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Syntax of negation in corrective *but* sentences: Evidence from syntax-semantics and prosody

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Abstract

This paper proposes an analysis of corrective *but* sentences (e.g. *Max doesn't eat spinach but chard*) that parallels Wu's (2022a, 2022b) analysis of *either . . . or . . .* sentences, and raises a novel view that there is a use of negation that requires *but* (parallel to *either* that requires *or*). I argue that there are two positions for this negation. Either position may be pronounced, but only the higher position is interpreted. In addition, ellipsis deletes repeated material in the second conjunct, leading to the appearance that negation is higher than it actually is. Ellipsis leads to the consequence that when negation appears to be non-adjacent to the apparent *but*-coordination (e.g. *Max doesn't eat* [*spinach but chard*]), negation takes surface scope; but when negation appears to be adjacent to the apparent *but*-coordination (e.g. *Max eats not* [*spinach but chard*]), negation can take higher scope than its surface position. This analysis is consonant with previous proposals for the syntax of focus-sensitive operators such as the Question-particle and *only*, suggesting that all focus-sensitive operators, as is exemplified by negation here, may have two positions in a sentence. My syntactic analysis draws evidence from a mix of domains, including syntax, semantics and a prosodic experiment, following a tradition in the literature that looks to prosody for evidence for the syntactic structure (e.g. Bresnan 1971; Clemens and Coon 2018; Clemens 2021). This prosodic experiment also demonstrates the mutual reinforcement of syntactic theory and prosodic experimentation: not only can we draw evidence for syntactic theories from prosody, but syntactic theories also lay the foundation for investigations of syntax-prosody mapping.

Keywords Corrective but · Negation · Coordination · Ellipsis · Focus · Syntax-prosody mapping · Prosodic experimentation · Syntax

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1 Introduction

This paper provides a syntactic analysis of corrective *but* sentences (i.e., *not* ... *but* ... sentences) with the following consequences: there is a use of negation that must be left-adjacent to the first conjunct in a conjunction. In this use, negation is also a focus-sensitive operator. My analysis of negation in corrective *but* contributes to the generalization that all focus-sensitive operators have two positions in a sentence. My syntactic analysis draws evidence from a mix of domains, from the more traditional sources of syntax and semantics to a prosodic experiment, following a tradition in the literature that looks to prosody for evidence for the syntactic structure (e.g., Bresnan 1971; Clemens and Coon 2018; Clemens 2021).

But in English has at least three uses: counterexpectation, semantic opposition and correction (e.g., Toosarvandani's 2014 taxonomy). This paper focuses on the corrective use of *but*. Each use of *but* requires contrast of some sort. In the counterexpectational use, the first conjunct creates an expectation that is rejected by the second conjunct (e.g., *Max eats spinach but hates it*). In semantic opposition, the conjuncts contrast with each other in two positions (e.g., *John is tall but Bill is short*, where the subjects and the adjectives are contrasted). Corrective *but* requires presence of negation in the first conjunct and absence of negation in the second conjunct (1). Absence or presence of negation in both conjuncts is not possible (2)–(3).

(1) Max does*n't* eat spinach but chard. (Toosarvandani 2013:828)

(2) #Max eats spinach but chard.

(3) #Max does*n't* eat spinach but *not* chard.

Vicente (2010) claimed that corrective *but* always coordinates clauses, and when it appears not to, ellipsis has occurred. For example, while (1) appears to involve *but*-coordination of two DPs *spinach* and *chard*, he claimed that it actually involves CP-coordination plus ellipsis, where the *remnant* (the phrase that survives ellipsis; *chard*) moves out of the ellipsis site, which then gets deleted:

(4) *Vicente's (2010) analysis of (1)*
[$_{CP}$ Max does*n't* eat spinach] but [$_{CP}$ chard$_i$ [$_{TP}$ ~~Max eats t$_i$~~]].

Toosarvandani (2013) agreed that (1) must involve ellipsis, but disagreed on the size of the underlying conjuncts. He claimed that it involves vP-coordination plus ellipsis:

(5) *Toosarvandani's (2013) analysis of (1)*
Max does [$_{vP}$ *not* eat spinach] but [$_{vP}$ chard$_i$ [~~eat t$_i$~~]].

Besides this difference from Vicente, Toosarvandani's most important challenge to Vicente was his observation that corrective *but* can coordinate phrases smaller than a clause (what he called *subclauses*), which can also be considered as a challenge to Hirsch's (2017) and Schein's (2017) claim that coordinators can only combine propositions. Consider (6), a minimal pair with (1), which puts negation before *spinach*:

(6) Max eats *not* spinach but chard.

Toosarvandani argued for an analysis of (6) that does not involve ellipsis, but only coordination of two DPs, where the first DP is a negated DP:

(7) Max eats [$_{DP}$ *not* spinach] but [$_{DP}$ chard].

I agree with Toosarvandani on the analysis of (1), but in addition to his analysis with DP-coordination of (6), (8a), I will argue that (6) can also coordinate larger phrases (e.g., two vPs, (8b); or two TPs, (8c)) and involve ellipsis. I argue for this structural ambiguity of (6) using evidence from syntax and semantics (Sect. 4) and prosody (Sect. 7).

(8) *My analysis of* (6)

a. Max eats [$_{DP}$ *not* spinach] but [$_{DP}$ chard].
b. Max [$_{vP}$ eats *not* spinach] but [$_{vP}$ chard$_i$ [~~eat t$_i$~~]].
c. [$_{TP}$ Max eats *not* spinach] but [$_{TP}$ chard$_i$ [~~he eats t$_i$~~]].

According to my analysis, (1) requires ellipsis, but (6) optionally involves ellipsis. This analysis, which assigns a single analysis to (1) but multiple possible analyses to (6), predicts that if the multiple possible analyses can lead to different meanings, then we should be able to observe ambiguity for sentences like (6), but only a single reading for sentences like (1). Section 5 shows that this prediction is borne out in scope readings. Furthermore, the facts based on scope also suggest that there is a close relationship between negation and *but*-coordination: negation always takes scope immediately below the conjunction, suggesting that negation is always the daughter of the first conjunct.

But in (8b–c), which are my analyses of (6), negation is not the daughter of the first conjunct, but deeply embedded in the first conjunct. I will show that my generalization still holds because despite being deeply embedded, the negative morpheme *not* in (8b–c) actually takes scope above its surface position, and directly below the underlying conjunction.

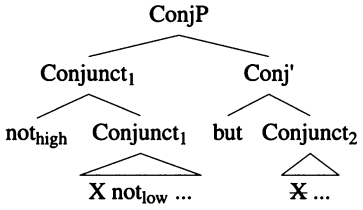
I therefore argue that in addition to ellipsis, there are two positions for the negative morpheme: the higher position (which I call *high negation*) is interpreted, and is the daughter of the first conjunct. The lower position (which I call *low negation*) is semantically vacuous, and deeply embedded inside the first conjunct. Either position may be pronounced. When low negation is pronounced (pronounced negation is marked in italics, and silent negation in <>), because it is the unpronounced high negation that is interpreted, it has the effect that negation takes scope at a place higher than its surface position.

(9) *My analysis of* (6) *plus positions of negation*

a. Max eats [$_{DP}$ *not* <not> spinach] but [$_{DP}$ chard].
b. Max [$_{vP}$ <not> eats *not* spinach] but [$_{vP}$ chard$_i$ [~~eat t$_i$~~]].
c. [$_{TP}$ <not> Max eats *not* spinach] but [$_{TP}$ chard$_i$ [~~he eats t$_i$~~]].

Below is my full analysis, incorporating ellipsis (of identical material X) and the two positions of the negative morpheme:

(10) *My full analysis of corrective* but *coordination*



Low negation is not base-generated freely in any position. Section 6 will argue that it needs to c-command the leftmost focus (i.e., the leftmost corrective focus in the coordination) in *but*-coordination. Its sensitivity to focus is a hallmark property of focus-sensitive operators. There has been a generalization in the literature based on the Question-particle, *only* and *either* that all focus-sensitive operators have two syntactic positions in a sentence (e.g., Lee 1999; Cable 2007; Hole 2015; Hirsch 2017; Hole 2017; Quek and Hirsch 2017; Bayer 2018; Wu 2022b). I argue that the negative morpheme in corrective *but* sentences is also a focus-sensitive operator, and that this negative morpheme has two positions, consonant with this generalization.

This analysis of corrective *but* is identical to Wu's (2022b) analysis of *either* ... *or* ..., suggesting that negation, like *either*, requires coordination. Parallel to the fact that *either* requires *or*, corrective *but* requires negation (1)–(3), and constituent negation requires *but*:[1]

[1] In contrast to constituent negation, sentence negation, *neither* and *not a single NP* can occur without *but*.

(i) a. Max doesn't eat spinach.
b. They had neither obsession nor attraction.
c. They saw not a single person.

Not {many/much/all/every} NP can occur without *but*, but only in the subject position (Klima 1964; Postal 1974):

(ii) a. {Not many friends/Not all his friends/Not everybody} came to the party.
b. *John invited {not many friends/not all his friends/not everybody} to the party.
(Based on Kayne 1998:157)

No can occur in the object position without *but*, but only as the object of a verb that raises to T (e.g., *be* and *have*). When it is the object of a verb that doesn't raise to T (e.g., *become* and *own*), prosodic focus on the verb is required (observed by Bolinger 1983; Kayne 1998):

(iii) a. He {was/*became} no recluse.
b. He {has/*owns} no car.

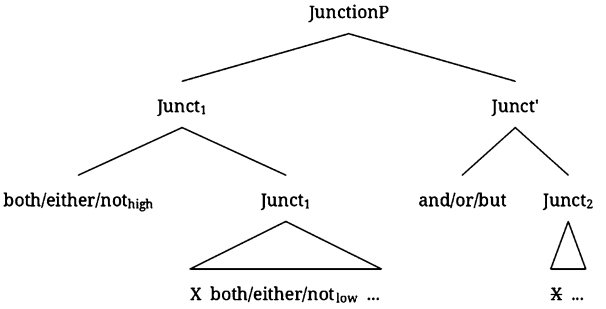
I assume that the negation that can occur without *but* still has another form as a coordinator, which does require coordination. The negation that can occur without *but* is the non-coordinator homophone. I leave to future research exactly what types of negation have non-coordinator homophones and the conditions that license them. But I want to point out that the ungrammatical sentences above improve with *but*, suggesting that when negation is a coordinator, it is not subject to the restrictions that the non-coordinator form of negation is subject to.

(iv) a. John invited not all his friends but only some to the party.
b. ??He became no A+ student, but an A- student.

(11) a. Max eats either spinach *(or chard).
b. Max eats not spinach *(but chard).

I call coordination where one coordinator depends on the other (e.g., *either* ... *or* ..., *both* ... *and* ..., *neg* ... *but* ..., *not only* ... *but also* ...) *correlative coordination*, *either*, *both* and negation *first coordinators*, and *or*, *and* and *but second coordinators*. Based on *either* and negation, I generalize my analysis to other first coordinators like *both* and potentially across languages, and hypothesize that perhaps in all correlative coordinations, the first coordinator has two positions, with the higher position being the daughter of the first junct, and the lower position being deeply embedded inside the first junct and c-commanding focus. Their positions may be obscured by ellipsis in the second junct:

(12) *My generalized analysis of correlative coordination*



I should add a caveat that I only claim that the negation in corrective *but* sentences is a first coordinator and has the syntax in (12), but not negation in general. Negation has other uses, which may have related meanings to the negation in corrective *but* sentences, but not necessarily the syntax and semantics I propose in this paper. The same caveat applies to *either* and *both*, which have other related uses beyond coordination, but those uses do not necessarily have the same syntax and semantics as *either* and *both* as first coordinators.

Before delving into the data and analysis in the next sections, I want to introduce some terminology that will aid in understanding the data. I call sentences where negation seems to be adjacent to the first conjunct *neg*(*ation*)*-adjacent-to-conj*(*unction*) (e.g., (6)), and sentences where negation seems to be further to the left and away from the first conjunct *neg*(*ation*)*-not-adjacent-to-conj* (e.g., (1)). Note that these terms are only based on appearance because once we consider ellipsis, the conjunction may be larger than it seems. According to my analysis, NEG-not-adjacent-to-CONJ is an illusion: negation should always be the daughter of the first conjunct and therefore located at its left edge; when negation appears further to the left at a higher position, I propose that ellipsis must be involved, which allows for negation to be the daughter of the first conjunct. In Wu's (2022b) analysis of *either* ... *or* ..., she gave different terms to *either*'s positions. NEG-adjacent-to-CONJ parallels *either*-seems-normal in her paper, and NEG-not-adjacent-to-CONJ parallels her *either*-seems-high.

The following examples demonstrate that corrective *but* sentences can involve negative elements other than *not* (e.g., *no* and *neither*). The examples so far may

lead to the impression that I analyze sentences with constituent negation differently from sentences with sentence negation, which was in fact Toosarvandani's (2010) approach. I differ from Toosarvandani: my analytical divide is between NEG-adjacent-to-CONJ, which I argue is structurally ambiguous, and NEG-not-adjacent-to-CONJ, which is not. I follow Toosarvandani's definition of sentence negation as negation that appears in the canonical sentential position and optionally cliticizes as *n't*, and constituent negation as negation that doesn't appear in the sentential position. The following examples show that NEG-adjacent-to-CONJ does not require constituent negation (13c) and (14b), and NEG-not-adjacent-to-CONJ does not require sentence negation (15b).

(13) *Neg*(*ation*)*-adjacent-to-conj*(*unction*)

a. Max eats [$_{DP}$ *not* spinach] but [$_{DP}$ chard].
b. He was [$_{DP}$ *no* recluse] but [$_{DP}$ a man of the world acquainted with public affairs]. (Toosarvandani 2013:830, 842)
c. Max does[$_{vP}$ *n't* sing] but [$_{vP}$ dance].

(14) *Neg*(*ation*)*-adjacent-to-conj*(*unction*)

a. They had [$_{DP}$ *neither* obsession nor attraction] but [$_{DP}$ real love].
b. Max does [$_{vP}$ *n't* buy spinach] but [$_{vP}$ grows it].

(15) *Neg*(*ation*)*-not-adjacent-to-conj*(*unction*)

a. Max does*n't* eat [spinach] but [chard].
b. He met *not* a friend [of a linguist] but [of a philosopher].

It is worth mentioning that McCawley (1991) made the same analytical divide as me, and therefore my terminology NEG-adjacent-to-CONJ is equivalent to what he called the basic form, and NEG-not-adjacent-to-CONJ is equivalent to his anchored form. McCawley's terminology is based on the scope of negation: the basic form is ambiguous, while the anchored form is not, and the scope of negation is "anchored" by its surface position.[2] As I will show in Sect. 5, NEG-adjacent-to-CONJ sentences are ambiguous, while NEG-not-adjacent-to-CONJ sentences are not, and thus we can consider these two terms to correspond to the basic form and the anchored form respectively. I do not adopt McCawley's terminology because it is not as easy and straightforward to tell the scope of a sentence as it is to tell whether negation appears at the left edge of coordination.

This paper is organized as follows. Section 2 argues that NEG-not-adjacent-to-CONJ sentences (i.e., sentences where negation appears higher than the left edge of coordination) must involve ellipsis, using a mix of Vicente's (2010) and my own evidence. Section 3 moves on to the other types of sentences, NEG-adjacent-to-CONJ, where negation appears at the left edge of coordination, and argues that they do not need to involve ellipsis based on a critical review of Toosarvandani (2013). The rest of the paper presents novel claims that have not been made before about corrective *but* sentences: Sect. 4 argues that NEG-adjacent-to-CONJ can involve ellipsis.

[2] I think that Toosarvandani (2013) may have misinterpreted McCawley's terminology by saying that the basic form refers to corrective *but* sentences with constituent negation, and the anchored form refers to corrective *but* sentences with sentence negation. McCawley did say explicitly that what distinguishes between these two forms is the scope of negation.

Section 5 provides further evidence for ellipsis in NEG-adjacent-to-CONJ, and also evidence that negation has two positions in a sentence. Section 6 argues that negation's base-generated position is sensitive to focus, and draws parallel to the other focus-sensitive operators. I argue for ellipsis in NEG-adjacent-to-CONJ in multiple ways at once, drawing evidence from syntax and semantics (Sects. 4–5) and prosody (Sect. 7). Section 7 presents a prosodic experiment whose results are consistent with the current proposal for ellipsis in NEG-adjacent-to-CONJ, but not with the claim that NEG-adjacent-to-CONJ does not involve ellipsis. To preview the experimental results, the first conjunct of a NEG-adjacent-to-CONJ sentence like *Max misses* [*not spinach*] *but* [*chard*] is followed by a larger prosodic boundary than the first conjunct in *Max doesn't mix* [*spinach*] *and* [*chard*]. This experiment not only demonstrates that prosodic evidence can shed light on the syntactic structure of NEG-adjacent-to-CONJ, but it also demonstrates that syntactic theory can in turn provide a basis for investigating questions about the mapping process between syntax and prosody—the prosody of NEG-not-adjacent-to-CONJ suggests that the prosodic structure can be recursive just like the syntactic structure. Specifically, the vP in a sentence like *Max does*$[_{vP}$ *n't miss spinach*] *but chard* corresponds to a stronger prosodic phrase than the DP in *Max doesn't mix* $[_{DP}$ *spinach*] *and* [*chard*], presumably because the vP in the former sentence embeds a DP, whereas the DP in the latter sentence does not embed any phrase. My prosodic findings rely on an important assumption—other than syntax, very few factors may affect prosodic phrasing in English coordination. This is not a trivial claim, and I use two additional experimental analyses to exclude two factors that the reviewers suggested may affect prosodic phrasing. The first factor I exclude is focus and the type of focus (e.g., corrective, informational, association with *only*, or parallel). Second, a follow-up experiment suggests that contrastive discourse coherence relations do not affect prosodic phrasing, either. Section 8 concludes the paper, generalizes the current analysis to all correlative coordinations, such as *either* … *or* … sentences, and compares the negation in corrective *but* sentences with negative concord.

