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That-trace effects are yet to be explained away: challenges for prosody-based accounts

Luis Miguel Toquero-Pérez
University of Southern California
Department of Linguistics
toquerop@usc.edu

Abstract   *That-trace* effects in English have been treated as violations of prosodic well-formedness conditions (Kandybowicz 2006a; Sato & Dobashi 20160): the C head and the trace cannot be parsed in the same prosodic phrase. Satisfying this condition allows for amelioration effects induced by sentitial adverbs and narrow focus on the embedded verb. However, I argue that a [C *t*] prosodic parse should never be predicted since it goes against the Lexical Category Conditon (Truckenbrodt 1999) or Prosodic Vacuity (Kandybowicz 2015): function words always require a (lexical) host in the Phonological Phrase they belong to. On the one hand, I provide a set of empirical arguments based on the phrasing of subject pronouns and relative clauses, and the availability of certain phonological processes. Besides, I question the application of the focus rules and their corresponding phrasing to get the desired amelioration. On the other, I question the assumption that traces are important for the system of prosodic phrasing. In fact, the system should not have access to traces at all assuming if occurs late at PF after Vocabulary Insertion.

1   Introduction

That-trace effects refer to the unacceptability of a configuration where a complementizer "immediately precedes" the trace or copy of a moved subject, as in (1)

(1)   * Who did you say that *t* wrote *Good Omens*?

Despite there being a whole body of literature addressing the phenomenon since Perlmutter (1968), it remains a problem to this day what is the best analysis to derive the effects. Some proposals argue for syntactically ill-formedness, i.e. a constraint making reference to the hierarchical structure of the clause (see Pesetsky (2017) for a detailed overview on the phenomenon). On top of the early ECP accounts based on government (Pesetsky 1982; 1995; Rizzi 1982; Culicover 1993a;b), some have recently argued that the effects can be explained if there is an antilocality constraint (Erlewine 2016; 2020; Brillman & Hirsch 2016; Toquero-Pérez 2020) according to which movement from Spec,TP to Spec,CP is too short (i.e. it does not cross enough projections).

There are also amelioration effects that improve the acceptability of sentences with an overt complementizer and a subject trace. The most common one is the "adverb effect" originally spotted by Bresnan (1977: 194, fn.6) and rediscovered by (Culicover 1993a). This consists on inserting an adverbial that breaks the linear adjacency between the C head and the trace, as in (2). The syntactic accounts mentioned above based on antilocality predict the amelioration assuming that the adverbial is adjoined to a functional projection above the TP (Browning 1996), and this makes the movement "long enough" bypassing antilocality.

(2)   ? Who did you say that for **all intents and purposes** t wrote *Good Omens*?

In addition to this ameliorating effect, Kandybowicz (2006a: 221-222) claims that there are other mitigating effects that are due to prosody. Among these, narrow focus on the embedded verb (3) and C-auxiliary contraction (4) are supposed to improve the acceptability of a sentence with *that-trace* effects:

(3)   ? I know you don't know who filmed it, but who did you say that t WROTE *Good Omens*?

(4)   ? Who did you say that'll t write *Good Omens*?

Data like (3) and (4), assuming they are acceptable,[1] present serious challenges for purely syntactic accounts: no obvious change in the syntactic structure seems to have occurred that would explain the amelioration. Thus, (3) and (4) make prosody-based accounts appealing.

Nevertheless, despite the fact that these two prosodic approaches apparently derive the facts in an elegant fashion, I would like to point out there are some overlooked challenges that are worth calling attention to. In this squib, I will review two recent prosody-based accounts, i.e. Kandybowicz (2006a) and Sato & Dobashi (2016), and I will raise two sets of concerns: one of them is empirical and is related to the mappings created by the syntax-prosody algorithm if constraints like the Lexical Category Condition (Truckenbrodt 1999) or Prosodic Vacuity (Kandybowicz 2015) are operative in the grammar, as is assumed at least by Sato & Dobashi (2016); the other is conceptual and focuses on the accessibility that the prosodic phrasing algorithm has to traces. The squib is organized as follows: section 2 overviews the two mentioned proposals; section 3 discusses the first set of observations; section 4 briefly presents the conceptual argument against the two mentioned approaches; section 5 concludes the squib.

