) time*, which is a DP, is introduced as the complement of the preposition *at* ((7)).

(7) [PP at [DP *what(ever) time*]]

Second, we propose that an occurrence of *at* that takes an overt occurrence of *what(ever) time* as its complement is optionally deleted in PF ((8), *At-deletion before What(ever) Time (ADBWT)*, hereafter).

(8) *At-deletion before What(ever) Time (ADBWT)*: The preposition *at* is optionally deleted in PF when it takes an overt occurrence of *what(ever) time* as its complement.

[PP [P *at*] [DP *what(ever) time*]] → [PP [P ~~*at*~~] [DP *what(ever) time*]]

Third, we propose that ADBWT and Copy Deletion (CD hereafter) are freely ordered: ADBWT can be applied either before or after CD ((9)). (9) is a null hypothesis, because there is no well-established empirical or theoretical reason for forcing a particular ordering of their applications (at least as far as we now know).

- (9) ADBWT and Copy Deletion are freely ordered.

In the following subsections, it will be shown how *what(ever) time*-clauses are derived by the proposed analysis and evidence will be offered for the particular derived structures it yields.

3.2. Applications of ADBWT and CD

What time in its "adverbial" use seems to be optionally associated with the preposition *at*: (a) in rare cases, *at* can optionally appear immediately before *what time*, which is fronted to the initial position of a clause by wh-movement ((10a, b)); (b) *at* can optionally but marginally appear in (what seems to be) the original position of *what time* too ((10a, c)). (11) and (12) are attested examples that correspond to (10b) and (10c), respectively, that were gleaned from COCA.

- (10) a. I know what time you came here.
 b. I know at what time you came here.
 c. ? I know what time you came here at.
- (11) a. At what time do you start making phone calls? (COCA)
 b. You can see on the left, there's a graph, and it shows at what time you've used the most electricity or gas, ... (COCA)
- (12) a. Do you know what time the e-mail came in at? (COCA)
 b. The law of the land is you close by 1:30, and that's what time our boss always had us close at.² (COCA)

There is no doubt that (10a) is grammatical. Examples like (10b) are rare but judged to be acceptable by our informant. Actual examples like (11) can be attested in COCA. Examples like (10c) are rare and less acceptable than (10a, b) and (11) as well.³ However, actual examples like (12) can be found in COCA. For this reason, the rule(s) of English grammar relevant to "adverbial" *what(ever) time* should be formulated in a way that examples like (10c) and (12) can be generated or produced (albeit with a degraded status). The lower acceptability of (10c), as compared with (10a, b), will be explained later. It should be noticed at this point that the presence of examples like (10a, c), (11) and (12) shows that the "adverbial" *what(ever) time* is closely related to the preposition *at*. It is also remarkable that no preposition other than *at* can appear in (10c) and (12).

Taking up the embedded clauses in (10) as examples, let us show how *what time*-clauses are derived by the proposed analysis and offer evidence for the particular derived structures that it yields. In the derivations

² It is unclear whether *what time* in (12b) is used as an interrogative wh-DP or the head of a free relative. Whichever analysis turns out to be correct, (12b) shows that 'adverbial' *what time* in the clause-initial position is related to *at* in its original position.

³ Examples like (10c) are judged to be unacceptable by Hornstein and Weinberg (1981), for example.

of (10a-c), the PP in (7) is merged with the verb phrase *came here* as in (13). When wh-movement is applied to *what time* in (13), it can either pied-pipe *at* ((14)) or strand it ((15)).

(13) [CP/C' C [IP you [VP came here [PP at [DP what time]]]]]

(14) Pied-piping

[CP [PP at [DP what time]] [C' C [IP you [VP came here [PP at [DP what time]]]]]]]

(15) P-stranding

[CP [DP what time] [C' C [IP you [VP came here [PP at [DP what time]]]]]]]

(14) and (15) undergo ADBWT (optionally) and CD (obligatorily) in PF. The derivations resulting from (14) (with Pied-piping of the *at*-PP) are shown in Section 3.2.1 and the ones resulting from (15) (with stranding of *at*) are shown in Section 3.2.2.

3.2.1. The Derivations Where the *At*-PP is Pied-Piped

We begin by discussing the derivations resulting from (14).

(14) Pied-piping

[CP [PP at [DP what time]] [C' C [IP you [VP came here [PP at [DP what time]]]]]]]

Now recall that we proposed that ADBWT and CD are freely ordered ((9)). If ADBWT precedes CD and the option of applying ADBWT is chosen, the derivation will proceed as in (16).

(16) a. ADBWT (optional; applied)

[CP [PP ~~at~~ [DP what time]] [C' C [IP you [VP came here [PP ~~at~~ [DP what time]]]]]]]

b. CD (obligatory)

[CP [PP ϕ [DP what time]] [C' C [IP you [VP came here [PP ϕ [DP ~~what time~~]]]]]]]

c. [CP [PP ϕ [DP what time]] [C' C [IP you [VP came here ϕ]]]]]

In (16a), the occurrences of *at* in the landing site and the base position of *at what time* are deleted by ADBWT. Notice that ADBWT can be applied to *at* in the lower copy of *at what time* in (16a), because the lower copy has not been deleted by CD at that derivational stage. In (16b), the lower copy of the moved PP is deleted by CD, deriving the structure (16c). Although the lower copy of the PP in (16b) contains a deleted occurrence of *at*, we assume that CD can be applied to it, because there is no independent reason that deletion cannot be applied in such cases. It should be noted that *what time* in the initial position in (16c) can be analyzed as a PP with elided *at*.