2 NEG-not-adjacent-to-CONJ must involve ellipsis

This section presents five pieces of evidence that NEG-not-adjacent-to-CONJ must involve ellipsis, the first two of which are replicated from Vicente (2010). Vicente provided six arguments in total that NEG-not-adjacent-to-CONJ in English and Spanish must involve ellipsis. His arguments focused on corrective *but* sentences with sentence negation, but I will show that they actually apply to sentences where negation seems non-adjacent to conjunction, including those with constituent negation. Then I add three arguments of my own showing the same thing—that NEG-not-adjacent-to-CONJ involves ellipsis. All these supplemental arguments are replicated from Wu's (2022b) arguments for *either* … *or* … sentences, a preview of the striking similarities between corrective *but* sentences and *either* … *or* … sentences. Section 8.1 will compare these two constructions in detail.

2.1 Argument 1: Islands

Vicente argued for ellipsis in NEG-not-adjacent-to-CONJ based on the observation that that ellipsis involves a movement step that is subject to islands. For example, corrective *but* sentences that move the remnant across an adjunct island are degraded (16a–b):

(16) a. ??I didn't leave the party [{after/because} Amy started telling bad jokes] but [childhood anecdotes].
b. ??I didn't leave the party [{after/because} Amy started telling bad jokes] but [Cassandra]. (Vicente 2010:395)

Vicente accounted for this fact using ellipsis (16a–b), where the remnant has to move across the adjunct:

(17) a. I didn't leave the party [{after/because} Amy started telling bad jokes] but [childhood anecdotes]$_i$ [~~I left the party [$_{island}$ {because/after} Amy started telling t$_i$~~].
b. I didn't leave the party [{after/because} Amy started telling bad jokes] but [Cassandra]$_i$ [~~I left the party [$_{island}$ {because/after} t$_i$ started telling bad jokes~~].

Contrast (16a–b) with (18a–b), which are grammatical because the remnant itself includes the island, and the remnant does not move across any island.

(18) a. I didn't leave the party [{after/because} Amy started telling bad jokes] but [{after/because} she started telling childhood anecdotes].
b. I didn't leave the party [{after/because} Amy started telling bad jokes] but [{after/because} Cassandra started telling them].

Following are Vicente's analyses of (18a–b):

(19) a. I didn't leave the party [{after/because} Amy started telling bad jokes] but [{after/because} she started telling childhood anecdotes]$_i$ [~~I left the party t$_i$~~].
b. I didn't leave the party [{after/because} Amy started telling bad jokes] but [{after/because} Cassandra started telling them]$_i$ [~~I left the party t$_i$~~].

Vicente's argument focused on corrective *but* sentences with sentence negation, which can cliticize as *n't*. Below I show that it is not those sentences that are subject to the island constraint and therefore involve ellipsis, but the sentences where negation seems non-adjacent to conjunction. I show this with two types of islands: the adjunct island and the complex NP island. (16a–b) are NEG-not-adjacent-to-CONJ sentences that just happen to involve sentence negation. In (20a–c) and (21a–c), the apparent coordination is *spinach but chard*; negation appears to be non-adjacent to this conjunction, even though the negation in (20b–c) and (21b–c) is constituent negation. These sentences are ungrammatical because the remnant *chard* moves across an island. This problem is fixed in (20d–f) and (21d–f) because the remnants include the island, and therefore their movement do not cross any island.

(20) *Negation and the apparent conjunction cannot be separated by an adjunct clausal boundary*

a. *Max did*n't* decide to go home [$_{island}$ after eating spinach], but chard.
b. *Max decided *not* to go home [$_{island}$ after eating spinach], but chard.
c. *Max decided to go home *not* [$_{island}$ after eating spinach], but chard.
d. Max did*n't* decide to go home [$_{island}$ after eating spinach], but [after eating chard].
e. Max decided *not* to go home [$_{island}$ after eating spinach], but [after eating chard].
f. Max decided to go home *not* [$_{island}$ after eating spinach], but [after eating chard].

(21) *Negation and the apparent conjunction cannot be separated by a complex NP boundary*

a. *Max did*n't* want to revise [$_{island}$ his decision to eat spinach] but chard.
b. *Max wanted to *not* revise [$_{island}$ his decision to eat spinach] but chard.
c. *Max wanted to revise *not* [$_{island}$ his decision to eat spinach] but chard.
d. Max did*n't* want to revise [$_{island}$ his decision to eat spinach] but [his decision to eat chard].
e. Max wanted to *not* revise [$_{island}$ his decision to eat spinach] but [his decision to eat chard].
f. Max wanted to revise *not* [$_{island}$ his decision to eat spinach] but [his decision to eat chard].

Following are my analyses of (20)–(21):

(22) *Analysis of (20a–f)*

a. Max did*n't* decide to go home [$_{island}$ after eating spinach], but [chard$_i$ [$_{vP}$ ~~decide to go home~~ [$_{island}$ ~~after eating t$_i$~~]]].
b. Max decided *not* to go home [$_{island}$ after eating spinach], but [chard$_i$ [$_{TP}$ ~~to go home~~ [$_{island}$ ~~after eating t$_i$~~]]].
c. Max decided to go home *not* [$_{island}$ after eating spinach], but [chard$_i$ [$_{island}$ ~~after eating t$_i$~~]].
d. Max did*n't* decide to go home [$_{island}$ after eating spinach], but [after eating chard]$_i$ [$_{vP}$ ~~decide to go home t$_i$~~].
e. Max decided *not* to go home [$_{island}$ after eating spinach], but [after eating chard]$_i$ [$_{TP}$ ~~to go home t$_i$~~].
f. Max decided to go home *not* [$_{island}$ after eating spinach], but [after eating chard].

(23) *Analysis of (21a–f)*

a. *Max did*n't* want to revise [$_{island}$ his decision to eat spinach] but [chard$_i$ [$_{vP}$ ~~want to revise~~ [$_{island}$ ~~his decision to eat t$_i$~~]]].
b. *Max wanted to *not* revise [$_{island}$ his decision to eat spinach] but [chard$_i$ [$_{vP}$ ~~revise~~ [$_{island}$ ~~his decision to eat t$_i$~~]]].
c. *Max wanted to revise *not* [$_{island}$ his decision to eat spinach] but [chard$_i$ [$_{island}$ ~~his decision to eat t$_i$~~]].

d. Max did*n't* want to revise [$_{island}$ his decision to eat spinach] but [his decision to eat chard]$_i$ [$_{vP}$ ~~want to revise t$_i$~~].
e. Max wanted to *not* revise [$_{island}$ his decision to eat spinach] but [his decision to eat chard]$_i$ [$_{vP}$ ~~revise t$_i$~~].
f. Max wanted to revise *not* [$_{island}$ his decision to eat spinach] but [his decision to eat chard].

2.2 Argument 2: Bound variable reading

Another argument provided by Vicente (2010) involved variables in each conjunct of *but* that are bound by a universal quantifier:

(24) I did*n't* say that every$_i$ farmer loves his$_i$ donkey but his$_i$ horse.
(Adapted from Vicente 2010:398)
Bound variable reading: 'I didn't say that every$_i$ farmer loves his$_i$ donkey but I said that every$_j$ farmer loves his$_j$ horse.'

An analysis without ellipsis (25) may be able to account for the bound variable reading of (24), but cannot account for the fact that negation's scope is restricted to the first conjunct.

(25) *Analysis without ellipsis cannot account for negation's scope in the first conjunct*
I did*n't* say that every$_i$ farmer loves [$_{DP}$ his$_i$ donkey] but [$_{DP}$ his$_i$ horse].

In contrast, an analysis with ellipsis (26) can account for the negation's scope, while at the same time posits an elided universal quantifier in the second conjunct that binds the second variable.

(26) *Analysis with ellipsis can account for both negation's scope and the bound variable reading*
[$_{CP}$ I did*n't* say that every$_i$ farmer loves his$_i$ donkey] but [$_{CP}$ [$_{DP}$ his$_j$ horse] [$_{TP}$ ~~I said that every farmer$_j$ loves t$_i$~~]].

A NEG-not-adjacent-to-CONJ sentence with constituent negation instead of sentence negation can also include bound variables, again suggesting that what requires ellipsis is not sentence negation, but the appearance that negation is non-adjacent to conjunction:

(27) I pretended to *not* say that every$_i$ farmer loves his$_i$ donkey but his$_i$ horse.
Bound variable reading: 'I pretended to not say that every$_i$ farmer loves his$_i$ donkey but say that every$_j$ farmer loves his$_j$ horse.'

2.3 Argument 3: Constituency

Having replicated some of Vicente's (2010) arguments for ellipsis in NEG-not-adjacent-to-CONJ, I add three more arguments of my own. The first relies on the assumption that only constituents can be coordinated by *but*. If we find apparent coordination of non-constituents, then ellipsis must have occurred. Following is a baseline, where the conjuncts (bracketed) are constituents:

(28) *Coordination of apparent constituents in* NEG*-not-adjacent-to-*CONJ (*baseline*)

a. John did*n't* look at [the planet with ice caps], but [the star with dark spots].
b. Mary did*n't* play [checkers from Egypt], but [chess from India].

In contrast, what appear to be coordinated in the following sentences are not constituents:[3]

(29) *Coordination of apparent non-constituents in* NEG*-not-adjacent-to-*CONJ

a. John did*n't* look at [the planet with a telescope], but [the star with binoculars].
b. Mary did*n't* play [checkers today], but [chess yesterday].

As a reviewer pointed out, the bracketed material in (29) would be constituents if we follow Pesetsky's (1996) cascading analysis. According to the cascading analysis, the object DPs are in Spec, PP:

(30) *Coordination of apparent non-constituents in* NEG*-not-adjacent-to-*CONJ

a. John did*n't* look at [$_{PP}$ [$_{DP}$ the planet] with a telescope] but [$_{PP}$ [$_{DP}$ the star] with binoculars].
b. Mary did*n't* play [$_{PP}$ [$_{DP}$ checkers] today] but [$_{PP}$ [$_{DP}$ chess] yesterday].

I do not follow the cascading analysis because the cleft test suggests that the bracketed parts in (29) are not constituents:

(31) *Cascading analysis of (29)*

a. *It was [the star with binoculars] that John looked at.
b. *It was [chess yesterday] that Mary played.

We can resolve the apparent coordination of non-constituents if we posit ellipsis. With ellipsis, the underlying conjuncts are still constituents:

(32) *Apparent coordination of non-constituents must involve ellipsis in* NEG*-not-adjacent-to-*CONJ

a. John did*n't* [look at the planet with a telescope], but [~~look at~~ the star with binoculars].
b. Mary did*n't* [play checkers today], but [~~play~~ chess yesterday].

[3]The bracketed material in (29a) may be a constituent, if the sentence involves VP conjunction and ATB-movement of the verb (*look*) and the preposition (*at*) out of the conjunction:

(i) John didn't look$_i$ at$_j$ [$_{VP}$ t$_i$ t$_j$ the planet with a telescope] but [$_{VP}$ t$_i$ t$_j$ the star with binoculars].

While it is possible that the verb (*look*) ATB-moves to v, there is unlikely to be another head position below v that the preposition can move to, therefore I consider the bracketed material not to be a constituent. Even if ATB-movement of *look* and *at* were possible, it would be difficult to account for the other arguments in this section without ellipsis, such as the arguments based on islands and bound variables.

2.4 Argument 4: Sloppy identity

My second argument bears similarity to Vicente's (2010) argument based on bound variables. Instead of using a variable bound by a universal quantifier, I rely on the fact that elided pronouns can have sloppy identity. The following NEG-not-adjacent-to-CONJ sentence has both strict and sloppy readings, expected under ellipsis because elided pronouns give rise to both readings:[4]

(33) Mary did*n't* expect John$_i$ to like his$_i$ mother, but Bill.
NEG-not-adjacent-to-CONJ

a. Strict
Mary did*n't* expect John$_i$ to like his$_i$ mother, but ~~expect~~ Bill$_j$ ~~to like his$_i$ mother~~.

b. Sloppy
Mary did*n't* expect John$_i$ to like his$_i$ mother, but ~~expect~~ Bill$_j$ ~~to like his$_j$ mother~~.

An analysis without ellipsis fails to account for the word order of (33), unless it posits rightward movement of *but Bill*:

(34) Mary did*n't* expect John$_i$ t$_j$ to like his$_i$ mother, but [Bill]$_j$.
NEG-not-adjacent-to-CONJ

But this analysis with rightward movement has difficulty accounting for the sloppy reading of the pronoun because without ellipsis, this pronoun cannot be bound by *John* and *Bill* at the same time. This analysis also fails to account for the fact that negation's scope is restricted to the first conjunct.

2.5 Argument 5: Antecedent-contained deletion

The final argument I provide relies on antecedent-contained deletion (ACD). I will show that an analysis without ellipsis runs into problems with sentences involving ACD, while an analysis involving ellipsis avoids these issues.

ACD often involves a relative clause that attaches to a DP, and there is VP-ellipsis in this relative clause (35a). Common analysis of ACD posits quantifier raising (QR) of the DP above the main verb (i.e., QRing of *every philosopher that Mary did*, as in (35b)) in order to construct an antecedent VP (i.e., A in (35b), *talked to trace*) that is parallel to the elided phrase (i.e., E in (35b), *talk to trace*; Sag 1976; May 1985; Kennedy 1997; Fox 2002):

[4]Non-elliptical sentences can have sloppy identity, and thus sloppy identity readings have been suggested to not be a reliable diagnostic of ellipsis (Merchant 2013):

(i) a. Ralph ate his ice-cream with a spoon, and Seymour did the same thing.
b. Harvey stubbed his toe on the doorstop, and it happened to Max, too. (Merchant 2013:5)

The non-elliptical sentences that have the sloppy identity reading all involve lexical items, such as *the same time*, *likewise* and overt pronouns. I take this to indicate that the sloppy identity reading requires ellipsis or such a lexical item. Since the second conjunct in (33) does not involve any such lexical item, it must involve ellipsis.

(35) a. John talked to every philosopher that Mary did.
b. John [every philosopher that Mary did [$_E$ ~~talk to t~~]]$_i$ [$_A$ talked to t_i].

Kennedy (1994) observed that the direct objects of the overt verb and the elided verb in ACD must be identical. Following is the relevant contrast, to which I added the elided verbs:

(36) a. Polly visited every town Erik did ~~visit~~.
b. *Polly visited every town in a country Erik did ~~visit~~. (Kennedy 1994:2)

This contrast suggests that if the DP that the relative clause attaches to is embedded in another DP as in (36b), only the embedded DP (i.e., *a country Erik did*) can QR, but not the larger DP (i.e., *every town in a country Erik did*) because QRing the larger DP would predict grammaticality, contrary to fact. Specifically, QRing the embedded DP would lead to non-parallel antecedent (*visited every town in t*) and elided phrase (*visited t*) and thus ungrammaticality (37a), whereas QRing the larger DP would lead to parallel antecedent (*visited t*) and elided phrase (*visited t*) and thus grammaticality (37b), contrary to fact.

(37) a. Polly [a country Erik did [$_E$ ~~visited t~~]]$_i$ [$_A$ visited every town in t_i].
b. Polly [[every town in a country]$_j$ Erik did [$_E$ ~~visited t_j~~]]$_i$ [$_A$ visited t_i].

I apply this generalization by Kennedy (1994) to NEG-not-adjacent-to-CONJ sentences that contain ACD:

(38) *ACD in NEG-not-adjacent-to-CONJ sentences*
John did*n't* talk to some linguist but every philosopher that Mary did.

According to Kennedy's generalization, only the universal quantifier (*every philosopher that Mary did*) undergoes QR in (38), but not the larger DP conjunction (*some linguist but every philosopher that Mary did*). If we do not posit ellipsis for (38), then just QRing the universal quantifier would violate Coordinate Structure Constraint. Even if Coordinate Structure Constraint could be violated, it would lead to non-identical antecedent and elided phrase as in (39), where the antecedent is *talked to some linguist but trace*, and the elided phrase is *talk to trace*.

