

## SQUIB

In situ mixed *wh*-coordination and the argument/adjunct distinction

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One of the most important results of syntactic inquiry has been a detailed empirical and, to some extent, theoretical understanding of the argument/adjunct distinction, which underlies a wide array of superficially different phenomena. Therefore, any phenomena that appear to challenge the argument/adjunct distinction deserve scrutiny. This squib investigates an almost unremarked-upon phenomenon of just that type: apparent in situ mixed *wh*-coordination (ISMW: *Mary ate WHAT and WHEN to impress Sue?!), in which argument and adjunct *wh*-phrases are apparently coordinated in situ. Two analyses of ISMW are compared: the *Wh*-Coordination Analysis, on which the conjuncts are the *wh*-phrases, and the VP-Coordination Analysis, on which the conjuncts are VPs whose head Vs undergo across-the-board head movement to *v*. The squib argues for the VP-Coordination Analysis on conceptual and empirical grounds. Conceptually, the VP- but not the *Wh*-Coordination Analysis is compatible with our understanding of the argument/adjunct distinction, and involves an unremarkable derivation that it would take a stipulation to rule out; hence, the VP-Coordination Analysis is preferable. Empirically, the VP- but not the *Wh*-Coordination Analysis makes several correct predictions: (a) that ISMW should be impossible with obligatorily transitive verbs; (b) that adverbs should be able to follow the first *wh*-phrase in ISMW that cannot follow it in the left periphery; and (c) that there should be apparent in situ coordination of argument *wh*-phrases with different  $\theta$ -roles. That ISMW involves VP-coordination rather than *wh*-coordination indicates that it in fact does not threaten the argument/adjunct distinction, contrary to initial appearances, a theoretically welcome result.*

**Keywords:** Argument/adjunct distinction; *wh*-coordination; mixed *wh*-coordination; VP-coordination; V-to-*v*; across-the-board movement

## 1 Introduction

One of the most important results of work in syntax has been a detailed empirical and, to some extent, theoretical understanding of the argument/adjunct distinction. Thus, it is now known that arguments and adjuncts differ systematically along multiple dimensions:

- (1) a. *Obligatoriness/optionality*: Arguments can be obligatory or optional. Adjuncts are always syntactically optional.<sup>1</sup>
- b. *Iterability*: Adjuncts are iterable. (To a [host + adjunct] structure, another adjunct of the same type can typically be added: Hornstein & Nunes 2008.) Arguments are not iterable.
- c. *L(lexical) selection*: A head H can L-select the head of a phrase XP if XP is an argument of H, but not if XP is an adjunct (Pesetsky 1991; Merchant 2019).

<sup>1</sup> There are apparent cases of obligatory adjuncts (Grimshaw & Vikner 1993; Goldberg & Ackerman 2001; Sailor & Schütze 2013; Melchin & Toivonen 2018), but most of the relevant constraints appear to be semantic-pragmatic, and the remaining cases likely do not involve true structural adjuncts.

For many more argument/adjunct asymmetries, some seldom discussed, see Toivonen (n.d.). The argument/adjunct distinction, then, underlies a wide array of superficially very different phenomena, indicating that it runs deep in syntax, as is generally acknowledged.<sup>2</sup> This being so, any phenomena that appear to blur or challenge the argument/adjunct distinction deserve careful scrutiny, to determine whether our understanding of it needs revising, and what their etiology is.

This squib investigates a phenomenon of just that type: apparent in situ mixed *wh*-coordination. It proceeds as follows. Section 2 sets the stage by discussing (left-peripheral) mixed *wh*-coordination, in which an argument and an adjunct *wh*-phrase appear to be coordinated, and reviews one existing analysis of it, on which it actually does not challenge the argument/adjunct distinction. Section 3 introduces the main phenomenon investigated here—apparent in situ mixed *wh*-coordination (ISMW)—and shows that it initially appears more problematic for the argument/adjunct distinction than its non-in-situ counterpart.

Section 4 develops two analyses of ISMW: the *Wh*-Coordination Analysis (on which the conjuncts are the *wh*-phrases) and the VP-Coordination Analysis (on which the conjuncts are VPs whose head Vs undergo across-the-board movement to *v*). It is shown that the VP- but not the *Wh*-Coordination Analysis is compatible with our understanding of the argument/adjunct distinction, and involves an unremarkable derivation that is difficult to rule out; consequently, the former is conceptually preferable. That section then tests some empirical predictions of the two analyses, showing that, in all three cases considered, the VP- but not the *Wh*-Coordination Analysis makes the right prediction. Section 5, the conclusion, lays out the main finding: that a phenomenon (ISMW) that initially appears seriously problematic for the argument/adjunct distinction actually is not, a theoretically welcome result.