Recall that we proposed that ADBWT is an optional rule. If ADBWT precedes CD but the non-application of ADBWT is chosen, the derivation will proceed as depicted in (17).

- (17) a. ADBWT (optional; not applied)
 [CP [PP at [DP what time]] [C' C [IP you [VP came here [PP at [DP what time]]]]]]]
 b. CD (obligatory)
 [CP [PP at [DP what time]] [C' C [IP you [VP came here ~~[PP at [DP what time]]~~]]]]]
 c. [CP [PP at [DP what time]] [C' C [IP you [VP came here ϕ]]]]

In (17a), the occurrences of *at* in the landing site and the base position of *at what time* remain undeleted. In (17b), the lower copy of the moved PP is deleted by CD, yielding the structure (17c). Due to the non-application of ADBWT, the PP *at what time* occurs in the initial position of the clause in (17c).

If CD precedes ADBWT and the option of applying ADBWT is chosen, the continuation of the derivation will be as in (18).

- (18) a. CD (obligatory)
 [CP [PP at [DP what time]] [C' C [IP you [VP came here ~~[PP at [DP what time]]~~]]]]]
 b. ADBWT (optional; applied)
 [CP [PP ~~at~~ [DP what time]] [C' C [IP you [VP came here ϕ]]]]]
 c. [CP [PP ϕ [DP what time]] [C' C [IP you [VP came here ϕ]]]]

In (18a), the lower occurrence of the PP is deleted by CD. Then, in (18b), *at* contained in the wh-moved PP is deleted by ADBWT to derive (18c). It should be noted that *what time* in the initial position in (18c), like that in (16c), can be analyzed as a PP with elided *at* too.

If CD precedes ADBWT and the option of not applying ADBWT is chosen, the relevant derivation will be as in (19).

- (19) a. CD (obligatory)
 [CP [PP at [DP what time]] [C' C [IP you [VP came here ~~[PP at [DP what time]]~~]]]]]
 b. ADBWT (optional; not applied)
 [CP [PP at [DP what time]] [C' C [IP you [VP came here ϕ]]]]]
 c. [CP [PP at [DP what time]] [C' C [IP you [VP came here ϕ]]]]

Like in (17c), the PP *at what time* occurs in the initial position in (19c), due to the non-application of ADBWT.

3.2.2. The Derivations Where *At* Is Stranded

Now I turn to the derivations resulting from (15) (Preposition-stranding). If ADBWT precedes CD and the option of applying ADBWT is chosen, the derivation will proceed as follows.

- (20) a. ADBWT (optional; applied)
 [CP [DP what time] [C' C [IP you [VP came here [PP ~~at~~ [DP what time]]]]]]]]
- b. CD (obligatory)
 [CP [DP what time] [C' C [IP you [VP came here [PP ϕ [~~DP what time~~]]]]]]]]
- c. [CP [DP what time] [C' C [IP you [VP came here [PP ϕ ϕ]]]]]]

At, which has been stranded by *wh*-movement, is deleted by ADBWT in (20a) because it takes, as its complement, the lower overt copy of [*DP what time*], which remains undeleted at this derivational stage. The lower copy of [*DP what time*] is then deleted by CD in (20b), which derives (20c). Importantly, although no preposition overtly appears in the base position of *what time* in (20c), *what time* in the initial position can only be analyzed as a DP (i.e. [*DP what time*]), not as a PP.

If ADBWT precedes CD and the option of non-application of ADBWT is chosen, the derivation will proceed as in (21).

- (21) a. ADBWT (optional; not applied)
 [CP [DP what time] [C' C [IP you [VP came here [PP at [DP what time]]]]]]]]
- b. CD (obligatory)
 [CP [DP what time] [C' C [IP you [VP came here [PP at [~~DP what time~~]]]]]]]]
- c. [CP [DP what time] [C' C [IP you [VP came here [PP at ϕ]]]]]]

Because ADBWT does not apply in (21a), *at* continues to appear in (21b, c). The lower copy of [*DP what time*] is then deleted by CD in (21b), which derives (21c). Importantly, in (21c), *what time* in the initial position should be analyzed as a DP (i.e. [*DP what time*]) but not as a PP, and *at* appears immediately before the base-position of *what time*.

If CD precedes ADBWT, the derivation will proceed as in (22).

- (22) a. CD (obligatory)
 [CP [DP what time] [C' C [IP you [VP came here [PP at [~~DP what time~~]]]]]]]]
- b. ADBWT (optional, Not Applicable)
 [CP [DP what time] [C' C [IP you [VP came here [PP at ϕ]]]]]]
- c. [CP [DP what time] [C' C [IP you [VP came here [PP at ϕ]]]]]]

After CD is applied at (22a), no overt occurrence of *what time* appears as the complement of *at*. For this reason, the precondition for the application of ADBWT is not satisfied and thus it cannot be applied ((22b)). Notice that, because the condition on the application of ADBWT is not satisfied, the issue of whether ADBWT is applied or not does not arise in the first place. Since ADBWT is not applied, *at* continues to appear immediately before the original position of *what time* ((22c)). Importantly, in (22c) too, *what time* in the initial position can only be analyzed as a DP (i.e. [*DP what time*]).

3.2.3. Interim Summary

We have shown that there are seven possible derivations resulting from the same underlying structure (13) ((16), (17), (18), (19), (20), (21), (22)), depending on whether *at* is pied-piped or stranded, whether ADBWT precedes CD or vice versa, whether ADBWT is applicable or not, and whether ADBWT is applied or not (if it is applicable). The structures that result from these derivations are repeated below.