2   Prosody-based accounts

In this section, I summarize the main points of the two prosodic accounts I will be concerned with for the rest of the squib. I start with Kandybowicz (2006a) and then move on to Sato & Dobashi (2016).

2.1   Kandybowicz's *$<C^0$, $t>$ filter

Kandybowicz (2006a) proposes that there is a *$<C^0$, t$>$ filter at PF (5) that disallows certain prosodic mappings.

(5)   *$<C^0$, t$>$ iff:

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[1] Ritchart, Goodall & Garellek (2016) tested Kandybowiczs (2006) hypothesis by looking at focused data. They found that the ameliorating effect that focus has been claimed to have exists, but it is not specific to *that-trace* sentences; it provides, instead, a more general amelioration of all subject gaps (including non-islands) but not enough to make the sentences used here acceptable. They also looked at and C^0-aux cliticization (*that will* → *that'll*), which I have not mentioned here. In the case of C^0-aux cliticization, they found that it does not have amelioration effects on the acceptability of the sentence: no *that* is signigicantly better than overt *that* and *that*-AUX; overt *that* and *that*-AUX are equally bad.

     a. C^0 and t are adjacent within a prosodic phrase; and

     b. C^0 is aligned with a prosodic phrase boundary   (Kandybowicz 2006a: 223)

A note on the terminology is in order. Given the broadness of the term "prosodic phrase" in (5), it could make reference to any prosodic constituent: from a Prosodic Word (which roughly corresponds with lexical items that might host function words) to Intonational Phrases (which correspond to clauses or full utterances typically marked by obligatory pauses). The ones that will be relevant here are Intonational Phrases (IPs), Intermediate Phrases (intPs) and Phonological Phrases (PhPs). A PhP consists of at least a Prosodic Word, and roughly corresponds to XPs in the syntax, while an intP typically describes topics, adverbial clauses (Hsu 2016: 3) (i.e. they are bigger than PhPs but smaller than IPs).

That said, according to (5) a sentence like (1), repeated as (6), is ruled out because it violates both conditions of the filter. (5a) because "when C is pronounced in full, an Intermediate Phrase divides the embedded clause from the matrix clause" (Kandybowicz 2006a: 222). Thus, C and the trace are contained within the same prosodic phrase, i.e. the intP that introduces the embedded clause. (5b) is violated given that the C head is aligned with the left edge of the intP.

(6)   * ($_{IP}$ Who did you say ($_{intP}$ that *t* wrote *Good Omens*?))

The filter in (5) also provides an explanation for the adverb the adverb amelioration effect in (7): sentential adverbials can be parsed as IPs creating a prosodic boundary to the right of the complementizer. Thus, even though C is aligned with a prosodic phrase boundary, C and the trace are in separate phrases. Kandybowicz (2006a: 223, fn.2) assumes that the trace is not contained within any prosodic phrase, but rather is a float that the prosodic phrasing algorithm ignores when doing the syntax-prosody mapping. This raises one of the questions that will be dealt with in section 4: prosody and its accessibility to traces.

(7)   ($_{intP}$ Who did you say that) ($_{IP}$ for all intents and purposes) ($_{intP}$ *t* wrote *Good Omens*?)

Kandybowicz (2006a) also observes that the effects are ameliorated if the embedded verb is focused as in (8a). The reason for the amelioration is the assumption that the focused constituent will create a separation into two different intPs: one containing the matrix clause and crucially the complementizer, and another that contains the embedded clause whose prosodic edge is marked by the focused constituent (8b). The trace is not part of either (Kandybowicz 2006a: 223,ex. 13a). Crucially, focusing any other element does not seem to give rise to this amelioration (8c):

(8)   a. ? Who did you say that *t* WROTE *Good Omens*?

        b.   ($_{intP}$ Who did you say that) *t* ($_{intP}$ WROTE *Good Omens*?)

        c. * ($_{IP}$ Who did you say ($_{intP}$ that *t* wrote) ($_{intP}$ *GOOD OMENS*?))

Although the proposal is attractive and seems to make the right predictions, I will mention some problems. But before I do that, I will overview the proposal by Sato & Dobashi (2016).