## 2 Setting the stage: Mixed *wh*-coordination

As is known, many overt-*wh*-movement languages permit apparent coordination of an argument and an adjunct *wh*-phrase in the left periphery (Browne 1972; Whitman 2002; Gračanin Yuksek 2007; Zhang 2007; Lipták 2011; Citko 2013; Citko & Gračanin-Yuksek 2013; Larson 2013; Melchin & Toivonen 2018; a.m.o.):

- (2) a. What and when did Mary eat?  
b. When and what did Mary eat?

This would be problematic for the argument/adjunct distinction if, in such mixed *wh*- coordinations, either the adjunct *wh*-phrase never occupied an adjunct position or the argument *wh*-phrase never occupied an argument position. For example, if *what and when* in (2-a) originated as the complement of V and moved to [Spec,CP], then at no derivational stage would *when* be adjoined to anything, contra the standard view that *when* is an adjunct.

Fortunately, though, a number of analyses of mixed *wh*-coordination avoid that consequence. To mention just one, Citko & Gračanin-Yuksek (2013) argue that, in English mixed *wh*-coordinations, the conjuncts are actually CPs. In (2-a), *what* originates as the complement of V, and *when* originates in an adjunct position, as usual. Then, *what* moves to [Spec,CP] in one of the CP conjuncts, and *when* moves to [Spec,CP] in the other CP

<sup>2</sup> For formal definitions of Adjoin and Merge that account for some of these argument/adjunct asymmetries, see Merchant (2014: 3; 2019: 326). To my knowledge, no existing definitions of these operations account for all of them.

conjunct. The reader is referred to their paper for detailed discussion.<sup>3</sup> What is important here is that, despite appearances, mixed *wh*-coordinations like (2a–b) do not seriously threaten the argument/adjunct distinction, because they do not force the conclusion that certain “adjunct” *wh*-phrases never occupy adjunct positions (at any derivational stage), or the parallel conclusion about “argument” *wh*-phrases.

### 3 The phenomenon: Apparent in situ mixed *wh*-coordination

There is, however, another type of mixed *wh*-coordination (almost unmentioned in the literature, though see Grosu 1985: 236–237 for two possible examples, and Kasai 2016 on Japanese) that initially appears much more problematic for the argument/adjunct distinction. In this type, an argument and an adjunct *wh*-phrase appear to be coordinated in situ ((3)–(4)). This phenomenon will be referred to here as *apparent in situ mixed wh-coordination* (ISMW—*apparent* because it is argued below that the conjuncts are actually VPs).<sup>4</sup>

- (3) a. Mary ate WHAT and WHEN to impress Sue?!  
 b. Mary ate WHEN and WHAT to impress Sue?!  
 (4) a. Mary ate WHAT and WHERE to impress Sue?!  
 b. Mary ate WHERE and WHAT to impress Sue?!

Of course, the adjunct *to impress Sue* is not obligatory; it is included in (3)–(4) to control for a potential confound. Consider (3-a) without it:

- (5) Mary ate WHAT and WHEN?!

Someone who wanted to deny that (5) involves (apparent) in situ mixed *wh*-coordination could argue that it involves CP-coordination with sluicing:

- (6) [<sub>CP</sub> Mary ate WHAT] and [<sub>CP</sub> WHEN ~~did Mary eat it~~]?!  
 But whatever the merits of (6) as a parse for (5), no analogous parse is available for (3-a). In (3-a), *to impress Sue* modifies (a verbal projection containing at least) *eat WHAT and WHEN*. On standard assumptions, this indicates that *eat WHAT and WHEN* is a constituent in (3-a):

- (7) Mary [[ate WHAT and WHEN] to impress Sue]?!  
 A defender of the CP-coordination-plus-sluicing analysis might argue that *to impress Sue* is adjoined to the entire coordinate structure:

(8) [<sub>ConjP</sub> [<sub>ConjP</sub> [<sub>CP</sub> Mary ate WHAT] and [<sub>CP</sub> WHEN ~~did Mary eat it~~]] to impress Sue]?!  
<sup>3</sup> On their analysis, *did*, *Mary*, and *eat* in (2-a) are realized only once (though (2-a) involves full CP coordination) because they are multidominated, each having a mother in each of the two CP conjuncts.

- <sup>4</sup> Citko (2013) claims English disallows in situ *wh*-coordination, citing examples like (i):

(i) (judgment from Citko 2013: 301)  
 \*Who ate what and where on Monday?

For me, (i) is acceptable, though semantically complex, a possible answer being *On Monday, Katie ate steak at Giovanni's, and Mike ate fish at home*. To avoid the complexity of examples like (i), this squib investigates ISMW in echo questions, which contain one fewer *wh*-phrase. I assume *wh*-phrases in echo questions do not move covertly (or, if they do, their movement is exempt from the Coordinate Structure Constraint).

For one reviewer, ISMW in echo questions is particularly acceptable “when their echo nature is primed”:

(ii) You said that Mary ate WHAT and WHEN to impress Sue?!

However, replacing *Sue* with *Mary's brother* yields a Condition C violation, indicating that *Mary* c-commands the infinitival adjunct and ruling out the structure in (8):

(9) Mary<sub>i</sub> ate WHAT and WHEN to impress {her<sub>i</sub> / \*Mary's<sub>i</sub>} brother?!