- (16) c. [CP [PP ϕ [DP what time]] [C' C [IP you [VP came here ϕ]]]]
(Pied-Piping \rightarrow ADBWT (applied) \rightarrow CD)
- (17) c. [CP [PP at [DP what time]] [C' C [IP you [VP came here ϕ]]]]
(Pied-Piping \rightarrow ADBWT (not applied) \rightarrow CD)
- (18) c. [CP [PP ϕ [DP what time]] [C' C [IP you [VP came here ϕ]]]]
(Pied-Piping \rightarrow CD \rightarrow ADBWT (applied))
- (19) c. [CP [PP at [DP what time]] [C' C [IP you [VP came here ϕ]]]]
(Pied-Piping \rightarrow CD \rightarrow ADBWT (not applied))
- (20) c. [CP [DP what time] [C' C [IP you [VP came here [PP ϕ ϕ]]]]]
(P-Stranding \rightarrow ADBWT (applied) \rightarrow CD)
- (21) c. [CP [DP what time] [C' C [IP you [VP came here [PP at ϕ]]]]]
(P-Stranding \rightarrow ADBWT (not applied) \rightarrow CD)
- (22) c. [CP [DP what time] [C' C [IP you [VP came here [PP at ϕ]]]]]
(P-Stranding \rightarrow CD \rightarrow ADBWT (not applicable))

We can classify these seven structures into three types: (a) (16c), (18c) and (20c), which contain the string *what time* in the clause-initial position but do not contain *at* in the original position of *what time*; (b) (17c) and (19c), which contain the PP *at what time* in the clause-initial position and do not contain *at* in the original position of (*at*) *what time*; (c) (21c) and (22c), which contain the string *what time* in the clause-initial position and contain *at* in the original position of *what time*. In what follows, the structural characteristics of each type are discussed in turn.

3.3. Structures (17c) and (19c): *I know at what time you came here.*

We begin by discussing (17c) and (19c). They are structures in which the entire PP (*at what time*) is pied-piped to the initial position and *at* is not deleted. The example (10b) corresponds to these two superficially identical structures. In other words, (10b) is generated by pied-piping of *at*, application of CD to the copy of *at what time* in its original position, and non-application of ADBWT, irrespectively of whether ADBWT precedes CD or vice versa.

- (10) b. I know at what time you came here.

What is crucial to the present analysis is the fact that *at* in the initial position of the embedded clause remains undeleted in (10b). This is the reason that application of ADBWT is taken to be optional. Another piece of evidence that ADBWT should be thought to be optional is provided by the following examples.

- (23) a. You started what time? (COCA)
 b. You started at what time?
 (24) a. She left what time?
 b. She left at what time? (COCA)

In (23) and (24), which can be considered to be echo wh-questions, wh-movement is not applied to *what time* (or the PP that contains it): *what time* remains in the complement of *at*. Interestingly, as the above example show, whether there is an occurrence of *at* immediately before *what time* or not does not affect their acceptability. This fact also shows that ADBWT is optional. The same point can be shown by the following examples.

- (25) a. I don't know why anyone was in the hospital at what time. (COCA)
 b. ... he's now lost his ability to even make a determination as to what weapon to use at what time. (COCA)

(25a, b) involve multiple wh-questions and wh-movement is not applied to *what time* (or the PP that contains it). These examples also show that *at* can cooccur with *what time* when the latter remains in the complement position of the former. Of course, this point can be easily captured by taking ADBWT to be optional.

3.4. Structures (16c), (18c) and (20c): *I know what time you came here.*

Now we turn to structures (16c), (18c) and (20c). Example (10a) corresponds to these three structures. In other words, (10a) (or more precisely the string of words in (10a)) can be generated either by (a) pied-piping of *at*, application of ADBWT, and application of CD to the copy of *at what time* in its original position, irrespectively of whether ADBWT precedes CD or vice versa ((16c) and (18c)) or by (b) stranding of *at*, which is followed by the application of ADBWT, which in turn is followed by CD applied to the copy of *what time* in its original position ((20c)). Importantly, (10a), in which the string *what time* is overtly located in the initial position of the embedded clause and *at* does not overtly appear in the original position of *what time*, is structurally ambiguous in that *what time* in the initial position can be analyzed either as a pied-piped PP with deleted *at* ((16c) and (18c)) or only as a DP that has stranded *at* in the original position ((20c)).

- (16) c. $[_{CP} [_{PP} \phi [_{DP} \text{what time}]]] [_{C'} C [_{IP} \text{you} [_{VP} \text{came here } \phi]]]]$

- (Pied-Piping → ADBWT (applied) → CD)
- (18) c. [CP [PP φ [DP what time]] [C' C [IP you [VP came here φ]]]]
 (Pied-Piping → CD → ADBWT (applied))
- (20) c. [CP [DP what time] [C' C [IP you [VP came here [PP φ φ]]]]
 (Stranding → ADBWT (applied) → CD)
- (10) a. I know what time you came here.

In what follows, we show the evidence for the two structural possibilities that the present analysis predicts are available for (10a).

The evidence for the structures (16c) and (18c) is provided by the following example.

- (26) I know right what time he came here.⁴

(26) shows that the intensifier *right* can appear immediately before *what time*. *Right* as an intensifier is known to be able to modify only prepositions (Jackendoff 1973; Tsao and Lin 1991). The acceptability of *right* in (26) is naturally expected under the present analysis because *what time* in (10a) can be analyzed as a PP with deleted *at* ((16c) and (18c)).

Now I turn to the evidence for the structure (20c). In (20c), the movement of *what time* has stranded *at* and *at* is deleted by ADBWT. Importantly, *what time* in the initial position can only be analyzed as a DP (not a PP with elided *at*). The evidence for this point comes from a fact about free relative involving *whatever time* ((27) and (28)).