2.2   Sato & Dobashi's alternative

A more recent proposal has been made by Sato & Dobashi (2016). Building on Kandybowicz (2006a), they propose an alternative PF condition (9):

(9)   Function words cannot form a prosodic phrase on their own.   (Sato & Dobashi 2016: 333)

According to (9) any prosodic phrase (e.g. PhP, intP, IP) that is made of only function words will be ruled out at PF. For them traces do count at the time of parsing and these are considered

empty categories whose status is identical to that of function categories, i.e. they cannot form a prosodic phrase on their own. That is, a prosodic phrase composed of only C and/or a trace should be ruled out. For them adjacency between C and the trace does not play a role; rather, the ungrammaticality stems from the fact that a prosodic phrase contains no lexical material. This is a well established assumption in the prosodic literature: constraints relating syntactic and prosodic categories only apply to lexical elements and their projections. Some examples of this include the Principle of the Categorial Invisibility of Function Words (Selkirk 1986), the Lexical Category Condition (Truckenbrodt 1999) or Prosodic Vacuity (Kandybowicz 2015).

In addition to this they adopt a theory of phases according to which the spell-out domain of a phase head is mapped onto a PhP at PF (Dobashi 2003). They also assume that in order to avoid an "assembly problem" during linearization, there must be a shared element that connects the two spell-out domains: the initial (or left most element in the structure) is left behind and remains accessible to the next application of spell-out. This allows for the subject to be parsed with the complementizer, for example (10a):

(10)   a. $[_{CP}$ C $[_{TP}$ Subj $[_{T'}$ T $[_{vP}$ v Obj]]]]

spell-out

        b. $(_{PhP}$ C Subj) $(_{PhP}$ T v V) $(_{PhP}$ Obj)   (Sato & Dobashi 2016: 334)

The proposal makes identical predicitions with respect to (1) and (7) but differs wtith the focused data. In fact, they assume that there is a Left Focus Restructuring Rule (LFR) for English (11), originally proposed by Kenesei & Vogel (1995), that applies at the level of PhPs and that alters the original prosodic mapping so that (9) is satisfied. An example is in (12):

(11)   Left Focus Restructuring: English
        If some word in a sentence bears focus, place a phonological phrase boundary at its right edge,and join the word to the phonological phrase on its left.
                        (Sato & Dobashi 2016: 339) *apud* (Kenesei & Vogel 1995: 19)

(12)   a.   Who did you say $(_{PhP}$ that *t*) $(_{PhP}$ WROTE *Good Omens*)?   Prior LFR
        b.   Who did you say $(_{PhP}$ that *t* WROTE) $(_{PhP}$ *Good Omens*)?   After LFR

After LFR has applied in (12b), the PF condition is satisfied and the amelioration effect is achieved. This is in direct contrast with Kandybowicz (2006a), for whom focus starts a prosodic phrase (8b).

Now that the two prosody-based accounts have been reviewed, I will move on to delve into the issues and questions raised by them, which to my knowledge remain unaddressed in the literature.

3   Functional categories and their own phonological phrases

Most of the syntax-prosody literature makes a distinction between lexical and functional categories. For example, lexical words in English require that one of their syllables is stressed, while function words do not; their vowels are typically unstressed and reduced to schwa (i.e.*that* = [ðət]). In fact, as argued by Selkirk (2011: 453), function words, especially monosyllabic ones, tend to not be standardly parsed as prosodic words. That said, and no matter what is the algorithm to match a syntactic structure into the corresponding prosodic one, function words should always be contained within a larger prosodic unit composed of at least one lexical element. In other words, there is no place for (unstressed) function words to project their own phonological phrase; instead they must clitizice either right or left onto something that can (see Tyler (2019) for further details on this).

This invisibility of function words is ensured by conditions like the Lexical Category Condition (Truckenbrodt 1999) and Prosodic Vacuity (Kandybowicz 2015) given in (13) and (14) respectively:[2]

(13) The Lexical Category Condition
      Constraints relating syntactic and prosodic categories apply to lexical syntactic elements and their projections, but not to functional elements and their projections, or to empty syntactic elements and their projections.   (Truckenbrodt 1999)

(14) Prosodic Vacuity
      Phonetically empty (i.e. null elements and functional heads) prosodic phrases are ruled out at PF.   (Kandybowicz 2015)

Based on these conditions, the mapping from syntax to prosody in a sentence like (1) repeated below should not be as (15a) or (15b), but it should be as (15c). The point here is not that (13) and (14) are being violated; rather, the mapping should never arise to begin with because unstressed function words need a prosodic host. And that assumption is built in the system.[3]