(39) *Analysis without ellipsis creates non-identical antecedent and elided phrase*
John did*n't* [every philosopher that Mary did [$_E$ ~~talk to t~~]]$_i$ [$_A$ talk to [some linguist] but t_i].

If (38) can involve ellipsis, we can avoid these problems simply by positing larger underlying coordination, and movement of only the universal quantifier in the second conjunct:

(40) *Analysis with ellipsis*
John did*n't* [$_{vP}$ talk to some linguist] but [$_{vP}$ [$_{DP}$ every philosopher that Mary did [$_E$ ~~talk to t~~]]$_i$ [$_A$ ~~talk to t_i~~]].

In sum, this section has presented two of Vicente's (2010) arguments plus three arguments of my own. They all show that NEG-not-adjacent-to-CONJ must be derived by ellipsis.

3 NEG-adjacent-to-CONJ does not need to involve ellipsis

Toosarvandani (2013) challenged Vicente's (2010) claim that corrective *but* only coordinates clauses, using corrective *but* sentences involving constituent negation. Toosarvandani claimed that these sentences could be coordination of subclauses and do not need to involve ellipsis. This subsection provides a critical review of Toosarvandani's (2013) three arguments. I will argue that his arguments only show that ellipsis is not available when blocked by independent factors, such as islands and word order, but do not exclude ellipsis for all corrective *but* sentences with constituent negation. In other words, those sentences do not *need* to involve ellipsis, but as I will argue in Sects. 4, 5 and 7, they can in principle involve ellipsis, if ellipsis is not blocked by independent factors. I will also show that his generalization should actually apply to sentences where negation seems adjacent to conjunction, not sentences with constituent negation.

3.1 Argument 1: Islands

Toosarvandani observed that in contrast to the sentences with sentence negation that Vicente observed to obey island constraints, sentences with constituent negation do not show the same island sensitivity:

(41) a. Alfonse cooked rice and not beans but potatoes.
b. That Alfonse ate not the rice but the beans is fantastic.
c. Alfonse smashed the vase that Sonya had brought not from China but from Japan.
d. Jasper choked when he saw not Sally but John.

(Toosarvandani 2013:834)

Toosarvandani accounted for this by positing subclausal coordination:[5]

[5] Strictly speaking, only (41a) requires subclausal coordination. (41b–d) can be accounted for with clausal coordination, as long as that coordination does not involve islands, as in (ia–c). I am grateful to a reviewer for bringing this issue to my attention.

(i) a. That [$_{TP}$ Alfonse ate not the rice] but [$_{TP}$ [the beans]$_i$ ~~he ate t$_i$~~] is fantastic.
b. Alfonse smashed the vase that [$_{TP}$ Sonya had brought not from China] but [$_{TP}$ [from Japan]$_i$ ~~she had brought t$_i$~~].
c. Jasper choked when [$_{TP}$ he saw not Sally] but [$_{TP}$ John$_i$ ~~he saw t$_i$~~].

To demonstrate the contrast between sentence negation and constituent negation, Toosarvandani (2013) mentioned that the counterpart sentences to (41a–d) with sentence negation in the matrix clause lack the reading where negation scopes above the island:

(ii) a. Alfonse didn't cook rice and beans, but potatoes.
b. That Alfonse ate the rice isn't fantastic, but the beans.
c. Alfonse didn't smash the vase that Sonya had brought from China, but from Japan.
d. Jasper didn't choke when he saw Sally, but John.

For example, (iia) does not have the reading 'Alfonse didn't cook rice and beans, but he cooked rice and potatoes.' (iib) does not have the reading 'That Alfonse ate the rice isn't fantastic, but that he ate the beans is fantastic.'

(42) *Analysis without ellipsis for (41a–d)*

a. Alfonse cooked rice and [$_{DP}$ not beans] but [$_{DP}$ potatoes].
b. That Alfonse ate [$_{DP}$ not the rice] but [$_{DP}$ the beans] is fantastic.
c. Alfonse smashed the vase that Sonya had brought not [$_{PP}$ from China] but [$_{PP}$ from Japan].
d. Jasper choked when he saw [$_{DP}$ not Sally] but [$_{DP}$ John].

Because none of these structures involves any ellipsis, no movement is involved, and thus no island is crossed. While Toosarvandani's generalization was about corrective *but* sentences with constituent negation, it should actually apply to sentences where negation seems adjacent to conjunction because these sentences, even with sentence negation, are not sensitive to islands:

(43) Alfonse sang and didn't dance but stood still.

3.2 Argument 2: Word order

Toosarvandani's second argument relies on *but*-coordination in sentence-initial and sentence-medial positions:

(44) a. Not a mathematician but a physicist discovered the neutron.
b. Not three but four girls are sunbathing on the lawn. (Vicente 2010:400)

Toosarvandani accounted for these with surface coordination without ellipsis, e.g., [$_{DP}$ *Not a mathematician*] *but* [$_{DP}$ *a physicist*] *discovered the neutron*. An analysis with ellipsis would require backward ellipsis in the first conjunct:

(45) *Analysis with backward ellipsis for (44a–b)*

a. [[Not a mathematician ~~discovered the neutron~~] but [a physicist discovered the neutron]].
b. [[Not three ~~girls are sunbathing on the lawn~~] but [four girls are sunbathing on the lawn]].

Vicente (2010) noted that backward ellipsis in a coordinate structure is banned by the Backwards Anaphora Constraint (Langacker 1969). Toosarvandani also ruled out a right-node-raising analysis for (44) based on intonation and constituency, leaving surface subclausal coordination as the only possible analysis.

3.3 Argument 3: Scope interactions with a subject quantifier

Toosarvandani's third argument relies on sentences with a quantifier in the subject position, and negation and conjunction in the object position. (46) is an example

Then Toosarvandani claimed that (41a–d) do have these readings where negation scopes above the island. I do not think this is accurate. I think only (41a) has the relevant reading, but (41b–c) don't. For example, (41b) does not presuppose that Alfonse ate the rice, but rather presupposes that he didn't eat the rice. (41a) has the relevant reading presumably because *cooking rice and something that is not beans* is equivalent to *not cooking rice and beans*. (41b–d) do not have the relevant readings because the coordination there, whether clausal or subclausal, cannot include the island. Since negation scopes within the coordination, negation cannot scope above the island.

of such a sentence adapted from Toosarvandani. Toosarvandani claimed that these sentences have a reading where the subject quantifier scopes above the coordination.

(46) At least five students drank *not* the whiskey but the gin.
(based on Toosarvandani 2013:838)
✓*at least five* > ∧: 'There were at least five students who did not drink the whiskey and who drank the gin.'

This reading follows naturally from coordination of two DPs:

(47) *Analysis without ellipsis of (46)*
At least five students drank [$_{DP}$ *not* the whiskey] but [the gin].

Toosarvandani focused on the narrow scope of coordination, but did not rule out other possible readings. Thus, his argument only shows that the analysis without ellipsis is possible, but does not rule out the analysis with ellipsis. Section 4.3 will argue that (46) is ambiguous, and that its other reading corresponds to an analysis with ellipsis.

As a side note, Toosarvandani observed that if we replace the constituent negation in sentences like (46) with sentence negation, the sentence still has the narrow scope reading of conjunction:

(48) At least five students did*n't* drink the whiskey but the gin.
✓*at least five* > ∧: 'There were at least five students who did not drink the whiskey and who drank the gin.'

He used this fact as evidence that corrective *but* can coordinate vPs, contra Vicente's (2010) claim that corrective *but* always coordinates CPs. Toosarvandani would analyze (48) as:

(49) *Analysis with vP-coordination of (48)*
At least five students did*n't* [$_{vP}$ drink the whiskey] but [$_{vP}$ [the gin]$_i$ [~~drink~~ ~~t$_i$~~]].

In sum, Toosarvandani (2013) showed that at least some corrective *but* sentences do not have to coordinate clauses, but can coordinate subclauses. His claim was that corrective *but* sentences with constituent negation do not need to involve ellipsis. But I showed that his claim was not exactly right: his generalization applied to sentences where negation seems adjacent to conjunction, not sentences with constituent negation. I also stress that his arguments only showed that ellipsis was not possible in *some* NEG-adjacent-to-CONJ sentences (when ellipsis is blocked by independent factors, such as islands and word order), but did not rule out ellipsis for all NEG-adjacent-to-CONJ sentences. If ellipsis can apply to some corrective *but* sentences (specifically NEG-not-adjacent-to-CONJ) as Vicente demonstrated, then it should in principle be available to all corrective *but* sentences, including NEG-adjacent-to-CONJ. The next section will argue for precisely this—that ellipsis can occur in NEG-adjacent-to-CONJ sentences.

4 NEG-adjacent-to-CONJ can involve ellipsis

This section presents three arguments supporting that NEG-adjacent-to-CONJ can be derived by ellipsis. They are based on constituency, antecedent-contained deletion, and scope, respectively. The first two arguments apply my arguments for ellipsis in NEG-not-adjacent-to-CONJ in Sect. 2 to NEG-adjacent-to-CONJ. The third argument examines an additional reading of (46), which was used to argue for non-ellipsis in Sect. 3.3.

4.1 Argument 1: Constituency

Following the same logic as the argument for ellipsis in Sect. 2.3 and assuming that only constituents can be coordinated by *but*, if we find apparent coordination of non-constituents, then ellipsis must have occurred. Following is a baseline, where the conjuncts (bracketed) are constituents:

(50) *Coordination of apparent constituents in NEG-adjacent-to-CONJ (baseline)*

a. John looked at *not* [the planet with ice caps], but [the star with dark spots].

b. Mary played *not* [checkers from Egypt], but [chess from India].

In contrast, what appear to be coordinated in the following sentences are not constituents:

(51) *Coordination of apparent non-constituents in NEG-adjacent-to-CONJ*[6]

a. John looked at *not* [the planet with a telescope], but [the star with binoculars].

b. Mary played *not* [checkers today], but [chess yesterday].

If we posit ellipsis, then the underlying conjuncts are still constituents:

(52) *Apparent coordination of non-constituents must involve ellipsis*[7]

a. John [looked at *not* the planet with a telescope], but [~~looked at~~ the star with binoculars].

b. Mary [played *not* checkers today], but [~~played~~ chess yesterday].

[6] All the judgments in this paper come from informal surveys to native American English speakers. Contrary to their judgments, an anonymous reviewer reported not accepting (51). Section 6 will discuss (51) in detail, and given that discussion, the speaker variation in judgments suggests that speaker vary in whether the negative morpheme needs to c-command all the corrective foci, or just the leftmost one.

[7] I assume that in (29a–b) and (52a–b), the remnants move out of the ellipsis separately, like what we see in gapping:

(i) a. John [looked at *not* the planet with a telescope], but [the star]$_i$ [with binoculars]$_j$ ~~looked at~~ ~~t_i~~ ~~t_j~~.

b. Mary [played *not* checkers today], but [chess]$_i$ [yesterday]$_j$ ~~played~~ ~~t_i~~ ~~t_j~~.

4.2 Argument 2: Antecedent-contained deletion

Using the same argument based on ACD in Sect. 2.5, I will show that an analysis without ellipsis runs into problems with sentences involving ACD, while an analysis involving ellipsis avoids these issues. Recall Kennedy's (1994) observation that if the DP that the relative clause attaches to is embedded in another DP, only the embedded DP can QR, but not the larger DP. I apply this key observation to NEG-adjacent-to-CONJ sentences that contain ACD:

(53) *ACD in NEG-adjacent-to-CONJ*[8]
John talked to *not* some linguist but every philosopher that Mary did.

According to Kennedy's observation, we can only QR the universal quantifier in (53), but not the larger DP conjunction. If we do not posit ellipsis for (53), then just QRing the universal quantifier, would violate Coordinate Structure Constraint, and lead to non-identical antecedent and elided phrase (54), where the antecedent is *talked to not some linguist but trace*, and the elided phrase is *talk to trace*.

(54) *Analysis without ellipsis creates non-identical antecedent and elided phrase*
John [every philosopher that Mary did [$_E$ ~~talk to t~~]]$_i$ [$_A$ talked to [*not* some linguist] but t_i].

If (53) can involve ellipsis, we can avoid these problems simply by positing larger underlying coordination, and movement of only the universal quantifier in the second conjunct:

(55) *Analysis with ellipsis*
John [$_{vP}$ talked to *not* some linguist] but [$_{vP}$ [$_{DP}$ every philosopher that Mary did [$_E$ ~~talk to t~~]]$_i$ [$_A$ ~~talked to t_i~~]].

4.3 Argument 3: Scope interactions with a subject quantifier

Recall (46), repeated below, which was used as an argument that NEG-adjacent-to-CONJ does not have to involve ellipsis. Here I focus on the other reading of (46), spelled out below, where conjunction takes scope above the subject quantifier. This reading is equivalent to 'Less than five students drank the whiskey, but at least five students drank the gin.'

(46) At least five students drank *not* the whiskey but the gin.
(Toosarvandani 2013:838)
✓∧ > *at least five*: 'It's not the case that at least five students drank the whiskey, but it is the case that at least five students drank the gin.'

This reading is available because (46) is true in a situation where every student drank the gin and/or the whiskey, and among these students, 1 drank only the whiskey, 3

[8] An anonymous reviewer reported not accepting *not* following the preposition in general (e.g., **John talked to not Sue but Mary*, but *John talked not to Sue but to Mary*). This reviewer did not accept (53) for this reason, but accepted *John talked not to some linguist but to every philosopher that Mary did*. The argument in Sect. 4.2 still holds for such speakers, for whom the preposition *to* must be pied-piped.

drank only the gin, and 3 drank the gin and the whiskey. In this situation, the number of students who drank the whiskey is 4 (i.e., less than 5), and the number of students drank the gin is 6 (i.e., at least 5). This situation can distinguish the wide scope reading of coordination from the narrow scope reading of coordination discussed in Sect. 3.3 because that narrow scope reading is false in this situation. The wide scope reading of coordination follows naturally from ellipsis, but is puzzling without ellipsis:

(56) *Analysis with ellipsis of (46)*
[At least five students drank *not* the whiskey] but [~~at least five students drank~~ the gin].

In preview of my argument in Sect. 5, a reviewer suggested the following sentence, which is ambiguous between a weak reading where conjunction scopes above the necessity modal and a strong one where the modal scopes above conjunction.

(57) Mary needs to not rest but eat.
✓$\wedge > \Box$: 'It's not the case that Mary needs to rest but it is the case that Mary needs to eat.'
✓$\Box > \wedge$: 'What Mary needs to do is to not rest but eat.'

The weak reading follows from ellipsis, while the strong reading follows from VP-conjunction:

(58) a. *Analysis with ellipsis of (57)*
[Mary needs to *not* rest] but [~~Mary needs to~~ eat].
b. *Analysis without ellipsis of (57)*
Mary needs to [*not* rest] but [eat].

5 NEG-adjacent-to-CONJ has more possible analyses than NEG-not-adjacent-to-CONJ, and negation has two positions

According to my analysis, sentences where negation seems non-adjacent to conjunction only have one type of analysis (i.e., analysis with ellipsis, Sect. 2), whereas sentences where negation seems adjacent to conjunction have multiple possible analyses (i.e., analysis without ellipsis, Sect. 3; and analysis with ellipsis, Sect. 4). This makes a prediction: NEG-adjacent-to-CONJ should be able to have ambiguity, but NEG-not-adjacent-to-CONJ cannot have ambiguity. This section shows that this prediction is borne out. Furthermore, I will argue based on the ambiguity of NEG-adjacent-to-CONJ that there are two positions for negation in a sentence, though we only hear one, and only the higher position is interpreted as true negation.

First, the following sentence with conjunct-adjacent negation (59) is ambiguous. The key difference between its readings is in the scope interactions between negation, conjunction, and the intensional verbs (underlined and expanded in the readings for ease of distinguishing between them). Negation and conjunction can take scope below both verbs (reading 1), between them (reading 2), or above them (reading 3).

(59) Sherlock pretended to be looking for *not* a burglar but a thief.

NEG-adjacent-to-CONJ

✓Reading 1: Sherlock acted like he tried to find someone who is [*not* a burglar but a thief].

✓Reading 2: Sherlock acted like [he did*n't* try to find a burglar, but he tried to find a thief].

✓Reading 3: [Sherlock did*n't* act like he tried to find a burglar, but he acted like he tried to find a thief].

These readings are complicated. One way to distinguish between them is to focus on the part where they differ. For readings 1 and 2, that is the difference between 'trying to find someone who is not a burglar but a thief' and 'not trying to find a burglar but trying to find a thief'. The former is a stronger requirement than the latter because the latter does not care if the target is a burglar, but the former does. In a context where it is a crime for detectives to look for non-burglars (generally it is corrupt of detectives to exclude a type of criminals in their search, but perhaps even illegal in a world where burglars tend to bribe and corrupt detectives), we would need to use the stronger requirement in reading 1 rather than reading 2 to accuse someone of corruption. The fact that the sentence *Sherlock looked for not a burglar but a thief* can be used to accuse Sherlock of corruption suggests that it has the narrow scope of negation and conjunction. Likewise, the key difference between readings 2 and 3 is the difference between 'acting like not doing something' and 'not acting like doing something,' where the former is stronger than the latter. In a context where burglars are always on high alert, a fact that only the most brilliant detectives notice, and therefore pretend to not be interested in them, we would need to use the stronger reading 2 rather than reading 3 to argue for Sherlock's brilliance. (59) can indeed be used as evidence for Sherlock's brilliance, suggesting that reading 2 is available. Reading 3 can be used to correct an interlocutor who said *Sherlock pretended to be looking for a burglar*, while readings 1 and 2 are stronger than a correction.