Sentence (3-a) therefore cannot have a structure along the lines of (6): its structure must be as in (7).<sup>5</sup>

But this raises the question of how an argument and an adjunct *wh*-phrase can (apparently) be coordinated in situ. The question is important, because (7) gives the impression that perhaps *when* is not in an adjunct position, or *what* is not in an argument position, contra what the argument/adjunct distinction leads us to expect.

### 3.1 A note on the crosslinguistic landscape

Before we analyze ISMW, it will be worth noting that ISMW also occurs in (at least) Kuria, Dholuo, Spanish, and German ((10)–(13)). This indicates that ISMW (along with the apparent problem it poses for the argument/adjunct distinction) is not an English-specific quirk, but a phenomenon of much broader crosslinguistic import.<sup>6</sup>

(10) *Kuria* (Grosu 1985: 236)  
John aragire nke na ake?  
John eats what and where  
'What and where does John eat?'

(11) *Dholuo* (Grosu 1985: 237)  
John chamo ang'o kod kanye?  
John eats what and where  
'What and where does John eat?'

(12) *Spanish*  
María bebió {QUÉ y CUÁNDO / %CUÁNDO y QUÉ} para impresionar  
Mary drank {what and when / when and what} for to.impress  
a Juan?!  
A John  
'Mary drank {WHAT and WHEN / WHEN and WHAT} to impress John?!'

<sup>5</sup> Two other conceivable analyses of (i) (= (3-a)) are easily dismissed.

(i) Mary ate WHAT and WHEN to impress Sue?!

First, (i) could be a variant of (ii) (involving CP-coordination with sluicing) in which *and WHEN* is inserted into the first conjunct as a parenthetical (cf. Lipták 2011):

(ii) Mary ate WHAT to impress Sue?! And WHEN?!

This analysis, though plausible for (iii), fails for (i), in which *and WHEN* is not prosodically parentheticalized.

(iii) Mary ate WHAT—and WHEN—to impress Sue?!

Secondly, (i) could involve CP-coordination, with multidomination of everything except *WHAT and WHEN*. But this predicts that the putatively multidominated material should be linearly contiguous (Citko & Gračanin-Yuksek 2013: 4, (6c)); in fact, some of it precedes *WHAT and WHEN* and the rest follows it.

<sup>6</sup> Mandarin lacks ISMW, however (Zhang 2007: 2138).

Examples (10)–(11) unfortunately lack a clause-final adjunct (e.g., 'to impress Mary'), so they may involve CP-coordination with sluicing (cf. (6)) rather than true ISMW.

- (13) *German*<sup>7</sup>  
 Marie hat {WAS und WANN / WANN und WAS} gegessen?!  
 Mary has {what and when / when and what} eaten  
 ‘Mary ate {WHAT and WHEN / WHEN and WHAT}?!’

**4 Two possible analyses: *Wh*-coordination and VP-coordination**

We can now ask how ISMW sentences are derived—and, in particular, why they seem to allow coordination of argument and adjunct *wh*-phrases. Consider again the following example (= (3-a)):

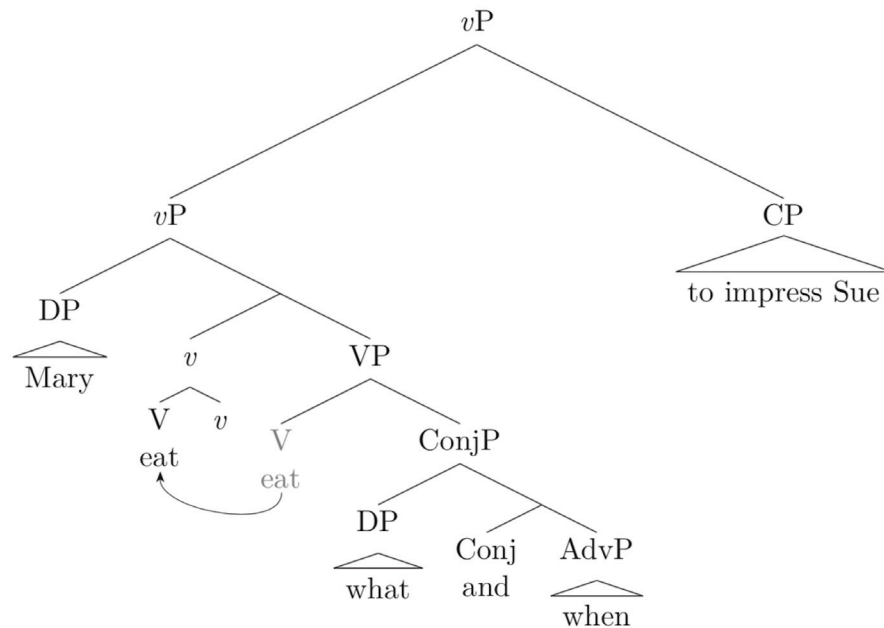
- (14) Mary ate WHAT and WHEN to impress Sue?!