- (27) Batula's method is to get eight hour [sic] of sleep, but that starts from whatever time he goes to bed.
 (COCA)
- (28) Context: Children are playing with a clock.
 They like whatever time the minute hand meets the hour hand.

It has been recognized in the literature that the categorial status of a free relative is identical to that of the wh-phrase that appears in its initial position (Ott 2011; Riemsdijk 2006). In (27), a free relative headed by *whatever time* is the object of the preposition *from*. In (28), the free relative appears as the direct object of the transitive verb *like*. It is natural to think that the entire free relative is a DP in both the two examples. Then *whatever time* in the initial position of the free relatives should also be analyzed as a DP ((29) and (30)).

- (29) ... [PP from [FR(=DP) [DP whatever time]] [C/CP C [IP he goes to bed [PP φ φ]]]]
- (30) ... like [FR(=DP) [DP whatever time]] [C/CP C [IP the minute hand meets the hour hand [PP φ φ]]]

⁴ Example (i), in which *right* is placed immediately before *at what time* in the initial position of the embedded clause is acceptable too. Since *at what time* is clearly a PP ((17c) and (19c)), it can be modified by *right*.
 (i) I know right at what time he came here.

This point shows that the derived structure (20c) actually exists. For the mechanism that determines the category of the entire free relative, by which the syntactic object formed by merging a *wh*-phrase with a *C'*/*CP* is labelled by the *wh*-phrase, see Ott (2011).

We have argued that examples like (10a), in which *what time* alone appears in the clause-initial position (without *at* appearing in its original position), are (derivationally and) structurally ambiguous: (i) *what time* is analyzed as a pied-piped PP containing *at* elided by ADBWT (i.e. (16c) and (18c)) or (ii) it is only analyzed as a DP that has stranded *at*, which is deleted by ADBWT (i.e. (20c)). The fact about the intensifier *right* in (26) supports (i) and the fact about free relatives headed by *whatever time* in (27) and (28) supports (ii). Potential alternative analyses of examples like (10a) might take *what time* in them (a) to always be a DP (because it consists of a determiner and a noun) or (b) to always be an AdvP or a PP (because it semantically functions as a modifier). The potential analysis (a) cannot explain the occurrence of *right* in (26) and the potential analysis (b) cannot account for the free relatives in (27) and (28). Our proposal that "adverbial" *what time* is actually a DP that is introduced as the complement of *at* and it can either pied-pipe or strand *at* (which can be later deleted by ADBWT) can capture both of these facts.

Before concluding this subsection, we should pay attention to the fact that (27) (=29) and (28) (=30) can only be generated by derivations like the one that leads to (20c). More precisely, it should be noted that (27) and (28) involve extraction of *whatever time* from within an adjunct *at*-PP and thus it is (incorrectly) predicted that they are degraded due to a violation of the Adjunct Condition (see Section 3.5). In Section 3.6, we will discuss the reason why they are perfectly acceptable despite the fact that they involve extraction from an adjunct.

3.5. Structures (21c) and (22c): ?*I know what time you came here at.*

Now we focus on the structures (21c) and (22c), which is derived by stranding of *at*, application of CD to the copy of *what time* in its original position, and non-application of ADBWT. The option of non-application of ADBWT is chosen in the derivation of (21c) and ADBWT is simply inapplicable in the derivation of (22c). Example (10c), in which *what time* appears in the initial position of the clause and *at* appears in the original position of *what time*, corresponds to these two superficially identical structures.

- (21) c. [CP [DP *what time*] [C' C [IP you [VP came here [PP at ϕ]]]]]
(Stranding \rightarrow AD (not applied) \rightarrow CD)
- (22) c. [CP [DP *what time*] [C' C [IP you [VP came here [PP at ϕ]]]]]
(Stranding \rightarrow CD \rightarrow AD (not applicable))
- (10) c. ?*I know what time you came here at.*

What is noteworthy about the structures in (21c) and (22c) is that, with *at* being left and pronounced at the original position of (*at*) *what time*, *what time* in the initial position can only be analyzed as a DP and it cannot be analyzed as a PP with elided *at*. Evidence for this point can be offered by the following example.

(31) * I know right what time he came here at.

(26) I know right what time he came here.

(31) should be compared with (26), which is acceptable. (31) shows that, when *at* appears in the original position of (*at*) *what time*, the intensifier *right* cannot be inserted immediately before *what time*. Under the present analysis, the unacceptability of (31) can be straightforwardly explained. Recall that *right* can only modify prepositions. Because *what time* in (31) can only be analyzed as a DP ((21c) and (22c)), it cannot be modified by *right*.

In this connection, consider the following example.

(32) Context: Children are playing with a clock.

?They like whatever time the minute hand meets the hour hand at. (cf. (28))

In (32), *whatever time* appears at the initial position of a free relative and *at* overtly appears in the original position of *whatever time*, which shows that the (derivations resulting in the) structures (21c) and (22c) are involved. Since the categorial status of a free relative is determined by the wh-phrase in its initial position and *what(ever) time* in (21c) and (22c) can only be a DP, not a PP with elided *at* ((33)), it is predicted that the free relative can appear as the direct object DP of a transitive verb: i.e. (32) is grammatical/acceptable.