In contrast, NEG-not-adjacent-to-CONJ sentences only have one reading, where the scope of negation and conjunction is frozen at negation's surface position (also observed by Kayne 1998):

(60) *NEG-not-adjacent-to-CONJ that only has reading 2*
Sherlock pretended *not* to be looking for a burglar but a thief.

(61) *NEG-not-adjacent-to-CONJ that only has reading 3*
Sherlock did*n't* pretend to be looking for a burglar but a thief.

The only reading of NEG-not-adjacent-to-CONJ follows from ellipsis, once we recover the elided material:

(62) *Analysis of NEG-not-adjacent-to-CONJ (60)*
Sherlock pretended [$_{TP}$ *not* to be looking for a burglar] but [$_{TP}$ ~~to be looking for~~ a thief].

(63) *Analysis of NEG-not-adjacent-to-CONJ (61)*
Sherlock did [$_{vP}$ *not* pretend to be looking for a burglar] but [$_{vP}$ ~~pretend to be looking for~~ a thief].

Reading 1 of NEG-adjacent-to-CONJ (59) follows from the analysis without ellipsis:[9]

(64) *Analysis without ellipsis of NEG-adjacent-to-CONJ* (59)→ *Reading 1*
Sherlock pretended to be looking for [$_{DP}$ *not* a burglar] but [$_{DP}$ a thief].

Readings 2 and 3 (abbreviated as R2 and R3) of NEG-adjacent-to-CONJ (59) follow from ellipsis, giving us higher scope of conjunction than its surface position:

(65) *Analysis with ellipsis of NEG-adjacent-to-CONJ (59)→ higher-than-surface scope of conjunction*
a. Sherlock pretend [to be looking for *not* a burglar] but [~~to be looking for~~ a thief]. *R*2
b. Sherlock [pretended to be looking for *not* a burglar] but [~~pretend to be looking for~~ a thief]. *R*3

Ellipsis can only give us the correct scope of conjunction in readings 2 and 3, but negation also takes higher-than-surface scope. This suggests that we need something besides ellipsis. Here I posit an unpronounced negation (in <> in (66a–b)) at the left edge of the first conjunct. The unpronounced negation is interpreted as actual negation, and the pronounced negation is semantically vacuous.

(66) *Analysis with ellipsis of NEG-adjacent-to-CONJ (59)→ high-than-surface scopes of conjunction and negation*
a. Sherlock pretended [<not> to be looking for *not* a burglar] but [~~to be looking for~~ a thief]. *R*2
b. Sherlock [<not> pretended to be looking for *not* a burglar but [~~pretended to be looking for~~ a thief]. *R*3

Here I discuss an alternative analysis that does not posit two positions for negation: perhaps there is no ellipsis at all, but just DP-conjunction *not a burglar but a thief* (similar to Penka and Zeijlstra's 2005 analysis of negative indefinites in Dutch and German). This DP-conjunction QRs to above *looking for* (for reading 2) or *pretended* (for reading 3), and then each conjunct (the indefinites) is reconstructed.

(67) *Alternative analysis without ellipsis of NEG-adjacent-to-CONJ (59)→ reading 2*
Step 1 (QR): Sherlock pretended [*not* a burglar but a thief]$_i$ to be looking for t_i.
Step 2 (reconstruction): Sherlock pretended [*not* a burglar but a thief]$_i$ to be looking for t_i [a burglar] [a thief].

This analysis fails to account for the evidence for ellipsis in Sect. 4 (i.e., evidence based on constituency, antecedent-contained deletion and scope), as well as NEG-adjacent-to-CONJ with VP-conjunction (68), which can also have ambiguity, but VPs are usually assumed to not be able to QR:

[9] As a reviewer pointed out, to get reading 1, $[\![\text{not a burglar}]\!] = \lambda P.\ \exists x.\ P(x) \wedge \neg\text{burglar}(x)$. Perhaps negation is type <e,t> and combines with its sister by predicate modification.

(68) Sherlock pretended to be *not* singing but dancing.
✓Reading 1: Sherlock acted like he was doing something that was not singing but dancing.
✓Reading 2: Sherlock didn't act like he was singing, but he acted like he was dancing.

Having seen my analysis of NEG-adjacent-to-CONJ and NEG-not-adjacent-to-CONJ, we may wonder why NEG-not-adjacent-to-CONJ can't have ambiguity. If it could, then (60) would have reading 3, contrary to fact:

(69) *Impossible reading 3 of (60)*
Sherlock [<not> pretended *not* to be looking for a burglar] but [~~pretended to be looking for~~ a thief].

This derivation is bad because ellipsis cannot apply here. Let us assume that in parallel to the movement of the remnant phrase *a thief*, *a burglar* moves to the parallel position in the first clause at LF. Furthermore, suppose ellipsis requires syntactic identity between an antecedent and the elided phrase (i.e., *pretended to be looking for trace*).

(70) *Impossible reading 3 of (60)*
Sherlock [[a burglar]$_i$ <not> pretended not to be looking for t_i] but [[a thief]$_j$ ~~pretended to be looking for t_j~~].

Because there is negation between *pretended* and *looking for* in the first conjunct, but no negation in the second conjunct, we cannot find an antecedent that is identical to the elided phrase.

Having seen how the presence of negation can restrict ellipsis in NEG-not-adjacent-to-CONJ, we may now wonder if it might also restrict ellipsis in NEG-adjacent-to-CONJ. Specifically, if it could restrict the derivations laid out in (69), that will prevent us from getting readings 2 and 3 for NEG-adjacent-to-CONJ (59).

Below I lay out the movements of *a burglar* and *a thief* for (59). The presence of negation does not affect us here because *not* is adjacent to *a burglar*, and is pied-piped by the movement of *a burglar*. Since *not* moves out together with *a burglar*, there is a phrase that is identical to the elided phrase, and thus ellipsis is licensed.

(71) *Analysis with ellipsis of NEG-adjacent-to-CONJ (59) → high-than-surface scopes of conjunction and negation*

a. *Reading 2*
Sherlock pretended [[not a burglar]$_i$ <not> to be looking for t_i] but [[a thief]$_j$ ~~to be looking for t_j~~].

b. *Reading 3*
Sherlock [[not a burglar]$_i$ <not> pretended to be looking for t_i] but [[a thief]$_j$ ~~pretended to be looking for t_j~~].

To summarize, this section has argued that the fixed scope of conjunction and negation in NEG-not-adjacent-to-CONJ is a result of ellipsis, but this ellipsis is constrained by the identity requirement on ellipsis, and therefore it does not generate more readings than attested. The ambiguity of NEG-adjacent-to-CONJ is a result of ellipsis,

and it has more ellipsis options than NEG-not-adjacent-to-CONJ because of the pied-piping of *not* in the antecedent. In NEG-adjacent-to-CONJ, not only can conjunction take higher scope, but negation also can, suggesting that there are two positions of negation, and the higher position is interpreted.

6 Focus sensitivity of negation

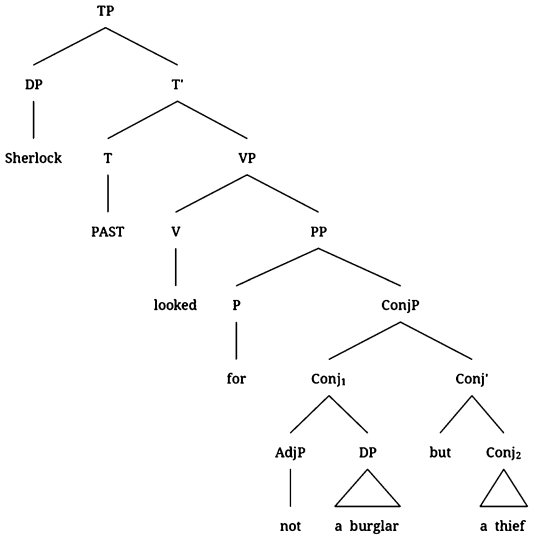
Having argued that negation has two positions in corrective *but* sentences, this section shows that the lower position must c-command focus, which is expected if the lower position is a focus-sensitive operator. Furthermore, it must c-command the leftmost focus, but does not need to c-command the other foci.

Corrective *but* sentences always involve contrastive foci (indicated by F-marking, e.g., *Max doesn't eat spinach*$_F$ *but chard*$_F$). I will show that negation's lower position must c-command the leftmost focus (*spinach*), but does not have to c-command the other focus (*chard*). As we saw in (59), repeated below, negation there can be low negation:

(59) Sherlock looked for *not* [a burglar]$_F$ but [a thief]$_F$.

If negation in (59) is low negation, it is embedded in the first conjunct, and thus only c-commands linearly the first focus *a burglar*, but not the second focus *a thief*:[10]

(72) *Syntactic tree of (59)*



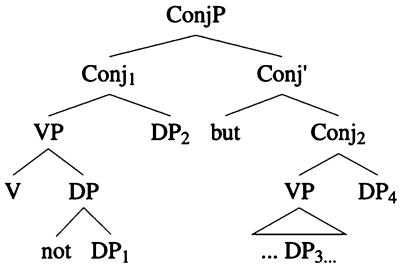
Not only does low negation only c-command the focus in the first conjunct, but when there are two foci in the first conjunct, low negation only needs to c-command the

[10]We may wonder if high negation c-commands the second focus. It doesn't. Since high negation is the daughter of the first conjunct, it does not c-command any material in the second conjunct, including the second focus *a thief*.

leftmost focus. I will now put two foci in each conjunct, and make linearly the first focus structurally lower than the second focus. Then I will show that in this configuration, negation only c-commands the leftmost focus, but does not need to c-command the other foci, even when the leftmost focus is not the structurally higher one.

The tree in (73) illustrates this configuration. Negation in (73) only c-commands DP_1, but not DP_2. If this configuration is grammatical with double focus on DP_1 and DP_2, then negation only needs to c-command the leftmost focus.

(73) *Double-focus configuration*



I demonstrate with four different constructions, and begin with direct object plus a higher instrumental phrase (74), assuming that the direct object is structurally lower than the instrumental phrase.

(74) *Direct object + a higher instrumental phrase*
John looked at [the planet]$_F$ with [a telescope]$_F$, and [the star]$_F$ with [binoculars]$_F$.

Examples (75a–c) vary the focus structure by putting focus on only the direct objects (75a), only the instrumental phrases (75b), and both the direct objects and the instrumentals (75c). Notice that only (75b) is ungrammatical.

(75) *Direct object + a higher instrumental phrase*

a. *Focus on Phrase$_1$ & Phrase$_3$*
John looked at [*not* [the planet]$_F$] with a telescope, but [the star]$_F$.

b. *Focus on Phrase$_2$ & Phrase$_4$*
*John looked at *not* the planet with [a telescope]$_F$, but with [binoculars]$_F$.

c. *Focus on Phrase$_1$, Phrase$_2$, Phrase$_3$ & Phrase$_4$*
John looked at [*not* [the planet]$_F$] with [a telescope]$_F$, but [the star]$_F$ with [binoculars]$_F$.

Examples (75a–b) establish the fact that negation here only c-commands the direct object, but not the instrumental DP: (75a) is grammatical because negation manages to c-command the focused direct object, but (75b) is ungrammatical because negation fails to c-command the focused instrumental DP. The grammaticality of (75c) suggests that negation only needs to c-command the direct object, which is the leftmost focus, but not the instrumental DP, which is the structurally higher focus.

Two reviewers suggested another hypothesis for the ungrammaticality of (75b). Instead of saying that low negation needs to c-command the first focus as I have,

we could instead say that low negation needs to be linearly adjacent to the first focus (in other words, low negation marks the left edge of the first focus). The reason why I do not pursue this alternative hypothesis is due to *either*'s behavior. As I have mentioned in Sect. 1 and will expand on in Sect. 8.1, *not* ... *but* ... behaves nearly identically to *either* ... *or* ..., and my analysis of corrective negation is nearly identical to Wu's (2022b) of *either*. Thus, when we lack evidence that might otherwise help adjudicate between different hypotheses about corrective negation, we might be able to learn from the evidence involving *either*. *Either*'s behavior leads me to pursue my hypothesis instead of the reviewers' suggestion because the low position of *either* only needs to c-command the leftmost focus, and can be higher than the edge of the leftmost focus:

(76) Max will either eat spinach$_{F}$ or he will eat chard$_{F}$.

If we assume that the low position of negation can do this as well, then it would challenge the reviewers' hypothesis. It is difficult to tell whether the low position of negation can do this because of a difference between *either* ... *or* ... and corrective *but* sentences: unlike *either* ... *or* ... sentences, corrective *but* sentences require ellipsis whenever the licensing conditions on ellipsis are met (Anscombre and Ducrot 1977; Horn 2001), as is demonstrated by (77).

(77) Max will not eat spinach$_{F}$ but he will eat chard$_{F}$.

I will discuss this fact in more detail in Sect. 8.1, but for now, it suffices to note the observation in the literature that a sentence like (77) does not have the corrective meaning; but when *he will eat* is elided, it does. Thus, I assume that where ellipsis is possible in the second conjunct of corrective *but* sentences, it is required. This is a confound because it prevents us from testing whether low negation can be higher than the left edge of the leftmost focus. But given the striking parallel between *either* and corrective negation in other aspects, it may be reasonable to suspect that low negation can, and therefore I hypothesize that low negation only needs to c-command the leftmost focus, rather than pursuing the reviewers' stronger suggestion that low negation needs to mark its edge.

I demonstrate this requirement with three other constructions: direct object plus a higher temporal phrase (78), ditransitive (79), and ECM (exceptional case-marking; (80)). All these constructions have the configuration where the adjunct/object on the right is structurally higher than the direct object, and demonstrate that low negation only needs to c-command the direct object when both the direct object and the adjunct/object on the right are under focus.

(78) *Direct object + a higher temporal*

a. *Focus on Phrase$_1$ & Phrase$_3$*
John played [*not* [checkers]$_{F}$] today but [chess]$_{F}$.

b. *Focus on Phrase$_2$ & Phrase$_4$*
*John played *not* checkers [today]$_{F}$ but [yesterday]$_{F}$.

c. *Focus on Phrase$_1$, Phrase$_2$, Phrase$_3$ & Phrase$_4$*
John played [*not* [checkers]$_{F}$] [today]$_{F}$ but [chess]$_{F}$ [yesterday]$_{F}$.

(79) *Ditransitive*

a. *Focus on Phrase*$_1$ *& Phrase*$_3$
John put [*not* [a book]$_F$] on the shelf, but [the record]$_F$.

b. *Focus on Phrase*$_2$ *& Phrase*$_4$
*John put *not* a book [on the shelf]$_F$, but [on the table]$_F$.

c. *Focus on Phrase*$_1$, *Phrase*$_2$, *Phrase*$_3$ *& Phrase*$_4$
John put [*not* [a book]$_F$] [on the shelf]$_F$, but [the record]$_F$ [on the table]$_F$.

(80) *ECM*

a. *Focus on Phrase*$_1$ *& Phrase*$_3$
John considers [*not* [the president]$_F$] a fool, but [his wife]$_F$.

b. *Focus on Phrase*$_2$ *& Phrase*$_4$
*John considers *not* the president [a fool]$_F$, but [a genius]$_F$.

c. *Focus on Phrase*$_1$, *Phrase*$_2$, *Phrase*$_3$ *& Phrase*$_4$
John considers [*not* [the president]$_F$] [a fool]$_F$, but [his wife]$_F$ [a genius]$_F$.

Sensitivity to focus is a hallmark property of focus-sensitive operators. I therefore argue that negation in corrective *but* sentences is a focus-sensitive operator. This parallels proposals that have been made for other focus-sensitive operators (e.g., Cable's (2007) for the question-particle, Hirsch's (2017) for *only*, Quek and Hirsch's (2017) for *even*, and Wu's (2022b) for *either*, along with many others, e.g., Lee 1999; Hole 2015, 2017; Bayer 2018). In fact, these proposals have suggested that perhaps all focus-sensitive operators have multiple positions in a structure that are related to each other by agreement and/or movement. If my analysis of negation is correct, it adds another data point to this typology of focus-sensitive operators.

7 Prosodic evidence

Have provided syntactic and semantic arguments for ellipsis in NEG-adjacent-to-CONJ based on constituency, scope, and antecedent-contained deletion; this section provides evidence from a prosodic experiment, adding to a small but growing literature that looks to prosody for evidence for syntactic theories (e.g., Bresnan 1971; Clemens and Coon 2018; Clemens 2021).