Two possible analyses of ISMW are the following:

- (15) a. ***Wh*-Coordination Analysis:** The conjuncts are the *wh*-phrases. (The argument and the adjunct *wh*-phrase are truly coordinated.)  
 b. **VP-Coordination Analysis:** The conjuncts are VPs. (Their head Vs undergo across-the-board head movement to *v*, making the VP-coordination look like *wh*-coordination on the surface.)

The relevant (partial) derivations follow:<sup>8</sup>

- (16) Partial derivation of (14): *Wh*-Coordination Analysis



<sup>7</sup> No clause-final adjunct is included here, since the clause-finality of V rules out a CP-coordination-plus-slucing derivation.

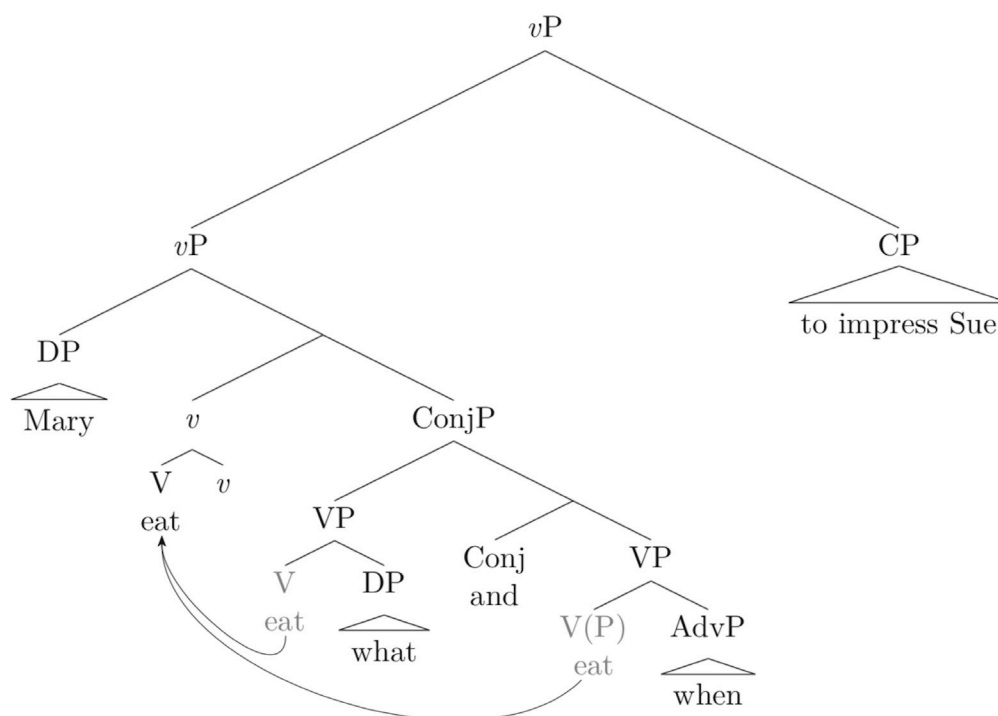
<sup>8</sup> The VP-Coordination Analysis is briefly proposed by Zhang (2007: 2136, fn. 1) for examples like (i):

- (i) Grosu (1985: 232)  
 John writes only funny letters and only to funny people.

This squib extends the VP-Coordination Analysis to ISMW, arguing for it and against the *Wh*-Coordination Analysis on a number of conceptual and empirical grounds.

Coordinate structures are assumed here for concreteness to be ConjPs (Johannessen 1998, a.m.o.), but little to nothing will hinge on this.

(17) Partial derivation of (14): VP-Coordination Analysis



All else being equal, the VP-Coordination Analysis predicts that there should be free apparent in situ argument/adjunct coordination with non-*wh* conjuncts. This is incorrect:

(18) \*Mary ate oysters and at strange times.

But all else is not equal. Grosu (1985) argues that these structures are subject to a semantic constraint: the conjuncts must “include *focused operators of a common type*” (231). When they do, these structures become acceptable:

- (19) a. Mary ate only oysters and only at strange times.
- b. Mary ate the most exotic oysters and at the strangest times.

The source of this constraint deserves further investigation.

Now, with the *Wh*- and VP-Coordination Analyses spelled out, we can begin to determine which is superior. The discussion will proceed as follows. Section 4.1 argues that the VP- but not the *Wh*-Coordination Analysis is compatible with our understanding of the argument/adjunct distinction, and involves an unremarkable derivation that it would take something special to rule out—and therefore the former is conceptually preferable. Section 4.2 argues on several grounds that the VP-Coordination Analysis is also superior empirically.

**4.1 Conceptual considerations**

The VP-Coordination Analysis, but not the *Wh*-Coordination Analysis, is compatible with our current understanding of the argument/adjunct distinction. Consider why.