(33) ... like [_{FR (= DP)} [_{DP} whatever time] [_{C'/CP} C [_{IP} the minute hand meets the hour hand [_{PP} at ϕ]]]]

According to our informant, (32) is only marginally acceptable (i.e. less acceptable than (28)). One might think that the relatively low acceptability of (32) undermines the proposed analysis of "adverbial" *what(ever) time*, especially our claim that (10c) involves extraction of *what time* as a DP from within the *at*-PP. However, we conjecture that the degradedness of (32) (and (10c)) is due to the fact that the PP headed by temporal *at* (i.e. [_{PP} at [_{DP} what time]]) is an adjunct. *Whatever time* in (32) (and (33)) and *what time* in (10c) are moved from within an adjunct and thus violate the Adjunct Condition, which forbids movement of an element from inside to outside an adjunct. Therefore, the marginality of (32) (and (10c)) is not incompatible with our analysis. Rather it can be explained as a violation of the Adjunct Condition under our analysis.

3.6. Revisiting the Structure (20c): Repair of a Violation of the Adjunct Condition by Deletion of *At*

In the last section, we have argued that the derivations of the structures (21c) and (22c) involve extraction of *what time* from the adjunct *at*-PP and this point is the reason for the relatively low acceptability of

(10c) and (32). In this connection, it should be recalled now that example (28), which unambiguously engages the structure (20c), is perfectly acceptable.

(28) Context: Children are playing with a clock.

They like whatever time the minute hand meets the hour hand.

(30) ... like [_{FR(=DP)} [_{DP} whatever time] [_{C'/CP} C [_{IP} the minute hand meets the hour hand [_{PP} ϕ ϕ]]]]

In the derivation of (28), *whatever time* as a DP is moved from within the adjunct PP ((30) = (20c)). It is then (incorrectly) predicted that (28) is as degraded as (32) and (10c) due to a violation of the Adjunct Condition. On the contrary, however, (28) is more acceptable than (32) and (10c). We guess that this improvement of acceptability in (28) is induced because *at* is deleted. It has been pointed out in the recent literature (Bošković 2011, 2013; Stepanov 2012) that an island effect caused by movement across a syntactic island can disappear if the head of the island is removed by movement or deletion: the usually expected degraded acceptability to be induced by movement from an island is improved in such cases. As for (28) (= (30)), *what time* is moved from within the adjunct *at*-PP, which is an island for movement, but, importantly, *at*, which is the head of the adjunct PP, is later deleted by ADBWT. As a result, the effect of Adjunct Condition disappears in (28) (= (30)). An explanation along this line can be implemented as in what follows.

Let us assume, following Bošković (2011: 17), that, in island-violations and violations of Attract Closest, a marker for a troublemaker (e.g. [*]) is assigned to the heads of the islands or interveners. The presence of the [*] assigned to the head of the troublemaker in the final PF-representation leads to degradedness. On the other hand, if the [*] is removed by deletion and is absent in the final PF-representation, no violation will be induced. The derivation of the free relative in (28) (= (30)) is as depicted in (34).

- (34) a. [_{C'/CP} C [_{IP} the minute hand meets the hour hand [_{PP (Adjunct)} at [_{DP} whatever time]]]]
 b. Wh-movement and [*]-assignment
 [_{FR(=DP)} [_{DP} whatever time] [_{C'/CP} C [_{IP} the minute hand meets the hour hand
 [_{PP (Adjunct)} at_[*] [_{DP} whatever time]]]]]]
 c. ADBWT
 [_{FR(=DP)} [_{DP} whatever time] [_{C'/CP} C [_{IP} the minute hand meets the hour hand
 [_{PP (Adjunct)} ~~at_[*]~~ [_{DP} whatever time]]]]]]
 d. CD
 [_{FR(=DP)} [_{DP} whatever time] [_{C'/CP} C [_{IP} the minute hand meets the hour hand
 [_{PP (Adjunct)} ϕ [~~DP whatever time~~]]]]]]
 e. The final PF-representation
 [_{FR(=DP)} [_{DP} whatever time] [_{C'/CP} C [_{IP} the minute hand meets the hour hand [_{PP (Adjunct)} ϕ ϕ]]]]

First, the DP *whatever time* is merged as the complement of *at* and the PP headed by *at* is an adjunct ((34a)). Second, the DP *whatever time* is moved by wh-movement stranding the preposition *at*. Because this movement

crosses the adjunct PP (headed by *at*), the preposition *at*, which is the head of the adjunct island, is assigned a [*] ((34b)). In PF, the structure in (34b) undergoes ADBWT ((34c) and then CD ((34d)). Due to the application of ADBWT, the preposition *at* with a [*] is deleted ((34c)) and the [*] does not occur in the final PF-representation ((34e)). The perfect acceptability of (28) (=30)) is thus explained as an instance of 'repair by ellipsis/deletion'.

4. Concluding Remarks

In this paper, we have analyzed *what(ever) time* in its “adverbial” use. We have proposed that (a) in its "adverbial" use, *what(ever) time*, which is a DP, is introduced as the complement of the preposition *at*; (b) an occurrence of *at* that takes an overt occurrence of *what(ever) time* as its complement is optionally deleted in PF (*At-Deletion Before What(ever) Time*, ADBWT); (c) ADBWT and Copy Deletion, which is applied to the lower copy/copies in chains created by movement, are freely ordered. Our proposal, especially, (b) and (c) above correctly predicts that, in (interrogative) sentences with 'adverbial' *what time*, (i) the PP *at what time* can appear in the clause-initial position ((10b)), (ii) *what time* alone can appear in the clause-initial position **without** *at* appearing in its original position ((10a)), or (iii) *what time* alone can occur in the clause-initial position **with** *at* appearing in its original position ((10c)).

- (10) a. I know what time you came here.
 b. I know at what time you came here.
 c. ? I know what time you came here at.