This prosodic experiment was designed to not only adjudicate between the competing syntactic analyses of NEG-adjacent-to-CONJ, but also address another question about the mapping process between syntax and prosody. I will address this research question by examining the prosody of NEG-not-adjacent-to-CONJ, whose syntactic analysis is less controversial than NEG-adjacent-to-CONJ: the literature agrees that NEG-not-adjacent-to-CONJ involves ellipsis. This uncontroversial analysis of NEG-not-adjacent-to-CONJ sentences makes them a great place to study an important question about the syntax-prosody mapping: whether the prosodic structure can be recursive. Therefore, the prosody of corrective *but* sentences can address two separate research questions: (a) what the correct syntactic analysis of NEG-adjacent-to-CONJ is; and (b) whether the prosodic structure can be recursive and replicate the dominance relations in syntax, based on the prosodic study of NEG-not-adjacent-to-CONJ.

This section will begin by introducing these two research questions in Sects. 7.1 and 7.2, respectively, including the relevant hypotheses and their prosodic predictions. Then Sect. 7.3 will present the prosodic experiment, its results, and a discussion of their consequences for the research questions. The experimental findings rely on two key assumptions that are important in their own right, and are tested with follow-up experimental analyses. Section 7.4 will present an experimental analysis that shows that focus and the type of focus (e.g., corrective, informational, association with *only*, or parallel) cannot affect prosodic phrasing in English. Section 7.5 will present a follow-up experiment whose results suggest that clauses in contrastive discourse coherence relations do not correspond to stronger prosodic domains than non-contrastive clauses.

7.1 Competing syntactic analyses of NEG-adjacent-to-CONJ and their prosodic predictions

This subsection reviews the competing syntactic analyses of a NEG-adjacent-to-CONJ sentence like (81), and discusses their prosodic predictions.

(81) Max misses *not* spinach but chard.

Toosarvandani (2013) analyzed (81) as coordination of two DPs (82), and did not consider the possibility that it may involve ellipsis. Let us assume that this approach does not allow ellipsis, and call it *the strictly-DP-coordination approach*. This contrasts with my analysis in (83), which allows for structural ambiguity—it can involve ellipsis but does not have to. I call this *the ambiguity approach*.

(82) *Analysis of* (81) *according to the strictly-DP-coordination approach*
Max misses [$_{DP}$ *not* spinach] but [$_{DP}$ chard].

(83) *Multiple analyses of* (81) *according to the ambiguity approach*
a. Max misses [$_{DP}$ *not* spinach] but [$_{DP}$ chard].
b. Max [$_{vP}$ misses *not* spinach] but [$_{vP}$ chard$_i$ ~~misses t$_i$~~].
c. [$_{TP}$ Max misses *not* spinach] but [$_{TP}$ chard$_i$ ~~he misses t$_i$~~].

To adjudicate between these two analyses, we can use an empirical generalization about English coordination that has been confirmed experimentally (e.g., Downing 1970; Wagner 2005, 2010; Wu 2022a; Jeretič 2023; the follow-up experiment reported in Sect. 7.5 of this paper): in coordination, the size of the coordinated constituents is correlated with their prosody. For example, (84a) is coordination of two TPs, while (84b) can involve coordination of two DPs.

(84) a. [$_{TP}$ Lillian will look for Lauren] or [$_{TP}$ she will look for Bella].
b. Lillian will look for [$_{DP}$ Lauren] or [$_{DP}$ Bella] this Saturday.

This difference in syntactic structure is reflected in their prosody: *Lauren* in (84a) is followed by a stronger prosodic boundary than *Lauren* in (84b) (strength of a boundary can be detected durationally, as we will see later). Following this empirical observation that the syntactic size of conjuncts affects prosody, the two syntactic approaches make different predictions about the prosody of (81). The strictly-DP-coordination approach predicts that (81) should have the prosody of DP-coordination.

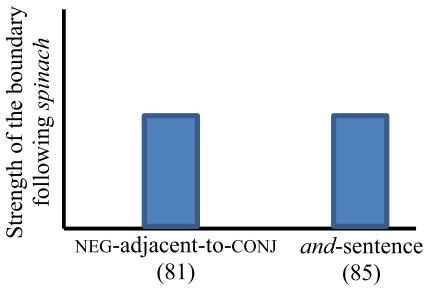


Fig. 1 Prediction of the strictly-DP approach

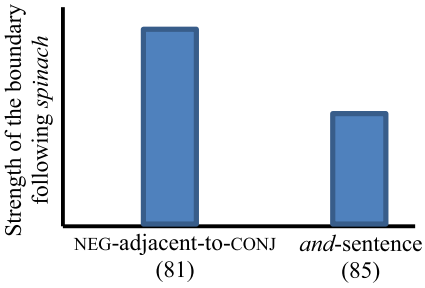


Fig. 2 Prediction of the ambiguity approach

We can test this prediction by comparing the prosody of (81) with that of a sentence that is uncontroversially DP-coordination, such as (85). I use the collective predicate *mix* in (85) to make sure it involves DP-coordination. The strictly-DP-coordination expects the prosodic boundary in (81) to be no different from the boundary in (85) (Fig. 1).

(85) Max doesn't mix spinach and chard.

In contrast, the ambiguity approach claims that (81) can involve vP- and TP-coordination. Suppose that when producing a structurally ambiguous sentence, the speaker chooses any one of the possible parses when saying it. This means that the speaker will sometimes produce (81) as DP-coordination, sometimes as vP-coordination, and other times as TP-coordination. If we can look at many speakers' many productions of (81), and take an "average" of their prosodic realizations across these many instances of production, then the ambiguity approach predicts that on average, the prosodic boundary in (81) should be stronger than that of (85) because of previous findings that coordinated TP has a stronger prosodic boundary than coordinated DP (Fig. 2).

7.2 Competing theories of syntax-prosody mapping and their prosodic predictions for NEG-not-adjacent-to-CONJ

Having discussed the competing syntactic analyses of NEG-adjacent-to-CONJ (81), I now show that the uncontroversial syntactic analysis of NEG-not-adjacent-to-CONJ (86) can in turn shed light on syntax-prosody mapping, the second research question that the prosodic experiment will address.

(86) Max does*n't* miss spinach but chard.

The literature agrees that (86) involves ellipsis but disagrees on the size of the underlying conjunction: Vicente (2010) analyzed it as CP-conjunction plus ellipsis, while Toosarvandani (2013) and I analyze it as vP-coordination plus ellipsis. Due to the evidence presented in Sects. 3.3 and 5, I follow the latter approach here (87). Notice that the vP contains a DP:

(87) *The analysis of (86a)*
Max does [$_{vP}$ not miss spinach] but [$_{vP}$ chard$_i$ ~~miss t$_i$~~].

To my knowledge it has not been studied before how in English, a vP that contains a DP is mapped onto prosody. This is the second research question that this prosodic experiment wants to address (i.e., what sorts of syntactic phrases are mapped onto prosody).

Different theories on syntax-prosody mapping make different predictions about this question. They fall into two types: one that follows the Strict Layer Hypothesis (e.g., Nespor and Vogel 1986; Selkirk 1986; Pierrehumbert and Beckman 1988), and assumes the prosodic structure is flatter than the syntactic structure and not recursive; and the other where the prosodic structure can be recursive and replicate the dominance relations in syntax (e.g., Truckenbrodt 1995, 1999; Selkirk 2009; Wagner 2010; Selkirk 2011; Elfner 2012; Ito and Mester 2013, 2015; Elfner 2015; Bennett et al. 2016). The first type of theories would neutralize the difference between a vP that contains a DP and a syntactic phrase that doesn't dominate any other phrase. The second type would map the vP that contains a DP to a stronger prosodic constituent than a phrase that doesn't dominate any other phrase. For concreteness, I discuss an example theory of each type.

Among the theories that respect the Strict Layer Hypothesis, edge-based theory aligns edges of syntactic maximal projections XPs (i.e., DP and vP in our case) to edges of prosodic constituents. Assuming that English aligns the right edge of DP and vP to the right edge of a phonological phrase (φ), and following versions of edge-based theory that do not allow recursive prosodic structure (i.e., a φ cannot dominate another φ, e.g., Selkirk 1986),[11] *spinach* in (87) would be followed by a single φ-boundary (88) because it is at the right edge of a DP and a vP. Note that the prosodic structure is flatter than the syntactic structure here because the two XP-boundaries correspond to a single φ-boundary.

(88) *Prosodic structure of (87) assigned by edge-based theory*
Max doesn't miss spinach)$_\varphi$ but chard.

Contrast edge-based theory with theories that do allow recursive prosodic structure. For example, Match Theory matches syntactic phrases to φ (e.g., Elfner 2012, 2015), and would assign the following prosodic structure to (87), where *spinach* is at the

[11] There are versions of edge-based theory that do allow for recursivity. For example, Selkirk (1995) and Truckenbrodt (1995, 1999) posited a ban against recursive prosodic structure which is violable. If other constraints dominate this constraint against recursivity, they could lead to recursive prosodic structure. The discussion here applies to edge-based theory (or any theory of syntax-prosody mapping) that bans recursivity in English coordination.

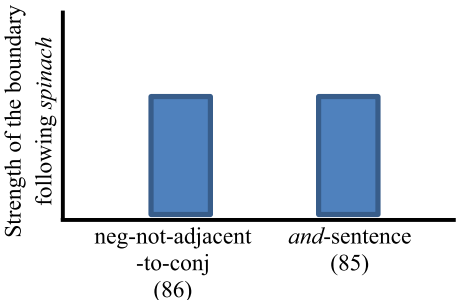


Fig. 3 Prediction of edge-based theory

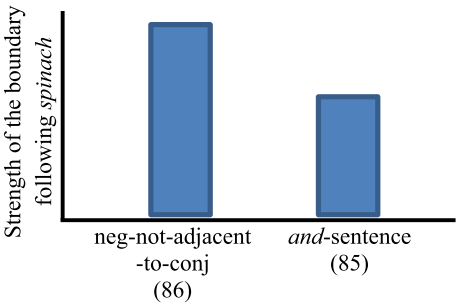


Fig. 4 Prediction of Match Theory

right edge of two φs: one that is mapped from the DP *spinach*, and the other that is mapped from the vP *miss spinach*:

(89) *Prosodic structure of (87) assigned by Match Theory*
Max doesn't miss spinach)$_\varphi$)$_\varphi$ but chard.

We cannot directly compare the predictions of these theories (88) and (89) experimentally, but we can test them by comparing the prosody of NEG-not-adjacent-to-CONJ (86) with an *and*-sentence like (85). Both edge-based theory and Match Theory would assign the following structure to (85) because *spinach* is at the right edge of a DP and no other XP.

(90) *Prosodic structure of (85) assigned by edge-based theory and Match Theory*
Max doesn't mix spinach)$_\varphi$ and chard.

Edge-based theory predicts that the prosodic boundary following *spinach* is roughly the same for (85) and (86) because *spinach* is at the right edge of a φ in both (Fig. 3), while Match Theory puts *spinach* at the right edge of two φs in (86) but only a single φ in (85) (Fig. 4).

The current prosodic experiment aims to test the underlying syntactic structures of the *but*- and *and*-sentences (81), (85), and (86) with prosodic phrasing, using the key assumption that the differences in prosodic phrasing among those sentences can only be affected by syntax.

The reviewers raised three possible confounds that all assume that non-syntactic factors can affect prosodic phrasing in English coordination. Those factors include

plural formation semantics, focus and focus type, and contrastive semantics. I discuss the first confound here and the other two in Sects. 7.4 and 7.5.

A reviewer suggested that the collective *and* in the *and*-sentence in (85) is a plural-forming operator, while *but* and clausal *and* cannot form plurals, and a plural-forming operator may somehow require smaller prosodic boundaries around the conjuncts than non-plural-forming operators. I want to point out that this view on plural-formation is controversial in the semantic literature. It has been claimed that not only can individuals form pluralities (Link 1983), but events (Landman 2000), worlds (Philippe 2002), functions (Gawron and Kehler 2004), and even questions can as well (Beck and Sharvit 2002), leading to Schmitt's (2019) proposal of a cross-categorial plural-forming operator, and Schmitt's (2025) claim that even *or* can form plurals. Since *but* is generally assumed to have the same at-issue meaning as *and*, *but* should in principle be able to form plurals if *and* and *or* can. Therefore, if the plural-forming reading is available in the *and*-sentence in (85), it should be equally available in vP- and clausal coordination by *but*. Furthermore, it has not been empirically tested whether plural formation does lead to smaller prosodic boundaries than Boolean conjunction. I leave this empirical question to future research.

7.3 The experiment

7.3.1 Materials

The speech materials for the experiment consisted of 8 sets of dialogs in 3 conditions (the two corrective *but* types and the *and*-sentence). All the speech materials, including those of the follow-up experiment, are presented in Online Resource. Each target sentence was shown to the subjects along with a leading context sentence and an interlocuter, speaker A's utterance, to elicit the intended information structure in the target sentence, speaker B's utterance. For example, the following materials were presented to the speaker to elicit the target sentences. The *but*-sentences had the same context and speaker A's utterance.

(91) Context: Max has been on an all-meat diet, and misses something in particular. They're debating about what Max misses.
A: Max misses spinach.
B1: He misses not spinach but pears.
B2: He doesn't miss spinach but pears.

(92) Context: Max is particular about his smoothie: he mixes all sorts of ingredients, except a vegetable and a fruit.
A: Which vegetable and which fruit doesn't Max mix?
B: He doesn't mix spinach and pears.

To make sure the difference between the sentences is minimal, I make the *and*-sentence answer to a double *wh*-question rather than a single *wh*-question, so that all the target sentences have the same focus structure and involve double focus. If the question were a single *wh*-question like *What doesn't Max mix?*, its answer (93B) would put focus on the entire conjunction phrase:

(93) A: What doesn't Max mix?
B: Max doesn't mix [spinach and chard]$_F$.

But due to the contrastive nature of the corrective *but* sentences, each conjunct in the *but*-sentences (i.e., *spinach* and *chard*) is focused separately:

(94) a. Max does*n't* miss [spinach]$_F$ but [chard]$_F$.
b. Max misses *not* [spinach]$_F$ but [chard]$_F$.

Comparing a sentence with single focus (93B) with the ones with double focus (91B1&B2) may create a confound, if focus can affect prosodic boundaries. Therefore, to eliminate this confound and make sure that all the target sentences have the same focus structure and put focus on each conjunct, I made the *and*-sentence answer to a double wh-question (92).

The speaker was to read the context silently, and say the dialog in the given order. Every speaker saw all 24 items. There were 100 filler items, which all contained a context, a question, and an answer.

7.3.2 Participants

I conducted a production study with 18 native speakers of North American English (14 female, 4 male, age 19 to 50), who were all university students and working professionals living in Boston, USA, and Oxford, UK. They were remunerated a small sum for their time, and granted their written consent to being tested.

7.3.3 Data collection

Recording took place in two locations. The first was a sound-attenuated booth at the Massachusetts Institute of Technology for 3 of the 18 participants, and the other was a quiet, non-reverberant room at Magdalen College, University of Oxford for the other 15 participants. In both locations, participants were seated in front of a computer, which displayed one context-question-answer trio at a time. The stimuli plus fillers were presented in pseudo-randomized order, and the order of items was different for every participant. Participants were given instructions about the task at the beginning of the experiment, which asked them to first read each trio quietly to themselves, and only proceed to read it out loud when they were ready. They could take as long as they wanted. They were asked to imagine they were playing three different roles in each trio, and to act out the dialogues naturally rather than reading the sentences mechanically. If the participants were not satisfied with their rendition of an item (a common reason was they stumbled over words), they were allowed to say it again. If they asked to repeat an item, I only considered the rendition they were happy with, and discarded the previous renditions.

7.3.4 Data processing and analysis

The recordings were aligned with the Montreal Forced Aligner (McAuliffe et al. 2017), using the pretrained acoustic model English (US) ARPA acoustic model (Gorman et al. 2011), and duration was calculated with the forced-aligned boundaries. I

measured the duration of the last rime of the word immediately before the prosodic boundary (e.g., for the *but*- and *and*-sentences discussed above, (81), (85) and (86), *ach* of *spinach*). I chose this durational measure because as Wightman et al. (1992) showed, the final rime of a word is lengthened before a phrase boundary, and the stronger this boundary, the longer the rime. Thus, the duration of the last rime of *spinach* in (81), (85), and (86) is correlated with the strength of the prosodic boundary following *spinach*.

I fitted a linear mixed effects model, with the duration of the last rime as the dependent variable, and condition as fixed effects. I calculated p-values using Satterthwaite's degrees of freedom method. The model included random intercepts by speaker and item group, and random slope by speaker.

7.3.5 Results

The last rime before *but* in NEG-not-adjacent-to-CONJ sentences (i.e., leftmost box in Fig. 5) is on average 50.6 ms longer than the last rime before *and* in *and*-sentences (i.e., rightmost box in Fig. 5; $p < 0.001$). The last rime before *but* in NEG-adjacent-to-CONJ sentences (i.e., middle box in Fig. 5) is on average 52.7 ms longer than the last rime before *and* in *and*-sentences (i.e., rightmost box in Fig. 5; $p < 0.001$). Finally, the last rime before *but* in NEG-not-adjacent-to-CONJ sentences (i.e., leftmost box in Fig. 5) does not differ significantly in duration from that in NEG-adjacent-to-CONJ sentences (i.e., middle box in Fig. 5). In all the figures in this paper, the top and bottom of the boxes are the 75th and 25th percentiles, and the middle line is the median. The dot is the mean, and the lines above and below it are standard error bars.