On the VP-Coordination Analysis (17), *what* is the complement of V in the first VP conjunct, and *when* is adjoined to V(P) within the second VP conjunct. That is, *what* and *when* respectively originate in an argument position and an adjunct position. This is perfectly compatible with the standard view that *what* and *when* are an argument and an adjunct

*wh*-phrase, respectively, and thus with our understanding of the argument/adjunct distinction.

Viewed against the background of the argument/adjunct distinction, the *Wh*-Coordination Analysis is much more troublesome. Consider the specific implementation of this analysis in (16). The analysis of *what* seems unproblematic. *What* is a conjunct within a ConjP in an argument position (complement-of-V position). Since coordinate structures generally have the same distribution as their conjuncts do when they occur independently, this is expected for an argument *wh*-phrase like *what*.<sup>9</sup> Now consider the analysis of *when* in (16). *When* itself is not in an adjunct position but in an argument position: the complement position of Conj. But this is unproblematic, since traditional adjuncts can be coordinated (*She works skillfully and efficiently*). What is far more problematic is that the coordinate structure of which *when* is a conjunct is also not in an adjunct position. On the analysis in (16), then, *when* is completely divorced from adjuncthood: neither it nor the coordinate structure of which it is a conjunct is in an adjunct position, contra the standard and well-motivated view that *when* is an adjunct *wh*-phrase. The *Wh*-Coordination Analysis is thus not straightforwardly compatible with our current understanding of the argument/adjunct distinction.<sup>10</sup>

Given the robustness of the argument/adjunct distinction and its near-centrality to the theory of syntax, these considerations indicate that the VP-Coordination Analysis is conceptually preferable to the *Wh*-Coordination Analysis.

Furthermore, as a reviewer notes, the derivation in (17) is quite unremarkable in the current theoretical context. All else being equal, we expect it to be available: it would take something special to rule it out.

The next subsection shows that the VP-Coordination Analysis is also superior empirically.

#### 4.2 Empirical predictions of the two analyses

We now turn to some empirical predictions of the VP- and *Wh*-Coordination Analyses. The investigation will proceed as follows. Section 4.2.1 tests the predictions of the two analyses about whether ISMW should permit obligatorily transitive verbs. Section 4.2.2 tests their predictions about what types of (non-*wh*) adverbs should be possible within the coordinate structure. Finally, Section 4.2.3 tests their predictions about whether there should be (apparent) in situ coordination of argument *wh*-phrases with different  $\theta$ -roles.

<sup>9</sup> Furthermore, on the ConjP analysis of coordinate structures, *what* is itself in an argument position: [Spec, ConjP].

<sup>10</sup> One might wonder whether the *Wh*-Coordination Analysis could be improved by positing that the ConjP is not the complement of the V *eat*, but adjoined to the V(P) *eat*:

- (i) ... [<sub>VP</sub> [<sub>V(P)</sub> eat] [<sub>ConjP</sub> what and when]]

Unfortunately, (i) suffers from a problem that is approximately the mirror image of the problem with (16). The treatment of *when* is unproblematic, because it is a conjunct within a ConjP in an adjunct position, which is expected behavior for an adjunct *wh*-phrase. However, although the ConjP is an adjunct, its first conjunct (*what*) is an “argument” *wh*-phrase. This is unlikely to be possible, because *what* cannot be an adjunct on its own:

- (ii) Mary ate steak (\*WHAT)?!

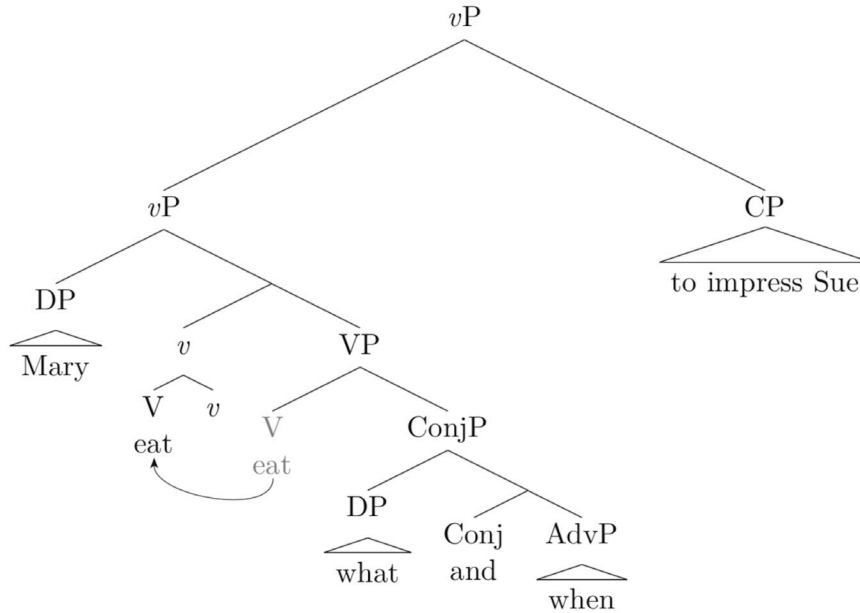
And crucially, a phrase (e.g., *the morning*) that can be an argument ((iii-a)) but not an adjunct ((iii-b)) cannot be a conjunct within a coordinate structure in an adjunct position ((iii-d)):

- (iii) a. Let's discuss **the morning**.  
 b. \*Let's discuss it **the morning**.  
 c. Let's discuss it in the {morning/afternoon}.  
 d. \*Let's discuss it **the morning** and in the afternoon.