(15)   * Who did you say that *t* wrote *Good Omens*?

    a. ($_{PhP}$ that) *t* ($_{PhP}$ wrote) ($_{PhP}$ *Good Omens*)   à la Kandybowicz (2006a)

    b. ($_{PhP}$ that *t*) ($_{PhP}$ wrote) ($_{PhP}$ *Good Omens*)   à la Sato & Dobashi (2016)

    c. ($_{PhP}$ that *t* wrote) ($_{PhP}$ *Good Omens*)   as predicted by (13) & (14)

One needs to remember that Kandybowicz (2006a) only talks about intPs and IPs, which are larger than PhPs. However, if traces do not count for the parse, we would expect *that* and the trace to be separated. If that is the case, there is no adjacency at a deeper prosodic level, so the first condition of the filter should not hold. Besides, if the trace is never parsed within a prosodic constituent, adjacency should not be relevant.[4] On the other hand, Sato & Dobashi's (2016) prosodic condition in (9) does not hold either: there is a lexical element contained within the PhP that also contains the complementizier and the trace. If (15c) is the correct mapping, then it poses a serious challenge to both theories reviewed here. Evidence for the fact that (15c) is the correct mapping comes from sentences that contain pronouns and subject relative clauses with an overt complementizer, as I will show in the next section.

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[2] The argument is also valid if we used other versions of these principles under Match Theory (Selkirk 2011). See Weir (2012), Elfner (2012), Bennett, Elfner & Mccloskey (2016) for details. I am making specific reference to these two because they are the ones that at least one of the works I am reviewing here follows them.

[3] One could think of this in terms of Optimality Theory (Prince & Smolensky 1993) where The Lexical Cateogry Condition or Prosodic Vacuity are very high ranked markedness constraints that must be satisified for the optimal output to win. If any candidate violates the constraint, such violation would be fatal. The simple tableau in (i) shows precisely that.

    (i)

that t wrote GO		LEXICAL CATEGORY CONDITION
a.	(that) t (wrote) (GO)	*!
b.	(that t) (wrote) (GO)	*!
c. ☞	(that t wrote) (GO)	

[4] One should note that (15c) violates *<C^0, t> filter, but it does so by accident given that according to Kandybowicz (2006a) the trace should never be parsed within a prosodic phrase.

3.1   Phonological Phrasing of subject pronouns

It has become standard in the literature, since (Abney 1987), to treat pronouns and determiners as belonging to the functional category of D heading a DP. If we transformed (15) into a declarative clause and replaced the embedded subject with a pronoun like *I/you*, we should predict that the sentence is equally ungrammatical because the complementizer and a function word of type D form a PhP. However, this prediciton is not borne out as shown in (16):

(16)   You said that I wrote *Good Omens*

      a. * you said ($_{PhP}$ that I) ($_{PhP}$ wrote) ($_{PhP}$ *Good Omens*)   à la Sato & Dobashi (2016)

      b. you said ($_{PhP}$ that I wrote) ($_{PhP}$ *Good Omens*)   as predicted by (13) and (14)

It is difficult to predict what the parsing would be under Kandybowicz (2006a) as he is not very explicit when it comes to the status of functional categories in general, but assuming that he allows for *that* to project its own phrase, the pronoun should too.

If phonological phrases are a domain within which segmental phonological processes apply, we can test the well-formedness of (16b) by using a phonological rule like the tap insertion rule or palatalization rule. If one of the environments that conditions the application of the tap or palatalization rule of coronal stops in English is that the target segment and the trigger segment belong to words in the same prosodic domain (i.e. a PhP), then we expect thes rules to apply to sentences like (16).[5] That prediction is borne out:

(17)   /t/→ [ɾ] / ($_{PhP}$ [V]__[V])
     you said ($_{PhP}$ tha[ɾaɪ] wrote) ($_{PhP}$ *Good Omens*)

(18)   /t/→ [tʃ] / ($_{PhP}$ [V]__[jV])
     I said ($_{PhP}$ tha[tʃu] wrote) ($_{PhP}$ *Good Omens*)

The same is predicted in a context where the complementizer is followed by verb that starts with /ɪ/ or /ju/, even though the sentences are ungrammatical. [6] This supports the fact that complementizer and the main verb belong to the same PhP:

(19)   /t/→ [ɾ] / ($_{PhP}$ [V]__[V])
     *who did you say ($_{PhP}$ tha[ɾɪ]nterpreted) ($_{PhP}$ Demon Crowley)

(20)   /t/→ [tʃ] / ($_{PhP}$ [V]__[jV])
     *Who did you say ($_{PhP}$ tha[tʃu]sed) ($_{PhP}$ Demon Crowley)

3.2   Subject relative clauses

In addition to this, both theories face some challenge with subject relatives like the one in (21). Under the head raising analysis, (Vergnaud 1974; Kayne 1994; Bhatt 2002) the head NP originates inside the CP relative and then moves out projecting a NP. Under the head external analysis (Chomsky 1977; Heim & Kratzer 1998) there is movement of the *wh*-operator to the specifier of the CP relative clause. Crucially for our purposes, any of this movement operations leaves a trace (or unpronounced copy) following the complementizer (21a-21b):[7]

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[5] The rules used here are very simplified versions of these rules. I am using them to support the main argument.

[6] 10 native speakers of English were informally asked to read a set of grammatical and ungrammatical *that-trace* sentences. In 9/10 cases, the two rules applied.

[7] One might argue that in subject relative clauses there is no *wh*-movement to the specifier of the CP because they show weaker island effects as observed by Chung & McCloskey (1983) and would violate some sort of antilocality (Brillman & Hirsch 2016; Toquero-Pérez 2020). In this case, instead of a trace, the *wh*-operator itself would be left in the specifier of TP immediately adjacent to the complementizer *that*. Even if we follow this approach, the predictions with respect to the prosodic mapping should be no different: there still is a null element following the complementizer which the PF interface should treat as any other unpronounced material.

(21)   The demon that saved the world from Armageddon

    a.   the [demon]$_2$ [$_{CP}$ [OP t_2]$_1$ that t_1 saved the world from Armageddon]

    b.   the demon [$_{CP}$ OP$_1$ that t_1 saved the world from Armageddon]

The structure of this sentence is identical to that in (15) where the complementizer is followed by a trace left by a *wh*-operator. Following the same logic as with (15), we should expect a mapping according to which (i) the Complementizer is adjacent to the trace and thus violates the *<C^0, t> filter, or (ii) the complementizer should project its own PhP and thus violates the prosodic condition in (9). This is illustrated in (22a) and (22b) respectively. In conclusion, these theories predict that subject relatives like (21) are ungrammatical, and yet they are not which suggests that the correct prosodic phrasing is not as these theories argue for, but should be as in (22c):

(22)   The demon that *t* saved the world from Armageddon

    a.   * The demon ($_{PhP}$ that) *t* ($_{PhP}$ saved the world) ($_{PhP}$ from Armageddon)

    b.   * The demon ($_{PhP}$ that *t*) ($_{PhP}$ saved the world) ($_{PhP}$ from Armageddon)

    c.   The demon ($_{PhP}$ that *t* saved the world) ($_{PhP}$ from Armageddon)

A priori, for Sato & Dobashi (2016: 343), this does not seem to be a problem because ther phasal spell-out forces the complementizer and the trace to belong to two different spell-out domanins: C transfers the TP complement with the trace left by the subject when the D head is merged. However, there is a loophole in their theory. According to their model of spell-out, based on Dobashi (2003), the initial (or left most) element in the structure is left behind and remains accessible to the next application of spell-out. This was shown in (10a) and repeated in (23a). For example, if the TP is spelled-out when C is merged, the subject (in Spec,TP) escapes the mapping and is able to form a phonological phrase with the preceding C head (Sato & Dobashi 2016: 334) (23b).

(23)   a.   spell-out

        [$_{CP}$ C [$_{TP}$ ⎡Subj⎤ [$_{T'}$ T [$_{vP}$ v Obj]]]]]
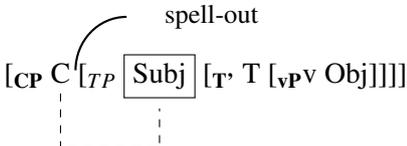
    b.   ($_{PhP}$ C Subj) ($_{PhP}$ T v V) ($_{PhP}$ Obj)   (Sato & Dobashi 2016: 334)

This has an important, though unnoticed, implication for subject relatives: when D is merged into the structure, the phase head C must spell-out its TP complement which includes the trace of the moved *wh*-subject. However, since they assume that the subject, i.e. the leftmost element in the spell-out domain, is still accessible to the next spell-out operation, there is nothing that prevents C and the trace from forming a PhP as (23b). And as a result, the structure should be incorrectly ruled out.