Our analysis predicts that the case (ii) is derivationally and thus structurally ambiguous: *what time* in the clause-initial position can be either (α) a PP with deleted *at* or (β) a DP that has been extracted from the PP headed by *at* (to be deleted by ADBWT). Evidence for this structural ambiguity is provided by a fact about the intensifier *right* (for (α)) and a fact about free relatives headed by *whatever time* (for (β)). The case (iii) is rare and less acceptable than (i) and (ii), because it involves extraction of *what time* from an adjunct *at*-PP. However, it clearly shows that "adverbial" *what time* that occurs alone in the clause-initial position is associated with *at*. The surprising fact that the case (β) is perfectly acceptable in spite of the violation of the Adjunct Condition was attributed to the deletion of *at*.

Our analysis raises two important issues. First, the issue arises of why *at* **can** be deleted when it takes an overt occurrence of *what(ever) time* as its complement. Ordinary instances of deletion in natural languages (e.g. Comparative Deletion, Gapping, Pseudo-gapping, Sluicing, Stripping, VP-deletion, etc.) are subject to the condition that an elided constituent should be associated with an antecedent that it is identical to or non-distinct from. ADBWT differs from them in that it deletes an element (i.e. the preposition *at*) that appears to not have any linguistic antecedent. Given that *at* does not have any antecedent, why is it allowed to be deleted? Incidentally, an issue of the same kind arises concerning the deletion of *at* that takes *where* as its complement, which has been proposed by Collins (2007), Collins and Radford (2015) and Fujii and Akiyama (2015) (see below).

Second, ADBWT is reminiscent of the analyses of "location" *where* that have been proposed by Collins (2007), Collins and Radford (2015) and Fujii and Akiyama (2015). For example, Fujii and Akiyama (2015) propose that an overt occurrence of the preposition *at* that takes *where* (which they take to be a DP) as its complement is **obligatorily** deleted in PF (*At*-Deletion Before *Where*, hereafter ADBW). This proposal explains the following fact: although *at* can (marginally) appear in the original position of *where* ((35b)), it cannot appear immediately before *where* ((35c); (36b)).

- (35) a. Where do you live?
 b. Where do you live at? (COCA)
 c. * At where do you live?⁵
- (36) a. Who lives where?
 b. * Who lives at where?⁶

Now the issue arises of why ADBWT is **optional** while ADBW is **obligatory**. This contrast should be reduced to some difference between *what time* and *where*.

In what follows, we offer some speculative answers to these questions, referring to Fujii and Akiyama (2015). As mentioned above, Fujii and Akiyama (2015) proposed that, in English sentences with location *where*, *where* as a DP is introduced as the complement of the preposition *at* and that *at* is obligatorily deleted in PF by ADBW when it takes an overt occurrence of *where* as its complement. *At* is deleted without being accompanied by any antecedent in this case too.⁷ For this reason, the same issue as the first one raised above concerning

⁵ According to Fujii and Akiyama (2015), (35b) is derived in the manner depicted in (i).

- (i) a. [CP/C' C [IP he [VP lives [PP at [DP where]]]]]
 b. P-stranding
 [CP [DP where] [C' C [IP he [VP lives [PP [P at] [DP where]]]]]
 c. CD
 [CP [DP where] [C' C [IP he [VP lives [PP [P at] ~~[DP where]~~]]]]]
 d. ADBW: Not applicable
 [CP [DP where] [C' C [IP he [VP lives [PP [P at] ϕ]]]] (... where he lives at)

First, *where* as a DP is introduced as the complement of the preposition *at* ((i-a)). *Where* as a DP is wh-moved stranding *at* ((i-b)). In PF, structure (i-b) undergoes CD (Copy Deletion) and ADBW, which are taken to be freely ordered. In Fujii and Akiyama (2015), it is proposed that ADBW is obligatorily applied when *at* takes an overt occurrence of [DP *where*] as its complement. In the derivation of (35b), CD precedes ADBW ((i-c) and (i-d)). Because CD deletes the lower copy of [DP *where*] as the complement of *at* ((i-c)), the precondition for the application of ADBW is not satisfied and *at* thus remains undeleted ((i-d)), like in the case (22c) involving *what(ever) time* discussed in the main text.

Example (35c) is thought to involve Pied-Piping of the PP headed by *at* ((ii)).

- (ii) Pied-piping
 [CP [PP [P at] [DP where]] [C' C [IP he [VP lives [PP [P at] [DP where]]]]]

Whether CD precedes ADBW or vice versa, *at* in the clause-initial position of (ii) takes an overt occurrence of [DP *where*] as its complement and thus is deleted by ADBW, which explains the unacceptability of (35c). For the derivations, the overt structures and the structural ambiguity of (35a), see Fujii and Akiyama (2015).

⁶ In (36), which is a multiple wh-question, [DP *where*] is not wh-moved and thus remains in the complement of *at*. ADBW is applied here, which explains the contrast between (36a) and (36b).

⁷ Collins and Radford (2015) dub deletion operations that do not require any antecedent *Ghosting*, which is intended to be distinct from ordinary deletion (see Collins and Postal (2012) too). However, it is unclear whether deletion of *at* by ADBW(T) is distinct in nature from ordinary deletion operations. It is true that deletion of *at* by ADBW(T) does not require any antecedent of *at*. This point does not mean that it is not subject to the recoverability condition, which we think is the cause of the necessity of antecedents in ordinary deletion operations. If deletion of *at* by ADBW(T) and

what(ever) time does arise here too. Fujii and Akiyama (2015) offer the following conjecture about this issue. As we said above, it has been recognized in the literature that deletion operations in natural languages are subject to the condition that an elided constituent should be associated with a proper antecedent that it is identical to or non-distinct from. Why is this condition imposed on deletion in many cases? It is natural to think that this condition is derived from the 'recoverability' condition on deletion: the content of the elided constituent should be somehow recovered. How can this be achieved? Of course, the content of the elided constituent can be recovered on the basis of its antecedent (which is identical to it or non-distinct from it), if there is any. However, this is not the only possibility: potential sources that serve to recover the content of an elided constituent are not restricted to the 'antecedent' in the familiar sense. For example, it is expected that the content of the elided constituent can be recovered on the basis of the remnant of deletion in some cases.⁸ Fujii and Akiyama speculate that ADBW is an instance of this hypothetical situation: the content of *at* is recovered not on the basis of an antecedent (because there is none) but on the basis of *where*, a part of the remnant of deletion.