7.3.6 Discussion

The durational pattern suggests that the prosodic boundary before *but* does not differ significantly for NEG-not-adjacent-to-CONJ (e.g., (86)) and NEG-adjacent-to-CONJ (e.g., (81)), but those boundaries are larger than the boundary before *and* (e.g., (85)). This is consistent with the ambiguity approach to NEG-adjacent-to-CONJ and mapping theories that allow for recursive prosodic structures. The fact that the prosodic boundary before *but* in NEG-adjacent-to-CONJ is greater than the prosodic boundary before *and* suggests that NEG-adjacent-to-CONJ is structurally ambiguous: it can not only be analyzed as DP-coordination, but also larger coordination with ellipsis. The fact that a vP that contains a DP (i.e., the vP in NEG-not-adjacent-to-CONJ, (86)) corresponds to a stronger prosodic phrase than just a DP (i.e., the DP in the *and*-sentence, (85)) suggests that the prosodic structure is not completely flat. One way to implement this is to allow for recursive φs (i.e., a φ can dominate another φ), and boundary strength depends on the number of φ-levels that a φ dominates.

Before carrying out the experiment, I did not make predictions about the prosodic difference between the two types of corrective *but* sentences (81) and (86) because their prosody depended on the questions that the experiment aimed to test—the syntactic analysis of NEG-adjacent-to-CONJ; and whether the prosodic structure can be recursive. A reviewer asked how to interpret the finding that the prosodic boundary did not differ for NEG-not-adjacent-to-CONJ and NEG-adjacent-to-CONJ, given

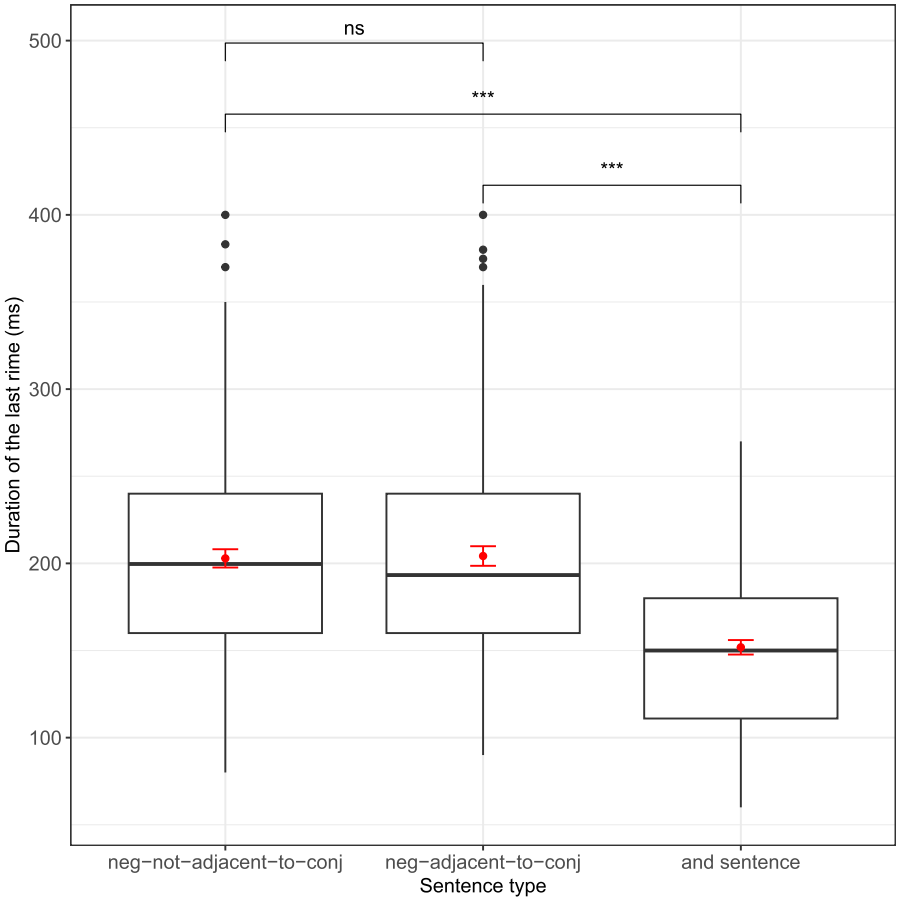


Fig. 5 Duration of the final rime before *but* / *and*

that they have different syntactic analyses. Let us follow my analysis—the NEG-not-adjacent-to-CONJ sentences have only one syntactic parse (i.e., vP-coordination), while the NEG-adjacent-to-conj sentences have multiple possible parses (i.e., DP-, vP- and TP-coordination, where the TP dominates a vP, which then dominates a DP). If this recursive TP is mapped to a stronger φ than the recursive vP, and this recursive vP to a stronger φ than the DP, then we expect the three syntactic parses of NEG-adjacent-to-CONJ to lead to these three prosodic realizations, respectively: a larger prosodic boundary before *but* than NEG-not-adjacent-to-CONJ, roughly the same boundary as NEG-not-adjacent-to-CONJ, and a smaller boundary than NEG-not-adjacent-to-CONJ. My finding is compatible with the idea that when speakers chose to produce a syntactically ambiguous NEG-adjacent-to-CONJ sentence, they produced each parse at chance (or at least the DP-coordination parse was produced as frequently as the TP-coordination parse).

7.4 Experimental analysis of whether focus affects prosodic phrasing in English

I controlled for the focus structure in the experimental materials by putting double focus in the corrective *but* and *and*-sentences, but I did not control for the focus type. Two reviewers asked whether the focus type may affect prosodic boundaries. Specifically, the conjuncts in corrective *but* sentences have corrective focus in Féry's (2013) sense, but the conjuncts in the *and*-sentence answer a *wh*-question and therefore have informational narrow focus. The reviewers suggested an alternative hypothesis, where corrective focus is followed by a larger prosodic boundary than informational narrow focus. If this is the case, then the experimental results may just be due to different focus types, not the underlying syntax of NEG-adjacent-to-CONJ and the recursive nature of the prosodic structure as I have claimed.

This subsection addresses this alterative hypothesis. First, I will explain why this alternative hypothesis, despite having empirical support in some languages, is implausible in English. Then I will present an experimental analysis whose results do not support the alternative hypothesis.

Féry (2013) suggested that corrective focus is "stronger" than informational narrow focus based on languages like Hungarian and Northern Bizkaian Basque. For example, Hungarian has a few different strategies to mark focus, one of which is to put the focused phrase in the preverbal position. This preverbal position is reserved for the strongest focus: if there are multiple foci in a sentence, the strongest focus is preverbal, while the other foci are postverbal. Thus, we expect that in a Hungarian sentence with both corrective focus and informational narrow focus, only the corrective focus can appear preverbally. Féry's (2013) claim was that stronger focus is more likely to be realized with a marked syntactic or prosodic structure, but if the focused phrase is already aligned to the edge of a prosodic domain in the unmarked structure, then a marked structure is unlikely.

Despite such evidence in Hungarian and Basque, it is highly debatable whether focus and focus type can affect the prosodic boundaries at all in English. Féry (2013), for example, predicted that they cannot. She claimed that languages prefer to align the focused phrase to one of the edges of a φ or an intonation phrase (ι), which for Germanic languages is the right edge. Then she argued that English and German cannot freely add or delete phrase boundaries to satisfy this alignment constraint. For example, consider the following dialog, which puts informational narrow focus on the subject *Max*:

(95) A: Who doesn't mix spinach and chard?
B: Max_{F} doesn't mix spinach and chard.

If speakers can freely add phrase boundaries in English, then they could add an ι-boundary immediately after *Max* to align it to its right edge, leading to (96a); PA indicates pitch accent, which in a broad-focus sentence falls on *Max*, *spinach*, and *chard*. But rather than producing (96a), speakers remove the pitch accents on the post-focal material, so that *Max* has the only and final pitch accent in the clause (96b). Using the Optimality Theory framework, Féry accounted for this by ranking the constraint that aligns focus to the right edge of an ι very low in Germanic, so that it does not have to be always satisfied. We can consider English to rank this alignment

constraint at least below the constraint that bans ι-insertion, so that no ι-boundary may be inserted to align the focus to an ι-edge.

(96) a. Max doesn't mix spinach and chard.
PA)$_\iota$ PA PA)$_\iota$
b. Max doesn't mix spinach and chard.
PA)$_\iota$

Notice that all types of narrow focus trigger post-focal de-accenting, including corrective focus. (97B) puts corrective focus on *Max* and *Chris*, and the clauses involve post-focal de-accenting.

(97) A: Max mixes spinach and chard.
B: Max doesn't mix spinach and chard; Chris mixes spinach and chard.
PA)$_\iota$ PA)$_\iota$

Therefore, I will assume that not only informational narrow focus, but even corrective focus cannot affect prosodic phrasing in English. I do not rule out the possibility that corrective focus is prosodically "stronger" than informational narrow focus, but at least that prosodic strength is not reflected in phrasing.

In further support of this, this subsection presents an experimental analysis that found no evidence that focus can affect prosodic phrasing in English, nor evidence that different types of focus lead to different degrees of phrasing. These questions are important not only because they may be a potential confound in the main experiment, but also because they are important questions in their own right to the information-structure-prosody interface: while there is general agreement that focus is realized universally by prominence (e.g., Truckenbrodt 2005; Büring 2009), it is less clear whether focus affects prosodic phrasing. Therefore, I have dedicated this subsection to an experimental analysis that directly investigates the effects of focus and focus type on phrasing.

Since the main experiment was not set up to test this question, I base my analysis on another experiment conducted by Wagner et al. (2010).[12] While this study was not originally intended to test the questions that interest us, its materials vary in their focus structure in ways that are perfect for testing our questions. The following subsections present the method of the experiment, including the materials, participants, and data collection (Sects. 7.4.1 to 7.4.3), which are replicated from Wagner et al. (2010). Then I present how I processed the data (Sect. 7.4.4), the predictions of each question (Sect. 7.4.5), the results (Sect. 7.4.6) and the discussion (Sect. 7.4.7).

7.4.1 Materials

The target sentences of the experiment were ditransitives of the form *Actor only verbed an object to Name* (e.g., *Gramma only gave a bunny to Maryanne*), and I call the object *direct object* (*DO*) and the Name *indirect object* (*IO*). The speech materials consisted of 10 sets of dialogs in 6 conditions, and my analysis will focus

[12] I am grateful to the authors of Wagner et al. (2010), Michael Wagner, Mara Breen, Edward Flemming, Stefanie Shattuck-Hufnagel, and Edward Gibson, for sharing their materials and data with me.

Table 1 Focus structure of Wagner et al.'s (2010) materials by condition

Condition	Direct Object	Indirect Object
1	association-with-*only*	none
2	association-with-*only*	parallel focus
3	none	association-with-*only*
4	parallel focus	association-with-*only*
5	association-with-*only*	association-with-*only*

on 5 of the 6 conditions, and thus only present those. The 5 conditions varied in the focus structure of the DO and the IO along two dimensions: (i) whether the object is focused or not; (ii) whether the focused object associates with *only* (what Féry 2013 called *association-with-only focus*) or has what Féry called *parallel focus* (Table 1). Parallel focus involves contrast of two elements in an implicit or explicit way, and often occurs in parallel or right-node-raising constructions. Féry claimed that parallel focus is stronger than association-with-*only* focus.

The information structure was manipulated with a preceding story and set-up sentence. This story made all the DPs in all the target sentences discourse-salient, and the set-up sentences varied the focus structure of the target sentence. Following is an example set of the 5 conditions. Conditions 1 and 3 put focus on one of the objects, while conditions 2, 4, and 5 put focus on both objects and differ in the type of focus on the objects (marked by F_only and F_parallel, respectively, below). In all the target sentences, all the DPs were disyllabic trochaic words; the verbs were monosyllabic.

(98) *Story:* It was Christmas, and Gramma was deciding what gifts to give to her grandchildren, John and Maryanne. She had knitted two scarves as gifts, and had also purchased a couple of stuffed bunnies. She wrapped up a scarf and a bunny for John. Then she remembered how rude Maryanne had been at Thanksgiving.

a. *Condition 1*
Set-up: Gramma didn't give a scarf to Maryanne.
Target: Gramma only gave a $\text{bunny}_{\text{F\_only}}$ to Maryanne.

b. *Condition 2*
Set-up: Gramma gave a scarf and a bunny to John.
Target: Gramma only gave a $\text{bunny}_{\text{F\_only}}$ to $\text{Maryanne}_{\text{F\_parallel}}$.

(99) *Story:* It was Christmas, and Gramma was deciding what gifts to give to her grandchildren, John and Maryanne. She had knitted two scarves as gifts, and had also purchased a couple of stuffed bunnies. She wrapped up a scarf and a bunny for Maryanne. Then she remembered how rude John had been at Thanksgiving.

a. *Condition 3*
Set-up: Gramma didn't give a bunny to John.
Target: Gramma only gave a bunny to $\text{Maryanne}_{\text{F\_only}}$.

b. *Condition 4*
Set-up: Gramma gave a scarf to both Maryanne and John.
Target: Gramma only gave a bunny$_{\text{F_parallel}}$ to Maryanne$_{\text{F_only}}$.

c. *Condition 5*
Set-up: Gramma didn't give a scarf to Maryanne, and she didn't give either a bunny or a scarf to John.
Target: Gramma only gave a bunny$_{\text{F_only}}$ to Maryanne$_{\text{F_only}}$.

Assuming the syntactic structure of the ditransitive sentence as in (100), under broad focus, Match Theory would put two right φ-edges after *bunny*, which correspond to the right edge of the NP and the DP in (100), respectively. *Maryanne* is at the right edge of the ι that corresponds to the entire sentence.

(100) Gramma [$_{\text{vP}}$ only gave [$_{\text{DP}}$ a [$_{\text{NP}}$ bunny]] to Maryanne].

(101) *Prosodic structure of broad focus*
Gramma only gave a bunny)$_{\varphi}$)$_{\varphi}$ to Maryanne)$_{\iota}$.

I am interested in these two questions: (i) whether the prosodic boundary immediately following the DO may be affected by whether the DO has focus or not; and (ii) whether this prosodic boundary may be affected by whether the DO has association-with-*only* focus or parallel focus. Section 7.4.5 will discuss the detailed predictions of each question.

7.4.2 Participants

The production study had 10 pairs of native English speakers from the MIT community. They received $15 for participating.

7.4.3 Data collection

Two participants (a speaker and a listener) sat in front of two computers in the same room, and could not see the other person's screen. On each trial, the speaker first read the story, set-up and target quietly, and then did a picture selection task to make sure they had understood the context and the target sentence correctly. Then the speaker produced the set-up and target out-loud for the listener, who did the same picture selection task. A participant was the speaker for half the trials, then roles were switched. Trials where the listener chose the wrong picture or the productions were disfluent were excluded from the analysis.

7.4.4 Data processing and analysis

The recordings were aligned with the Montreal Forced Aligner (McAuliffe et al. 2017), using the pretrained acoustic model English (US) ARPA acoustic model (Gorman et al. 2011), and duration was calculated with the forced-aligned boundaries. I measured the duration of the last rime of the DO (e.g., for the example sentences above, (98)–(99), *y* of *bunny*), as a measure of the strength of the prosodic boundary immediately following the DO.

I fitted two linear mixed effects models, with the duration of the last rime of the DO as the dependent variable, and focus structure (only-focus-on-DO; only-focus-on-IO; double-focus, to be explained in the next subsection) as fixed effects in one model, and focus type (DO_only, IO_parallel (condition 2); DO_parallel, IO_only (condition 4); DO_only, IO_only (condition 5)) as fixed effects in the other. I calculated p-values using Satterthwaite's degrees of freedom method. The model included random intercepts by speaker and item group, and random slope by speaker.

7.4.5 Predictions

I want to test two different questions. First, to test whether focus can affect prosodic phrasing, I examine the prosodic boundary following the DO, and compare condition 1, where only the DO has focus (I call this *only-focus-on-DO*), with condition 3, where only the IO has focus (I call this *only-focus-on-IO*), and conditions 2, 4, and 5, where both the DO and the IO have focus (I call this *double-focus*). Following Féry's (2013) claim that languages prefer to align focus to the right edge of a φ and an ι, if English can insert ι-boundaries to satisfy this requirement, then we would expect that under double focus, an ι-boundary is inserted after *bunny* to align both *bunny* and *Maryanne* to the right edge of an ι:

(102) *Prosodic structure of double-focus if focus can lead to ι − insertion*
Gramma only gave a bunny)$_{\varphi}$)$_{\varphi}$)$_{\iota}$ to Maryanne)$_{\iota}$.