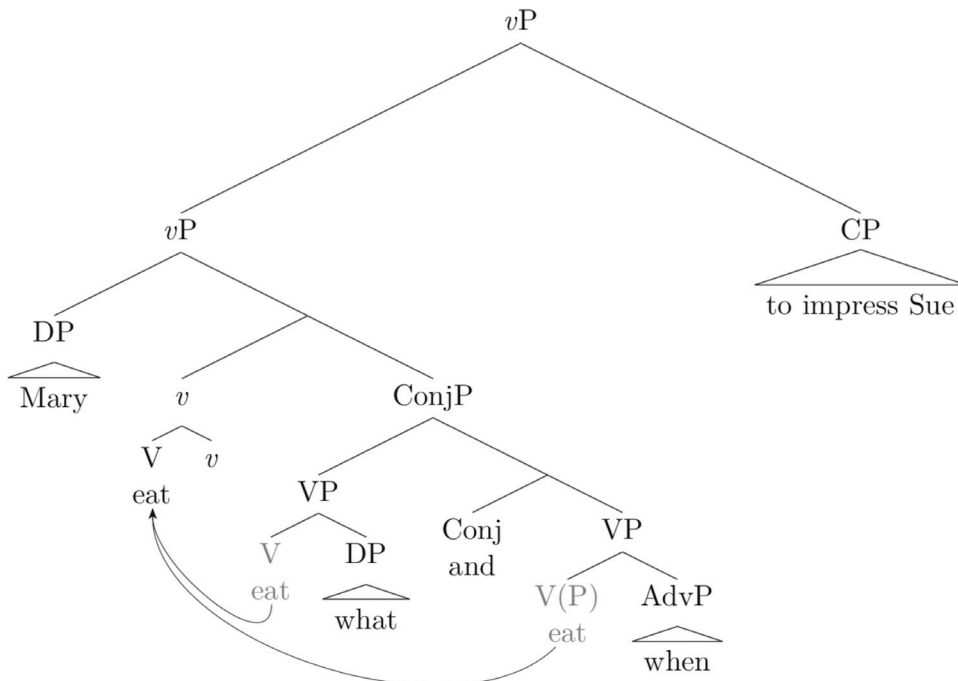
For convenience, the sample ISMW sentence in (3-a) is repeated in (20), and the structures assigned to it by the *Wh*- and VP-Coordination Analyses are repeated in (21)–(22):

(20) Mary ate WHAT and WHEN to impress Sue?!

(21) Partial derivation of (20): *Wh*-Coordination Analysis



(22) Partial derivation of (20): VP-Coordination Analysis



**4.2.1 Prediction A: Obligatorily transitive verbs**

The *Wh*- and VP-Coordination Analyses make different predictions about whether ISMW should be possible with obligatorily transitive verbs (cf. Whitman 2002; 2004; Gračanin Yuksek 2007; Citko 2013):



- (23) a. **Wh-Coordination:** ISMW should be possible with an obligatorily transitive verb.  
 b. **VP-Coordination:** ISMW should be impossible with an obligatorily transitive verb.

The subprediction in (23-b) is straightforward. If *eat* in (22) is replaced with an obligatorily transitive V like *devour*, the *devour* in the second conjunct will lack a direct object; thus, the resulting structure should be unacceptable.

That the *Wh*-Coordination Analysis makes the prediction in (23-a) is initially less obvious. But consider (21). On the *Wh*-Coordination Analysis, why is it possible for [<sub>ConjP</sub> *what and when*] in (21) to be the complement of the V *eat*? It cannot be because of *when*, since *eat* does not select adverbials like *when*. Rather, it must be because of *what*. That is, the *Wh*-Coordination Analysis must posit that a V that can select *what* (e.g., *eat: Mary ate WHAT?!*) can also select a ConjP with *what* as one of its conjuncts. Because obligatorily transitive verbs like *devour* can also select *what* (*Mary devoured WHAT?!*), the *Wh*-Coordination Analysis predicts that they should also be able to select ConjPs like *what and when*, giving rise to ISMW with obligatorily transitive verbs.

It turns out, however, that obligatorily transitive verbs are impossible in ISMW:<sup>11</sup>

- (24) a. \*Mary devoured WHAT and WHEN to impress Sue?!  
 b. \*\*Mary devoured WHEN and WHAT to impress Sue?!  
 (25) a. \*Mary congratulated WHO and WHERE to annoy Sue?!  
 b. \*\*Mary congratulated WHERE and WHO to annoy Sue?!