Suppose that locative *at* contains the semantic feature [Locative] and the categorial feature [Prepositional]. It is natural to think that *where* contains the semantic feature [Locative] and the categorial feature [Nominal] (or [+N, -V]), in addition to the wh-feature. Then the semantic feature [Locative] of *at* can be recovered on the basis of the same feature on *where*.⁹ At first glance, the categorial feature [Prepositional] of *at* seems not to be present on *where*. However, PP can be thought to be one of the extended projections of N (Grimshaw 2005: 4) and the categorial feature [Prepositional] can be understood to be [+N, -V]. If so, the categorial feature(s) of *at* can be recovered on the basis of that/those of *where*, which is nominal in nature (i.e. [+N, -V]). It can then be speculated that the feature content of *at* is recovered on the basis of *where*.

As for the obligatoriness of ADBW, Fujii and Akiyama (2015) offer the conjecture that follows. Their formulation of ADBW is based on the contrast between the cases in which [_{DP} *where*] is moved and strands *at* (in which case *at* can be overt, (35b)) and the cases in which [_{DP} *where*] remains in the complement of *at* (in which case *at* cannot be overt, (35c) and (36b)). It can be understood to mean that *at* and [_{DP} *where*] cannot overtly cooccur when they are too close to each other. The question now arises of how the relevant local domain within which overt [_{DP} *where*] and overt *at* CANNOT cooccur should be defined.

Fujii and Akiyama (2015) assume, essentially following the recent literature on phases and cyclic linearization (Abels 2003; Bošković 2014; Drummond et al. 2010), that, in addition to vP, CP and DP, "the

ordinary instances of deletion are subject to the same condition concerning recoverability, we need not think that they are distinct. In fact, as for ADBW(T), we are going to speculate below that, although the content of locative *at* and that of temporal *at* are not recovered on the basis of any 'antecedent' in the familiar sense, they are recovered on the basis of the feature content of *where* and on the basis of *what(ever) time*. If this speculative idea is on the right track, ADBW(T) can be thought to be subject to the same recoverability requirement as ordinary instances of deletion are, although they differ in how that requirement is met.

⁸ This point is reminiscent of the classical explanation of pro-drop in Romance languages like Italian or Spanish, in which the feature content of *pro* (or the elided subject pronoun) can be identified on the basis of inflectional features on V/Infl (i.e. a part of the remnant).

⁹ It might be the case that *at* is the unmarked locative preposition in English. More precisely, it might be the case that *at* inherently does not have any semantic feature that distinguishes it from *in* or *on*, for example, and the particular interpretation *at* receives arises by default. If so, *at* will have a (semantic) feature that specifies that it is locative (i.e. [Locative]), but will not have more specific one.

prepositional phrase" is a phase-category. Furthermore, they assume that, in "the prepositional phrase", a lexical PP is dominated by a functional projection FP that forms the extended projection of P as in (37) (Bošković 2014), and that F rather than P is the phase head in (37) (see Bošković (2014)).

(37) $[_{FP(Phase)} F [_{PP} P DP]]$

When FP is formed (or the next higher phase head is introduced), P and its complement DP are transferred together to be spelled out. With this in mind, let us reconsider the structure of the prepositional phrase involving *at* and $[_{DP} where]$ ((38)).

(38) $[_{FP(Phase)} F [_{PP} at [_{DP} where]]]$

In (38), *at* and $[_{DP} where]$ are transferred together. This point leads Fujii and Akiyama (2015) to conjecture that the obligatoriness of ADBW is a consequence of a ban against spelling out *at* and $[_{DP} where]$ **at the same time in the same transfer/spell-out domain**. As mentioned above, Fujii and Akiyama (2015) suggested that locative *at* shares the features [Locative] and [+N, -V] with $[_{DP} where]$ ((39)).

(39) $[_{FP(Phase)} F [_{PP} at_{[+N, -V], [Locative]} [_{DP} where]_{[+N, -V], [wh], [Locative]}]]]$

The ban in question can then be considered to be a ban against spelling out two (or more) elements that share features at the same time. This point can be captured by reformulating, in terms of syntactic and semantic features, the Distinctness condition on linearization proposed by Richards (2010), which was intended to prohibit two (or more) syntactic nodes of the same category from being linearized in the same transfer/spell-out domain. When the FP in (39) is formed (or when the next higher phase category is merged), *at* and $[_{DP} where]$ are transferred/spelled out together. Because *at* and $[_{DP} where]$ both have [Locative] and [+N, -V], it is natural to think that they induce a violation of (a reformulated version of) the Distinctness condition. The obligatoriness of ADBW might thus be a consequence of (a reformulated version of) the Distinctness condition: ADBW is obligatorily applied to help evade violating the Distinctness condition.