On the other hand, if focus cannot affect prosodic phrasing in English, then double-focus should have the same phrasing as a broad-focus sentence:

(103) *Prosodic structure of double-focus if focus cannot affect prosodic phrasing*
Gramma only gave a bunny)$_{\varphi}$)$_{\varphi}$ to Maryanne)$_{\iota}$.

The prosodic phrasing of only-focus-on-IO should be the same as the phrasing under broad focus because all the material before the IO is pre-nuclear and pre-focal, and the narrowly-focused IO is aligned to the right edge of an ι by default due to being sentence-final:

(104) *Prosodic structure of only-focus-on-IO*
Gramma only gave a bunny)$_{\varphi}$)$_{\varphi}$ to Maryanne)$_{\iota}$.

Different theories make different predictions about the prosodic phrasing of only-focus-on-DO. Following Féry's (2013) constraint that focus must be aligned to the right edge of an ι, and assuming this constraint is ranked higher than the ban on ι-insertion, we would expect an ι-boundary to be inserted after the DO:

(105) *Prosodic structure of only-focus-on-DO if focus can lead to ι − insertion*
Gramma only gave a bunny)$_{\varphi}$)$_{\varphi}$)$_{\iota}$ to Maryanne)$_{\iota}$.

If ι-boundaries cannot be inserted freely to align focus to the ι-edge, then we would expect the phrasing in only-focus-on-DO to be the same as the phrasing under broad focus:

(106) *Prosodic structure of only-focus-on-DO if focus cannot affect prosodic phrasing*
Gramma only gave a bunny)$_{\varphi}$)$_{\varphi}$ to Maryanne)$_{\iota}$.

There is another type of theories that would actually predict removal of the φ-boundaries after the DO (e.g., Beckman 1996). These theories claimed that every intermediate phrase (which we can consider to be roughly equivalent to a φ) has a head, and this head's prominence is *given* by a pitch accent. These theories therefore implied that every φ must have at least one pitch accent. In only-focus-on-DO, the material after the DO is usually de-accented. Because there is no accent in the post-DO region, these theories would predict that there should be no φ-phrasing in this area, either, leading to de-phrasing after the DO:

(107) *Prosodic structure of only-focus-on-DO if focus can lead to φ − removal*
Gramma only gave a bunny to Maryanne)$_{\iota}$.

Thus, if focus cannot affect prosodic phrasing, then we would expect the prosodic boundary following the DO to be the same for all three sentence types–only-focus-on-DO, only-focus-on-IO and double-focus. If focus can affect prosodic phrasing, then we would expect this prosodic boundary to be stronger in double-focus than only-focus-on-IO, and this boundary to be stronger or weaker in only-focus-on-DO than only-focus-on-IO, depending on whether we think focus on DO can lead to ι-insertion or post-focal φ-removal.

Having laid out the predictions of the first question, I turn to the second one—whether the prosodic boundary following the DO can be affected by the type of focus on the DO. This requires comparing the double-focus conditions: condition 2, with the association-with-*only* focus on the DO and parallel focus on the IO; condition 4, with the reverse configuration, parallel focus on the DO, and association-with-*only* focus on the IO; and condition 5, with association-with-*only* focus on both the DO and the IO.

If focus type cannot affect phrasing, then we expect the prosodic boundary following the DO to be no different for these three conditions. But if focus type can affect phrasing, and parallel focus should somehow be aligned to a stronger boundary than association-with-*only* focus, then we expect the prosodic boundary following the DO to be stronger in condition 4 than in conditions 2 and 5.

7.4.6 Results

There was not any significant difference in the duration of the last rime of the DO between only-focus-on-DO, only-focus-on-IO and double-focus (Fig. 6). Neither was there any significant difference in the rime duration between conditions 2, 4, and 5 (Fig. 7).

7.4.7 Discussion

The durational pattern suggests that the prosodic boundary following the DO does not differ significantly for only-focus-on-DO, only-focus-on-IO and double-focus,

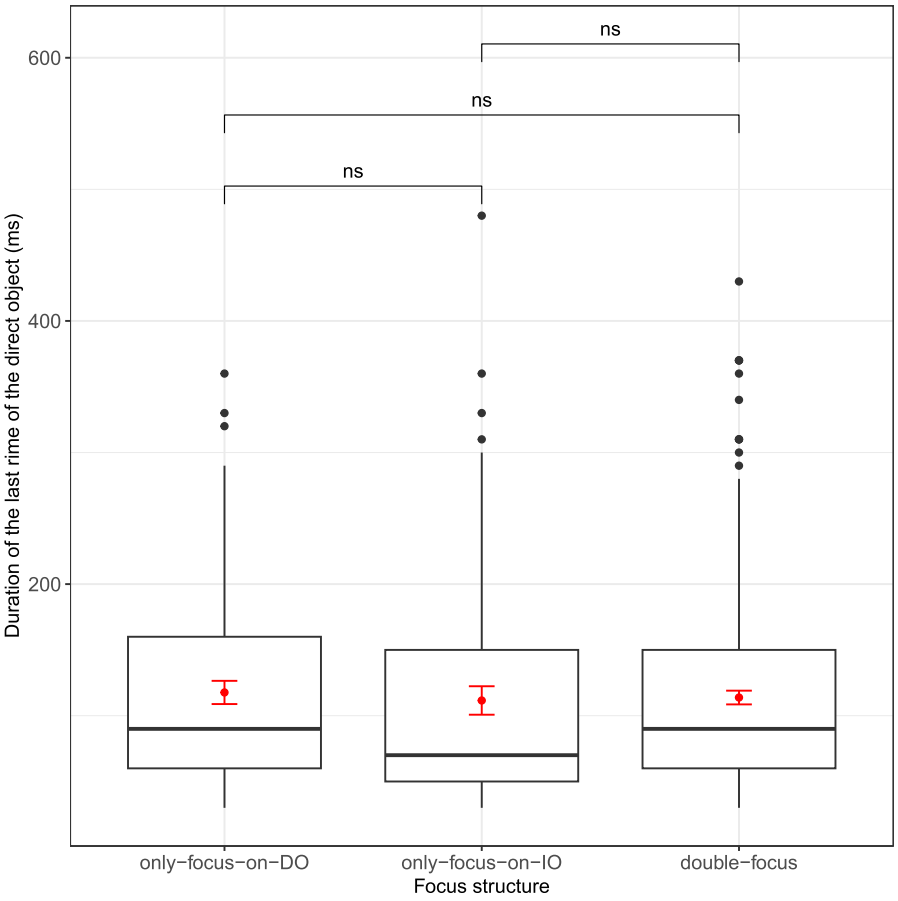


Fig. 6 Duration of the final rime of the DO

and thus there is no evidence on whether the focus on DO can affect the prosodic phrasing following the DO. The fact that the prosodic boundary following the DO does not differ for conditions 2, 4, and 5 suggests that the type of focus on the DO does not affect the prosodic phrasing following the DO. Thus, there is no evidence that focus or focus type can affect the prosodic boundaries in English coordination, suggesting that besides syntax, very few factors may affect prosodic phrasing in English.

7.5 Follow-up experiment comparing and-sentences and but-sentences

Having addressed the reviewers' concern about a potential confound, this subsection addresses the other confound raised by a reviewer: perhaps *but* is always preceded by a larger prosodic boundary than *and*. The reviewer's idea was that *but* triggers a larger prosodic boundary because the contrastive discourse coherence relation represented

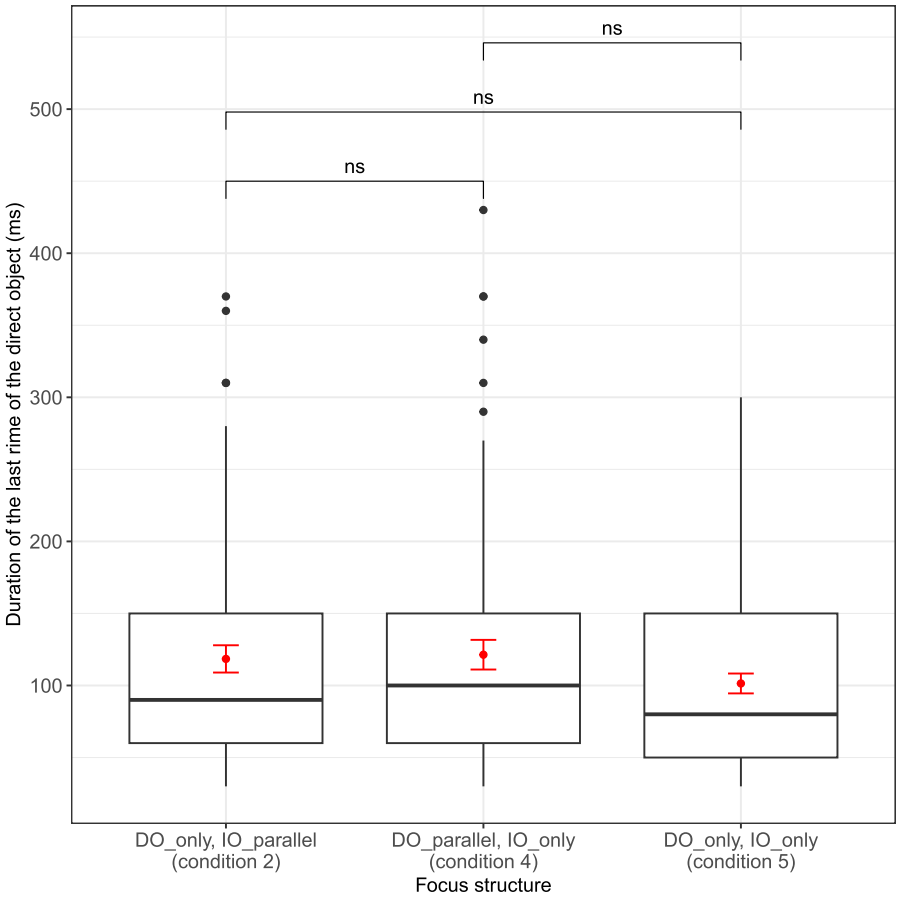


Fig. 7 Duration of the final rime of the DO

by *but* leads to a larger prosodic boundary. If this is the case, then the results of the main experiment may just be due to the prosodic difference between *but* and *and*. Following the reviewer's suggestion, I have conducted a follow-up experiment that tests whether *but* is preceded by a larger prosodic boundary than *and*, and present this experiment in this subsection.

7.5.1 Materials

The speech materials for the follow-up experiment consisted of 32 sets of dialogs in 3 conditions. The three conditions were *and*-sentence with DP-coordination (108B1), *and*-sentence with TP-coordination (108B2), and *but*-sentence with TP-coordination (108B3). The dialogs had the same structure as those in the main experiment, including a leading context sentence, speaker A's utterance, and the target sentence, speaker B's utterance. (108B1-3) had the same context and question (108A).

(108) Context: They are talking about the dinner party last night.
A: What happened?
B1: Max doesn't mix spinach and pears in his cooking.
B2: Max doesn't eat spinach and they didn't cook it.
B3: Max doesn't eat spinach but they still prepared it.

Like in the main experiment, the speaker was to read the context silently, and say the dialog in the given order. Every speaker saw all 96 items. There were 80 filler items, which all contained a context, a question and an answer.

The fact that (108B1) involves DP-coordination by *and* (109a), but (108B2) TP-coordination by *and* (109b), leads us to expect a stronger prosodic boundary following *spinach* in (108B2) than in (108B1) because a TP corresponds to a larger prosodic boundary than a DP. Thus, (108B1) and (108B2) provide a "sanity check" that syntactic size does affect prosodic size.

(109) a. Max doesn't mix [$_{DP}$ spinach] and [$_{DP}$ pears] in his cooking.
b. [$_{TP}$ Max doesn't eat spinach] and [$_{TP}$ they didn't cook it].
c. [$_{TP}$ Max doesn't eat spinach] but [$_{TP}$ they still prepared it].

The reviewer's hypothesis is tested by (108B2) and (108B3). Both sentences involve TP-coordination, and they differ in the coordinator, which represents different discourse coherence relations between the clauses–result in (108B2) and contrast in (108B3). If the contrastive discourse coherence relation represented by *but* leads to a larger prosodic boundary than non-contrastive relations as the reviewer suggested, we would expect a stronger prosodic boundary following *spinach* in (108B3) than (108B2). Otherwise, we do not expect the prosodic boundary to differ between (108B2) and (108B3). Since (108B3) involves TP-coordination, we expect it to have a stronger prosodic boundary than (108B1) if syntax affects prosody.

But in the third condition (108B3) is not corrective, but counterexpectational. It is difficult to put corrective *but* in the third condition because the experimental setup requires *but*-sentences with TP-coordination, and it is difficult to find unambiguously TP-coordination by corrective *but*. Thus, I have used counterexpectational *but* in the third condition instead. This should not affect the experiment because the reviewer's hypothesis is that contrastive relations lead to stronger prosodic boundaries, and counterexpectational *but* is widely assumed to cue contrast in discourse coherence theories (e.g., Lascarides and Asher 2007).

7.5.2 Participants

There were 12 native speakers of North American English (6 female, 6 male, age 20 to 33), who were all university students and working professionals living in Oxford, UK. They were remunerated a small sum for their time, and granted their written consent to being tested.

7.5.3 Data collection, processing, and analysis

The setup of the follow-up experiment was identical to the setup of the main experiment. It took place in a quiet, non-reverberant room at Magdalen College, University

of Oxford. Like in the main experiment, the recordings were aligned with the Montreal Forced Aligner (McAuliffe et al. 2017), using the pretrained acoustic model English (US) ARPA acoustic model (Gorman et al. 2011), and duration was calculated with the forced-aligned boundaries. I measured the duration of the last rime of the word immediately before the prosodic boundary (e.g., for the target sentences discussed above, (108B1-3), *ach* of *spinach*).

I fitted a linear mixed effects model, with the duration of the last rime as the dependent variable, and condition as fixed effects. I calculated p-values using Satterthwaite's degrees of freedom method. The model included random intercepts by speaker and item group, and random slope by speaker.

7.5.4 Results

The last rime before *and* is on average 35.5 ms longer in *and*-sentences with TP-conjunction (i.e., middle box in Fig. 8) than in *and*-sentences with DP-conjunction (i.e., leftmost box in Fig. 8; $p < 0.01$). The last rime before *but* (i.e., rightmost box in Fig. 8) is on average 47.5 ms longer than the last rime before *and* in *and*-sentences with DP-conjunction (i.e., leftmost box in Fig. 8; $p < 0.01$). The last rime before *and* in *and*-sentences with TP-conjunction (i.e., middle box in Fig. 8) does not differ significantly in duration from the last rime before *but* (i.e., rightmost box in Fig. 8).

7.5.5 Discussion

And- and *but*-sentences with TP-conjunction involve a stronger prosodic boundary than sentences with DP-conjunction, reaffirming the close correspondence between syntax and prosody. Keeping syntax constant, *but* is not preceded by a stronger prosodic boundary than *and*. This does not support the reviewer's alternative hypothesis.

To summarize, this section has provided arguments based on a prosodic experiment that NEG-adjacent-to-CONJ may involve ellipsis, and that the prosodic structure can be recursive. These arguments crucially assume that very few factors besides syntactic structure may affect prosodic phrasing in English coordination. I have excluded two factors with follow-up experimental analyses, and argued that focus and focus type, and discourse coherence relations cannot affect prosodic phrasing.

8 Conclusion

This paper has proposed an analysis for corrective *but* sentences that involves ellipsis and two positions for negation. Ellipsis creates the illusion that negation is higher than it actually is (NEG-not-adjacent-to-CONJ). NEG-adjacent-to-CONJ has multiple analyses, leading to possible ambiguity: an analysis without ellipsis, which derives the surface scope of negation and conjunction, and analyses with ellipsis, which derive higher scope of negation and conjunction than their surface positions. In contrast, negation and conjunction take scope at their surface positions in NEG-not-adjacent-to-CONJ. Furthermore, negation has two positions in a corrective *but* sentence, with

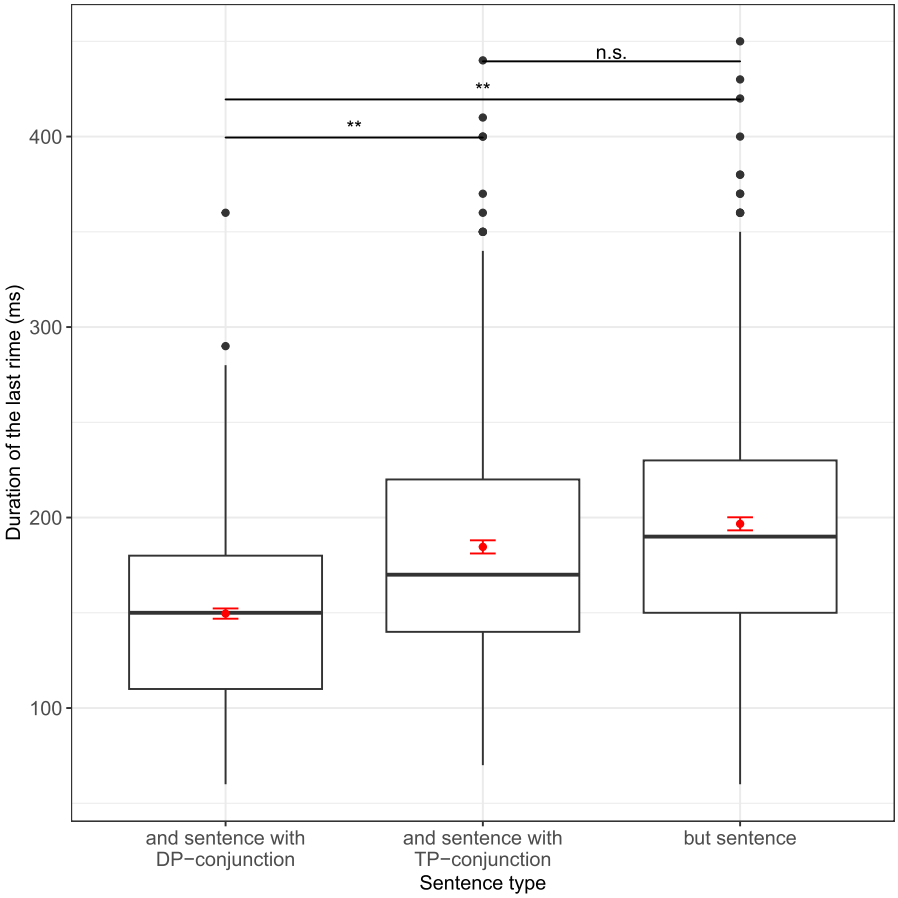


Fig. 8 Duration of the final rime before *but* / *and*

the higher position being the daughter of the first conjunct. Either position of negation can be pronounced, but only the higher position is interpreted as actual negation. The lower position must c-command the leftmost focus, making negation a focus-sensitive operator.