(24)   spell-out

    [$_{DP}$ the [$_{NP}$ demon [$_{CP}$ that [$_{TP}$ ⎡t⎤ [$_{T'}$ T [$_{vP}$ saved *the world*]]]]]]]
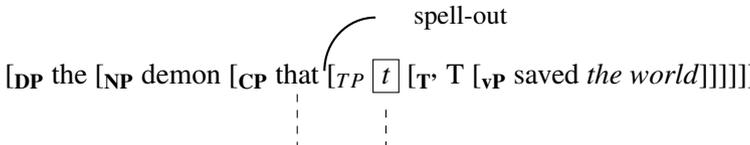
Phonological evidence for the mapping in (22c) is found in the successful application of the tap rule in (17). This is illustrated in (25) where the verb *saved* has been replaced with *incinerated*:

(25)   the demon tha[ɾɪ]ncinerated the world

Up until this point I have presented some empirical arguments for why *that-trace* effects of the type seen in English cannot be reduced to prosodic conditions proposed by Kandybowicz (2006a) and Sato & Dobashi (2016). Before moving on to the next section, I want to note two more concerns: one is related to cliticization of the complementizer, and the other is especifically concerned with LFR rule in (11).

3.3 A note on Complementizer cliticization and LFR

Both Kandybowicz (2006a) and Sato & Dobashi (2016) assume that the complementizer cannot cliticize to the left, outside the CP: *that* can reduce to schwa and generally fails to display pitch accent. As such, it is a weak function word, and it is notoriously difficult to say which direction such words cliticize onto in the prosody. One might think that *that* would need to phrase with something following it because it is at the left edge of a CP, but virtually all theories of syntax-prosody mapping in English treat right edges as being relevant to prosodic boundaries, with left edges much less so or not at all (Selkirk 1995; 1996; 2005; Truckenbrodt 1999). Besides, recent work by Tyler (2019) (building on prevous work by Zec (2005)) has convincingly shown that function words can have different subcategorization frames: they can either be left-clitizicing as Tyler argues for weak object pronouns, contracted negation *n't*, and the very reduced auxiliaries; or right-clitizicing as Tyler shows it is the case for most prepositions in Englsih, auxiliaries and determiners. To my knowledge there is no research that has probed what frame complementizers belong to. Thus, in principle, nothing should rule out a phrasing like the one in (26) where the complementizer has left-clitiziced onto the preceding material.[8]

(26) * [who did you ($_{PhP}$ say that)] [*t* ($_{PhP}$ wrote) ($_{PhP}$ *Good Omens*)]

Regarding LFR (11), it remains unaddressed what would happen if the focused element inside the embedded clause is an auxiliary verb as in (27a). Auxiliary verbs are function words and as such should not be phrased in their own PhP, regardless of whether they bear focus. If the LFR rule applies to (27a) we should get the phrasing in (27b):

(27) a. I know you don't know but, who do you think that *t* COULD write *Good Omens*?
      b. ($_{PhP}$ that *t* COULD) ($_{PhP}$ write) ($_{PhP}$ *Good Omens*?

(5) Function words cannot form a prosodic phrase on their own.   (Sato & Dobashi 2016: 333)

The focused auxiliary has created a boundary at its right edge and has joined to the phonological phrase on its left. Nevertheless, this should not be enough by itself to satisfy Sato and Dobashi's (2016) condition in (9), repeated above. The informants that I have consulted and that accept these sort of sentences with focus do not report a difference in acceptability between a focused auxiliary and a focused lexical verb, which goes against what one would expect under (9).[9]

Last but not least, (Kandybowicz 2006a) claims, contrary to Sato & Dobashi (2016), that the focused element marks the left edge of a prosodic boundary. There is no phonetic or phonological evidence that supports this claim. In fact, this goes against Selkirk (2000: 247-251) who argues that it is the right edge of a focused constituent that has to be aligned with the right edge of a prosodic phrase:

(28) She loaned her rollerblades to Robin   adapted fromSelkirk (2000: 247 ex.27)
      a.   ($_{PhP}$ she loaned her rollerblades) ($_{PhP}$ to Robin)
      b.   ($_{PhP}$ she LOANED) ($_{PhP}$ her rollerblades) ($_{PhP}$ to Robin)
      c. * ($_{PhP}$ she LOANED her rollerblades) ($_{PhP}$ to Robin)
      d. * ($_{PhP}$ she) ($_{PhP}$ LOANED her rollerblades) ($_{PhP}$ to Robin)

As a result, there are strong empirical arguments to be skeptical that these prosodic accounts can successfully provide a principled explanantion to *that-trace* effects in English. In the next section, I outline one conceptual argument that any syntax-prosody analysis would have to address.

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[8] I am very grateful to Jonah Katz for this suggestion.

[9] 10 native speakers of American English were consulted for judgments. Of those 10, only 2/10 accepted the structures with narrow focus on either lexical or auxiliary verbs. The other 8/10 did not report a significant amelioration aligning with the results found by Ritchart, Goodall & Garellek (2016) mentioned in fn.2.

4 Why should prosody care about traces?

It is typically assumed that null material in general does not count for prosodic phrasing, which puts into question why traces should be visible to prosody. More specifically, why should the fact that the trace following but not the one preceding the complementizer? If CP is a phase, and there is successive cyclic movement through its edge there should be another trace preceding the complementizer. Why isn't the latter the problematic one? And why do prosodic accounts never represent that higher trace in their phrasing? If traces are so important to prosody, all the traces left by the moved subject should count. What is more, one could reverse the perspective of the generalization and say something along the lines of (29):[10]

(29)   The Two-Trace Condition
       Do not have two traces/copies of the same moved constituent within the same phonological phrase.

(30)   * who did you say ($_{Php}$ t that t wrote) ($_{Php}$ *Good Omens*) ?

An example like (30) respects Prosodic Vacuity (Kandybowicz 2015) and the Lexical Category Condition (Truckenbrodt 1999) but violates the condition in (29). However, a constraint like (29) does not answer the question of why traces matter either. The same reasoning that has been applied to traces can also be applied to other null elements more generally, e.g. null operators, PRO, *pro*. What is more, if we extend these prosodic filters to other languages such as null subject languages, we should predict that any sentence that contains an overt complementizer and is followed by a null subject in Spec,TP should be prosodically ill-formed, which is not a desirable prediction if one looks at Romance for example.

In fact, prosodic filters like the Two-Trace Condition or *<C^0, t> filter (i.e. do not have a C next to a *t*) do not seem completely coherent within current models of the grammar. Within a broadly Chomskyan modular view of language there is no reason why the system of prosodic phrasing should regard traces or even have access to them.[11] This is especially problematic if prosodic phrasing happens quite late at PF after Vocabulary Insertion, and thus chain reduction, have applied (Kandybowicz 2006b: Ch.3 & 5). That said, the system of prosodic phrasing should apply to whatever terminal nodes have been spelled-out after Vocabulary Insertion and should have access to nothing else.

5 Conclusion

This squib has reviewed some PF proposals to *that-trace* effects based on prosodic ill-formedness made by Kandybowicz (2006a) and Sato & Dobashi (2016). These PF proposals are interesting alternatives to structurally based accounts because they deal with a set of data that the purely syntactic accounts rarely mention because they constitute a problem for most (if not all) of them. Nevertheless, I have raised some concerns that these two proposals have to face in order to be compelling alternatives. First of all, phonological phrases composed of only a complementizer or a complementizer and a trace should never be optimal candidates at PF; and there is empirical evidence from relative clauses and phonological processes like the tap insertion rule that support that is not the case. Second, given that prosodic phrasing occurs late at PF, once vocabulary items have been inserted and chains reduced, it remains a mystery how the system of prosodic prhasing has access to traces and why traces should be relevant. The conclusion arrived at here does not entail that a prosodic account is in principle inadrquate or impossible to articulate, for it is eyt to be understood what the best and more principled theory can provide an explanation

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[10] Many thanks to Roumyana Pancheva for suggesting this alternative.
[11] Jonah Katz raised this concern and pointed it out to me. I would like to thank him for it.

to these phenomena. Instead, the squib outlines a series of challenges that a any proponent of a prosody-based theory should consider.

Acknowledgments

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