This provides an argument for the VP- and against the *Wh*-Coordination Analysis.<sup>12</sup>

#### 4.2.2 Prediction B: Adverb insertion

The *Wh*- and VP-Coordination Analyses also make different predictions about what types of adverbs should be able to follow the first *wh*-phrase in ISMW:

- (26) a. **Wh-Coordination:** If an adverb immediately follows the first *wh*-phrase in ISMW, it should also be able to immediately follow that *wh*-phrase when the latter is in the left periphery.  
 b. **VP-Coordination:** It may well be possible for an adverb to immediately follow the first *wh*-phrase in ISMW that cannot immediately follow that *wh*-phrase when the latter is in the left periphery.

<sup>11</sup> These sentences must be read in a prosodically integrated manner. Unlike (24-a), (i) is acceptable:

(i) Mary devoured WHAT—and WHEN—to impress Sue?!

But (i) is presumably a variant of (ii) (which involves CP-coordination plus sluicing) in which *and WHEN* is inserted into the first conjunct as a parenthetical (cf. Lipták 2011), and therefore irrelevant to the analysis of ISMW.

(ii) Mary devoured WHAT to impress Sue?! And WHEN?!

Presumably the (b)-sentences in (24)–(25) are even worse than the (a)-sentences because the (a)-sentences at least contain locally well-formed strings like *Mary devoured WHAT*, unlike the (b)-sentences (*\*Mary devoured WHEN*).

<sup>12</sup> The VP-Coordination Analysis also predicts, correctly, that ISMW should allow double-object verbs whose objects are both optional:

(i) Mary paid him HOW MUCH and WHEN to impress Sue?!

Consider *why*. On the *Wh*-Coordination Analysis, the conjuncts are the *wh*-phrases. Therefore, if an adverb immediately follows the first *wh*-phrase, it must be right-adjoined to it (assuming there is no left-adjunction to the mother of *Conj*—the traditional “*Conj*”). And if that *wh*-phrase allows a particular right-adjunct when it is in [*Spec,ConjP*], then it is fully expected to also allow that right-adjunct when it is in the left periphery.

On the VP-Coordination Analysis, by contrast, the conjuncts in ISMW are VPs. Therefore, an adverb immediately following the first *wh*-phrase need not be right-adjoined to it: it may instead be right-adjoined to the first VP conjunct. Consequently, it is perfectly possible that the adverb will not be able to immediately follow that *wh*-phrase when the latter is in the left periphery: this is what is expected if the adverb is able to adjoin to VPs but not to *wh*-phrases.

The correct prediction, it turns out, is (26-b). Thus, the adverb *greedily* can immediately follow the first conjunct (*what*) in the following ISMWs:<sup>13</sup>

- (27) a. <sup>M</sup>Mary ate WHAT greedily and WHEN to impress John?!  
 b. <sup>M</sup>Mary ate WHAT greedily and WHERE to impress John?!

But it cannot immediately follow *what* when the latter is left-peripheral:

- (28) What (\**greedily*) (and {*when/where*}) did Mary eat to impress John?

The same holds in the corresponding embedded questions (where, as in (27), the linearly first *wh*-phrase immediately follows a verb):

- (29) I wonder what (\**greedily*) (and {*when/where*}) Mary ate to impress John.

Likewise, *publicly* can immediately follow the first conjunct (*with whom*) in the following ISMWs:

- (30) a. <sup>M</sup>Mary spoke WITH WHOM publicly and WHEN to annoy John?!  
 b. <sup>M</sup>Mary spoke WITH WHOM publicly and WHERE to annoy John?!

But it cannot immediately follow *with whom* in the left periphery:

- (31) a. With whom (\**publicly*) (and {*when/where*}) did Mary speak to annoy John?  
 b. I wonder with whom (\**publicly*) (and {*when/where*}) Mary spoke to annoy John.

In the examples discussed so far in this subsection, the first *wh*-phrase has been an argument *wh*-phrase, but analogous asymmetries are observed when the first *wh*-phrase is an adjunct *wh*-phrase. Thus, *publicly* can immediately follow the first conjunct (*when* or *where*) in the following ISMWs:

<sup>13</sup> Sentences like (27a–b) are slightly marked (<sup>M</sup>). In the default version of, e.g., (27-a), the adverb follows both conjuncts:

(i) Mary ate WHAT and WHEN greedily to impress John?!

Crucially, though, there is a sharp contrast between (27a–b) and the unacceptable versions of (28). Of 13 native speakers consulted, 12 judged \**What greedily and when did Mary eat to impress John?* much worse than (27-a). (The thirteenth rejected both.)

- (32) a. <sup>M</sup>Mary spoke WHEN publicly and WITH WHOM to annoy John?!  
 b. <sup>M</sup>Mary spoke WHERE publicly and WITH WHOM to annoy John?!