My analysis differs from Vicente's (2010) and Toosarvandani's (2013) analyses of corrective *but* sentences, but also overlaps with them in some parts.

Table 2 summarizes their analyses and is partly replicated from Toosarvandani (2013).

I agree with Vicente that (1) and (14b) involve ellipsis, but disagree on the size of the underlying coordination. I agree with Toosarvandani that corrective *but* can coordinate subclauses (e.g., (6) and (15b)), but argue that (6) is in fact structurally ambiguous. We also disagree on the analytical division of corrective *but* sentences. For Toosarvandani, sentences with sentence negation should have a different analysis from those with constituent negation, but I think the right way to divide corrective

Table 2 Comparison of Vicente (2010), Toosarvandani (2013), and the current proposal

	Vicente 2010	Toosarvandani 2013	My analysis
(1)	• CP-coordination with ellipsis: [$_{CP}$ Max does*n't* eat spinach] but [$_{CP}$ chard$_i$ [$_{TP}$ ~~Max eats t$_i$~~]].	• vP-coordination with ellipsis: Max does [$_{vP}$ *not* eat spinach] but [$_{vP}$ chard$_i$ [~~eat t$_i$~~]].	• vP-coordination with ellipsis: Max does [$_{vP}$ *not* eat spinach] but [$_{vP}$ chard$_i$ [~~eat t$_i$~~]].
(6)	?	• DP-coordination with no ellipsis: Max eats [$_{DP}$ *not* spinach] but [$_{DP}$ chard].	Multiple possible analyses: • DP-coordination with no ellipsis: Max eats [$_{DP}$ *not* spinach] but [$_{DP}$ chard]. • vP-coordination with ellipsis: Max [$_{vP}$ <not> eats *not* spinach] but [$_{vP}$ chard$_i$ [~~eat t$_i$~~]]. • TP-coordination with ellipsis: [$_{TP}$ <not> Max eats *not* spinach] but [$_{TP}$ chard$_i$ [~~he eats t$_i$~~]].
(14b)	• CP-coordination with ellipsis: [$_{CP}$ Max does*n't* buy spinach] but [$_{CP}$ [grows it]$_i$ [$_{TP}$ ~~Max t$_i$~~]].	• CP-coordination with ellipsis: [$_{CP}$ Max does*n't* buy spinach] but [$_{CP}$ [grows it]$_i$ [$_{TP}$ ~~Max t$_i$~~]].	Multiple possible analyses: • vP-coordination with no ellipsis: Max does*n't* [$_{vP}$ buy spinach] but [$_{vP}$ [grows it]. • CP-coordination with ellipsis: [$_{CP}$ Max does*n't* buy spinach] but [$_{CP}$ [grows it]$_i$ [$_{TP}$ ~~Max t$_i$~~]].
(15b)	?	?	• DP-coordination with ellipsis: He met [$_{DP}$ *not* a friend of a linguist] but [$_{DP}$ [of a philosopher]$_i$ ~~a friend t$_i$~~].

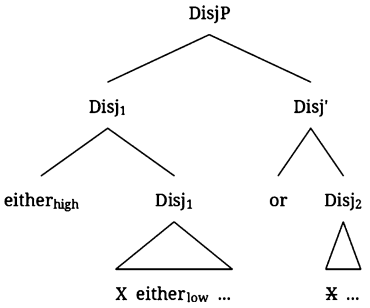
but sentences is the surface position of negation relative to the apparent conjunction (i.e., NEG-not-adjacent-to-CONJ vs. NEG-adjacent-to-CONJ).

My analysis echoes previous proposals for focus-sensitive operators, such as the Question-particle and *only* (e.g., Lee 1999; Cable 2007; Hole 2015; Hirsch 2017; Hole 2017; Quek and Hirsch 2017; Bayer 2018; Wu 2022b), which posit two positions for the operator. This suggests that all focus-sensitive operators, as is exemplified by negation, may have two positions in a sentence. Furthermore, this paper has demonstrated the mutual reinforcement of syntactic theory and prosodic experimentation: on the one hand, we can draw evidence for syntactic theories from prosodic experiments, and on the other hand syntactic theories lay the foundation for investigations of syntax-prosody mapping. The following two subsections compare corrective *but* sentences with *either* ... *or* ... and negative concord respectively.

8.1 Comparison with either ... or ...

My analysis of negation ... *but* ... is almost identical to Wu's (2022b) analysis of *either* ... *or* ..., which also posited two positions for *either*, with the lower position c-commanding the leftmost focus in the Disjunction Phrase (DisjP), and the higher position being the daughter of the DisjP or the first disjunct:

(110) *Wu's (2022b) analysis of* either … or …



Either behaves like negation in all the relevant tests discussed in this paper, many of which are replicated from Wu (2022b). For example, there are *either*-adjacent-to-disj(unction) (which Wu called *either*-seems-normal) (111) and *either*-not-adjacent-to-DISJ (which Wu called *either*-seems-high (112)). Larson (1985) observed that in *either*-adjacent-to-DISJ sentences, disjunction can take scope above *either*'s surface position (readings 1 and 2 below), while in *either*-not-adjacent-to-DISJ sentences, the scope of disjunction is frozen at *either*'s surface position (only reading 2):

(111) Mary is looking for either a maid or a cook. *Either-adjacent-to-DISJ*
✓Reading 1: Mary is trying to find a servant and would be satisfied with any individual meeting the description 'x is a maid or x is a cook'.
✓Reading 2: Mary is trying to find a maid, or she is trying to find a cook (highlighted by the continuation to (111) … *but I don't know which*.)
(Larson 1985:220)

(112) Mary is either looking for a maid or a cook. *Either-not-adjacent-to-DISJ*
*Reading 1
✓Reading 2

Either … or … and corrective *but* sentences are not entirely identical: corrective *but* sentences are more restricted than *either … or …* sentences. There is a type of sentences called *either*-seems-low (113), where *either* appears to be embedded in the first disjunct, but there is no NEG-seems-low (114).

(113) *Either-seems-low*
a. [$_{\text{DisjP}}$ [Max will *either* eat spinach] or [he will eat chard]].
b. Max [$_{\text{DisjP}}$ [*either* will eat spinach] or [he will eat chard].

(114) *NEG-seems-low*
a. [$_{\text{ConjP}}$ [Max will *not* eat spinach] but [he will eat chard]].
b. *Max will [$_{\text{ConjP}}$ [eat *not* spinach] but [eat chard].
c. *[$_{\text{ConjP}}$ [Max will eat *not* spinach] but [he will eat chard].

The observation by Anscombre and Ducrot (1977) and Horn (2001) is that a sentence like (114a) may be grammatical, but it does not have the corrective meaning. Instead, it can only be counterexpectational, and imply that based on the first conjunct (i.e.,

Max will not eat spinach), we normally expect the opposite of the second conjunct (i.e., Max will not eat chard). The corrective meaning crucially does not require this implication. Thus, I assume that there is no NEG-seems-low for corrective *but* sentences.

To account for the absence of NEG-seems-low, I claim that if clausal ellipsis can apply in the second conjunct of corrective *but*, then it must apply. Notice that not only is there no NEG-seems-low, but it is also ungrammatical to not elide when ellipsis is licensed:

(115) Max will [$_{\text{ConjP}}$ [*not* eat spinach] but [(*eat) chard]].

It is worth mentioning that my generalization only applies to the clausal ellipsis in the sister of *but*. Corrective *but* does not care if there is further ellipsis in the remnant:

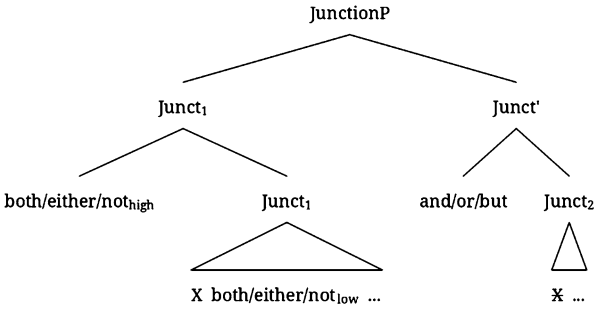
(116) a. Max will buy [*not* four cars] but [three (cars)].
b. Max does[*n't* expect Chris to win] but [Kim (to win)].

That corrective *but* in English requires ellipsis has also been Horn's (2001) description. Anscombre and Ducrot (1977) claimed that corrective 'but' sentences in French also require ellipsis; this holds in Hebrew as well (Danny Fox, p.c.). The only language that I know of where corrective 'but' does not allow ellipsis is Persian (Toosarvandani 2010).

Following Merchant (2001), ellipsis of a phrase is triggered by the [E](llipsis) feature on the sister of this phrase. Furthermore, suppose a [+E] head requires that if the licensing conditions on the ellipsis of its sister are met, ellipsis must occur; but if the licensing conditions are not met, then there is no ellipsis. In other words, clauses without ellipsis can have the [+E] feature, as long as the licensing conditions are not met. Then we can account for this generalization by saying that corrective *but* selects for a complement with [+E] feature, while *or* does not care about the [E]-value of its complement.

Except for the lack of NEG-seems-low, negation's identical behavior to *either* may lead us to think that negation offers no new insight beyond what we already know about *either*, but actually negation can teach us something that *either* cannot. The data on *either* ... *or* ... were compatible with two possible positions of high *either*: the daughter of the Disjunction Phrase as Wu (2022b) argued, or the daughter of the first disjunct as she mentioned in her footnote 19. The evidence on *either* discussed by Wu (2022b) could not pinpoint the precise position of *either*, but negation's scope, which is limited to the first conjunct, locates negation in the daughter position of the first conjunct. Assuming that *either* has the same positions as negation, we could imply that high *either* may also be the daughter of the first disjunct. I extend this analysis to other first coordinators like *both* and potentially first coordinators across languages, and hypothesize that perhaps all first coordinators have two positions, with the higher position being the daughter of the first junct, and the lower position being deeply embedded inside the first junct. Their positions may be obscured by ellipsis in the second junct:

(12) *My generalized analysis of coordination*



A reviewer noted that while there is general agreement that *either* ... *or* ... is correlative coordination, my claim that negation ... *but* ... is correlative coordination may be surprising because negation and *but* are usually viewed as independent from each other. I want to point out that *either* also has other uses that are independent from *or*: for example, *either* can be a quantifier (e.g., *Max will eat either vegetable*) or an additive particle (e.g., *Max won't eat spinach, either*).

Perhaps what contributes to the appearance that negation and *but* are distinct independent operators is their distinct meanings in corrective *but* sentences. In work in progress, I have suggested that negation presupposes that there is a true alternative proposition. In contrast, maybe corrective *but* presupposes that there is no true alternative proposition (i.e., it entails an 'only'-like meaning), thus negation and *but* have opposite meanings. In support of my speculation that corrective *but* has an exhaustive meaning, when a corrective *but* sentence involves more than two conjuncts, *not* is repeated but not *but*:

(117) a. John will eat not rice not beans but potatoes.
b. #John will eat not rice but beans but potatoes.

I argue that (117b) is odd for the same reason why it is infelicitous to have two *only*s (#*John will only eat beans; he will only eat potatoes*.)—the second *but*-phrase violates the first *but*'s presupposition that no other alternative proposition is true, and the first *but*-phrase also violates the second *but*'s presupposition. Multiple negations are fine in (117a) because negation only presupposes that there is a true alternative, and does not care how many false alternatives there are. My hypothesis predicts that it is odd to say *John will eat not rice but beans; he will also eat potatoes* in the same way that it is odd to say *John will only eat rice; he will also eat potatoes*. Judgments here are quite delicate, and I leave their investigation to future research.

In contrast to *not* ... *but* ..., perhaps *either* and *or* have very similar meanings, maybe even identical meaning: perhaps they both presuppose that an alternative proposition may be true. Their identical meaning may be the reason why many languages use the same operator for 'either' and 'or' (e.g., *soit* ... *soit* ... in French and *o* ... *o* ... in Italian and Spanish). The opposite meanings of negation and *but*, and the similar meanings of *either* and *or* may lead to the impression that the former two operators are independent while the latter two are dependent on each other, but syntactically speaking, they are all deeply connected to each other.

Having noted that negation and *either* have other uses that are related in meaning to the negation and *either* discussed here, I should add a caveat that my syntactic and semantic proposal only applies to the negation in corrective *but* sentences and *either* in *either* … *or* … sentences, but not their other uses. For example, I do not expect that all uses of negation have the same focus-sensitive meaning as the negation in corrective *but* sentences. Furthermore, we do not expect the non-coordinator uses of negation to be identical to the non-coordinator uses of *either*. For example, as a reviewer pointed out, … *but not* … is fine, but not … *or either* …. Likewise, negation cannot be a quantifier (e.g., **Max will eat not vegetable*) or an additive particle (e.g., *Max won't eat spinach, not*), but *either* can. Exactly what other uses these coordinators may have, and how they relate to the coordinator use are interesting questions but beyond the scope of this paper.

8.2 Comparison with negative concord

The two positions of negation I have proposed here bear similarity to negative concord. This section compares my analysis of corrective *but* sentences with Zeijlstra's (2004, 2008, 2011, 2012) analysis of negative concord. In Romance and Slavic, negative words that can create a negative meaning in isolation (e.g., *nikido* and *ne* in Czech) nevertheless lead to just a single semantic negation when co-occurring:[13]

(118) a. Dnes nikdo *(ne)volá.
Today nobody NEG.calls
'Today nobody is calling.'
b. Milan nevidi nikoho.
Milan NEG.sees nobody
'Milan doesn't see anybody.'
c. Dnes nikdo *(ne)volá nikomu.
Today nobody NEG.calls nobody
'Today nobody is calling anybody.' (Zeijlstra 2012:501)

Zeijlstra argued that all the negative words in (118) (which I call *negative concord items* or *NCIs*) have uninterpretable negative feature, and need to agree with covert semantic negation that is located high in the clause (e.g., <NEG> in (119)) in order to be licensed. This covert negation has interpretable negative feature, and c-commands all these NCIs.

(119) *Zeijlstra's analysis of (118c)*
[Dnes <NEG>$_{[iNEG]}$ [$_{TP}$ nikdo$_{[uNEG]}$ nevol$_{[uNEG]}$ nikoho$_{[uNEG]}$]]

Negative concord is similar to my analysis of negation here because in negative concord, semantic negation is covert and structurally higher than the NCIs, which appear to be negative but are semantically non-negative. Despite this similarity, I want to point out four differences between negative concord and negation in corrective *but*. First, Zeijlstra claimed that the position of semantic negation is fixed—very high in what he called Strict Negative Concord languages like Czech, and very high or in

[13] I follow Leipzig glossing conventions with the following abbreviation: NEG negation.

the middlefield above the auxiliary in what he called Non-strict Negative Concord languages like Spanish or Italian. But in corrective *but* sentences, high negation's structural position is very flexible. Because high negation is the daughter of the first conjunct, its structural height is correlated with the size of the conjunct: it can be very high (e.g., above TP) if the conjunct is large, and quite low (e.g., below VP) if the conjunct is small. Second, NCIs can stack as in (118), but there is only evidence for a single high negation and a single low negation in corrective *but* sentences. Third, according to Zeijlstra, NCIs are indefinites, but low negation in corrective *but* is semantically vacuous. Finally, as a reviewer pointed out, NCIs are not focus-sensitive, but low negation is. Given these differences between negation and negative concord, I leave to future research whether low negation in corrective *but* sentences can be considered to be an NCI.

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Declarations

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