With what has been said so far about *at* and $[_{DP} where]$ in mind, let us return to the issues of ADBWT. We begin by addressing the question of why *at* CAN be deleted when it takes an overt occurrence of *what(ever) time* as its complement. Suppose that temporal *at* contains the semantic feature [Temporal] and the categorial feature [Prepositional]. It is natural to think that *what(ever) time* has or at least can have the semantic feature [Temporal] and the categorial feature [Nominal] (or [+N, -V]), in addition to the *wh*-feature. Then the semantic feature [Temporal] of temporal *at* can be recovered on the basis of the same feature on *what(ever) time*.¹⁰ Like

¹⁰ It might be the case that *at* is the unmarked temporal preposition in English too: it might be the case that temporal *at* inherently does not have any semantic feature that distinguishes it from temporal *in* or temporal *on*, for example, and the particular interpretation *at* receives arises by default. If so, temporal *at* will have a (semantic) feature that specifies

in the case of *where*, if PP is one of the extended projections of N and the categorial feature [Prepositional] is understood to be [+N, -V], the categorial feature(s) of temporal *at* can be recovered on the basis of that/those of *what(ever) time*, which is nominal in nature (i.e. [+N, -V]). It can then be speculated that the feature content of temporal *at* is recovered on the basis of *what(ever) time*. This point may help explain the fact that temporal *at* CAN be deleted when it takes *what(ever) time* as its complement.

We should now address the question of why ATBWT is **optional** (while ADBW is obligatory). Fujii and Akiyama (2015) tried to attribute the obligatoriness of ADBW to the Distinctness condition on linearization. If temporal *at* and *what(ever) time* always shared the feature [Temporal] and [+N, -V], ADBWT would be obligatorily applied to evade a violation of the Distinctness condition. However, ADBWT is **optional**. The optionality of ADBWT suggests that temporal *at* and *what(ever) time* sometimes share these features (in which case ADBWT is applied) but sometimes do not (in which case ADBWT is not applied). If PP is one of the extended projections of N, temporal *at* and *what(ever) time* should always both have [+N, -V]. It is not reasonable to think that they can be sometimes different in the presence/absence of [+N, -V]. Rather, it is better to think that the presence/absence of the feature [Temporal] on *what(ever) time* is the source of the optionality of ADBWT. It is natural to consider that the source of the feature [Temporal] on *what(ever) time* is the noun *time*, which undoubtedly has a temporal meaning, rather than *what(ever)*, which is in itself a wh-Determiner that is not restricted to temporal expressions. We conjecture that the "optionality" of ADBWT can be attributed to this difference between *what(ever)* and *time* and the structural complexity of *what(ever) time*. *What(ever)* and *time* are merged to form *what(ever) time*. The entire phrasal expression *what(ever) time* must be labelled. Suppose that, when a functional projection formed by concatenating a functional head F and a lexical category L(P) is labelled, either (the features of) F ((40a)) or the union of (the features of) F and L (i.e. $F \cup L$, (40b)) can be the label (see Akiyama (2010, 2011) and Citko (2008), for the latter possibility).

- (40) a. $[_{FP} F L(P)]$
 b. $[_{F \cup L P} F L(P)]$

If these two options of determining the label of a functional projection are available in the determination of the label of *what(ever) time*, which is formed by concatenating a D (*what(ever)*) and an N (*time*), its label can be D(P) ((41a)) or DUN(P) ((41b)).

- (41) a. $[_{D(P)} \text{what(ever)}_{D [+N, -V], [wh]} \text{time}_{N [+N, -V], [Temporal]}]_{[+N, -V], [wh]}$
 b. $[_{D \cup N(P)} \text{what(ever)}_{D [+N, -V], [wh]} \text{time}_{N [+N, -V], [Temporal]}]_{[+N, -V], [wh], [Temporal]}$

In (41a), the label of the entire phrasal expression is (the set of the features of) D (or more precisely *what(ever)*) and does not include the feature [Temporal], which *time* contains. In this sense, the DP as a whole in (41a) does

that it is a temporal expression (i.e. [Temporal]), but will not have more specific one.

not have the feature [Temporal]; only the N *time* does. On the other hand, the D ∪ NP in (41b) has the union of the features of *what(ever)* and *time*, and thus has [Temporal], which *time* originally contains. Now let us consider (42). In (42a), the structure in (41a) is merged as the complement of temporal *at* and, in (42b), the structure in (41b) is.

- (42) a. $[_{FP(Phase)} F [_{PP} at_{[+N, -V], [Temporal]} [_{DP} what(ever)_{D [+N, -V], [wh]} time_{N [+N, -V], [Temporal]}]_{[+N, -V], [wh]}]]$
 b. $[_{FP(Phase)} F [_{PP} at_{[+N, -V], [Temporal]} [_{DUNP} what(ever)_{D [+N, -V], [wh]} time_{N [+N, -V], [Temporal]}]_{[+N, -V], [wh], [Temporal]}]]$

In (42b), the temporal *at* and the DUNP *what(ever) time* are transferred/spelled out together. We speculate that, because they share the features [+N, -V] and [Temporal], they induce a violation of the Distinctness condition. Therefore, ADBWT is forced to apply in (42b). In (42a), the temporal *at* and the DP *what(ever) time* are transferred/spelled out together. They differ in the presence/absence of the feature [Temporal], and we speculate that, due to this difference, no violation of the Distinctness condition results in (42a). For this reason, ADBWT is not applied in (42a).¹¹ We thus speculate that ADBWT must be applied if its application helps evade a violation of the Distinctness condition, just like ADBW is.

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¹¹ The N *time* share the features [+N, -V] and [Temporal] with temporal *at* in (42a) (and in (42b)). However, because DP is a phase category too, *time* has already been transferred/spelled out and thus is not transferred/spelled out together with temporal *at*.

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