But it cannot immediately follow *when* or *where* in the left periphery:

- (33) a. {When/Where} (\*publicly) (and with whom) did Mary speak to annoy John?  
 b. I wonder {when/where} (\*publicly) (and with whom) Mary spoke to annoy John.

The distribution of adverbs in ISMWs, then, provides a second argument for the VP- and against the *Wh*-Coordination Analysis.<sup>14</sup>

#### 4.2.3 Prediction C: Coordination of argument *wh*-phrases with different $\theta$ -roles

The discussion so far has focused on apparent in situ coordination of argument and adjunct *wh*-phrases. However, the *Wh*- and VP-Coordination Analyses also make different predictions about whether there should be apparent in situ coordination of argument *wh*-phrases with different  $\theta$ -roles (cf. Whitman 2002; 2004; Citko 2013):

- (34) a. ***Wh*-Coordination:** Argument *wh*-phrases with different  $\theta$ -roles should not be coordinable in situ.  
 b. ***VP*-Coordination:** Argument *wh*-phrases with different  $\theta$ -roles should be (apparently) coordinable in situ.

On the *Wh*-Coordination Analysis, the entire ConjP is in an argument position of V. Therefore, the entire ConjP should receive a  $\theta$ -role from V; there is no way for the individual conjuncts to receive  $\theta$ -roles, let alone different ones (Zhang 2007, §2.2.1).<sup>15</sup>

On the VP-Coordination Analysis, by contrast, the conjuncts are VPs. Therefore, if the V that undergoes across-the-board head movement is one that can assign more than one type of  $\theta$ -role, then it should be able to assign different  $\theta$ -roles within the two VP conjuncts.

One such V is *serve* (Whitman 2004):

- (35) Mary served {WHO/WHAT}?!                      (*who* = Goal; *what* = Theme)

Significantly, apparent in situ coordination of these two types of objects of *serve* is possible, if slightly marked ((36)). (See Whitman 2004: 427–428 and Citko 2013: 306 for related observations.)

- (36) <sup>M</sup>Mary served {WHO and WHAT / WHAT and WHO} at the hotel?!

Two more examples of apparent in situ coordination of argument *wh*-phrases with different  $\theta$ -roles are given below:

- (37) a. Mary spoke WITH WHOM and ABOUT WHAT to annoy Sue?!  
 b. Mary spoke ABOUT WHAT and WITH WHOM to annoy Sue?!

<sup>14</sup> On the VP-Coordination Analysis, the adverbs in ISMWs like (27a–b) are VP-adjoined. Therefore, only low adverbs (e.g., *greedily*, *publicly*) should occur in the relevant position: high adverbs should be barred. This is correct:

(i) Mary ate WHAT (\*probably/\*fortunately/\*perhaps) and WHEN to impress John?!

<sup>15</sup> This is true (barring stipulative additional assumptions) both on traditional  $\theta$ -theory and on Heim and Kratzer's (1998) approach.

Sentences like (36)–(37) provide a third argument for the VP- and against the *Wh*-Coordination Analysis.<sup>16</sup>

## 5 Conclusion

This squib has examined the almost uninvestigated phenomenon of apparent in situ mixed *wh*-coordination (ISMW), in which an argument and an adjunct *wh*-phrase appear to be coordinated in situ rather than in the left periphery. ISMW differs from left-peripheral mixed *wh*-coordination in that the former initially appears difficult to reconcile with the argument/adjunct distinction. Two possible analyses of ISMW were considered: the *Wh*-Coordination Analysis, on which the conjuncts are the *wh*-phrases, and the VP-Coordination Analysis, on which the conjuncts are VPs whose head Vs undergo across-the-board head movement to *v*. The VP- but not the *Wh*-Coordination Analysis is compatible with our understanding of the argument/adjunct distinction, and involves an unremarkable derivation that it would take a stipulation to rule out.

The VP-Coordination Analysis is also superior empirically, judging by evidence involving (a) obligatorily transitive verbs, (b) adverb insertion, and (c) apparent in situ coordination of argument *wh*-phrases with different  $\theta$ -roles. This being so, ISMW does not in fact threaten the argument/adjunct distinction, despite appearances—a theoretically most welcome result, given how fundamental to syntax the argument/adjunct distinction appears to be.

## Abbreviations

A = personal *a* (Spanish), <sup>M</sup> = marked

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## Competing Interests

The author has no competing interests to declare.

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<sup>16</sup> Kasai (2016) investigates apparent *wh*-coordination, including ISMW, in Japanese, a *wh*-in-situ language. On his analysis, as on the present one, the conjuncts are not the *wh*-phrases but verbal projections. The illusion that the conjuncts are the *wh*-phrases is attributed by Kasai to backward ellipsis, not across-the-board head movement. Nonetheless, Kasai's investigation provides consilient crosslinguistic evidence that ISMW involves coordination of verbal projections, not *wh*-phrases.

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