

## *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

Word count: 3191

**Abstract** *That-trace* effects in English have been treated as violations of prosodic well-formedness conditions (Kandybowicz 2006a; Sato & Dobashi 2016): the C head and the trace cannot be adjacent at PF or phonological phrases comprised of only functional material are ill-formed. In this squib, I argue that neither of those mappings should in principle arise if prosodic constraints like the Lexical Category Condition (Truckenbrodt 1999) or Prosodic Vacuity (Kandybowicz 2015) are operative in the grammar (as if they were highly ranked markedness constraints in Optimality Theory (Prince & Smolensky 1993)). Instead these constraints ensure that 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. 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.

**Keywords:** *that-trace* effects; syntax-prosody; Prosodic vacuity; relative clauses; narrow focus

### 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 mystery to this day what is the best analysis to derive the effects. Proposals typically fall into two main classes: (i) those that argue for syntactically ill-formedness, i.e. a constraint making reference to the hierarchical structure of the clause (Pesetsky 1982; 1995; Culicover 1993; Erlewine 2020; Toquero-Pérez 2020); (ii) those that argue for a PF-based constraint operating on the linear order relations (Chene 2000; Kandybowicz 2006a; Sato & Dobashi 2016). Among the latter, accounts based on the mapping from syntax to prosody have been proposed. On the one hand, Kandybowicz (2006a) proposes that there is a  $* < C^0, t >$  filter at PF (2) that disallows certain prosodic mappings.

- (2) \* <C<sup>0</sup>, t> iff:
- a. C<sup>0</sup> and t are adjacent within a prosodic phrase; and
  - b. C<sup>0</sup> is aligned with a prosodic phrase boundary (Kandybowicz 2006a: 223)

According to (2), a sentence like (1) is ruled out because it violates both conditions of the filter: (2b) on the assumption that the C head is the only element contained within the prosodic phrase, and hence aligns with a boundary; (2a) because the Phonological Phrase (PhP) that contains the C head is adjacent to the trace. The filter in (2) also provides an explanation for the adverb the adverb amelioration effect in (3): the linear adjacency between C and the trace is disrupted by the adverbial whose prosodic structure contains the C head now.<sup>1</sup>

- (3) Who did you say (<sub>phP</sub> that for all intents and purposes) *t* wrote *Good Omens*?

Kandybowicz (2006a) also observes that the effects are ameliorated if the embedded verb is focused as in (4a). The reason for the amelioration is the assumption that the focused constituent will create a separation into two different intonational phrases: 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 (4b). Crucially, focusing any other element does not seem to give rise to this amelioration (4c):

- (4) a. ? Who did you say that *t* WROTE *Good Omens*?  
 b. (<sub>IntP</sub> Who did you say that) *t* (<sub>IntP</sub> WROTE *Good Omens*)?  
 c. \* Who did you say (<sub>IntP</sub> that *t* wrote) (<sub>IntP</sub> GOOD OMENS?)

On the other hand, Sato & Dobashi (2016), building on Kandybowicz (2006a), propose an alternative PF condition (5):

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

For them adjacency does not play a role; rather the ungrammaticality stems from the fact that a prosodic phrase only 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 Categorical Invisibility of Function Words (Selkirk 1986), the Lexical Category Condition (Truckenbrodt 1999) or Prosodic Vacuity (Kandybowicz 2015).

The proposal makes identical predictions with respect to (1) and (3) but differs with the focused data. In fact, they assume that there is a Left Focus Restructuring Rule (LFR) for English (6), originally proposed by Kenesei & Vogel (1995), that applies at the level of PhPs and that alters the original prosodic mapping so that (5) is satisfied. An example is in (7):

- (6) 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)
- (7) a. Who did you say (<sub>phP</sub> that *t*) (<sub>phP</sub> WROTE *Good Omens*)? Prior LFR  
 b. Who did you say (<sub>phP</sub> that *t* WROTE) (<sub>phP</sub> *Good Omens*)? After LFR

<sup>1</sup> Kandybowicz (2006a) 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.

After LFR has applied in (7b), the PF condition is satisfied and the amelioration effect is achieved.

These proposals are groundbreaking because, assuming that the focus data is correct,<sup>2</sup> they pose a problem for any existing structural account. 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 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 discusses the first set of observations; section 3 briefly presents the conceptual argument against the two mentioned approaches; section 4 concludes the squib.

## 2 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 cliticize 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 (8) and (9) respectively:<sup>3</sup>

- (8) 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)
- (9) 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 (10a) or (10b), as proposed by Kandybowicz (2006a)

<sup>2</sup> Ritchart, Goodall & Garellek (2016) tested Kandybowicz's (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<sup>0</sup>-aux cliticization (*that will* → *that'll*), which I have not mentioned here. In the case of C<sup>0</sup>-aux cliticization, they found that it does not have amelioration effects on the acceptability of the sentence: no *that* is significantly better than overt *that* and *that-AUX*; overt *that* and *that-AUX* are equally bad.

<sup>3</sup> 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.

and Sato & Dobashi (2016) respectively, but it should be as (10c). The point here is not that (8) and (9) 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.<sup>4</sup>

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

- a. (<sub>PhP</sub> that) *t* (<sub>PhP</sub> wrote) (<sub>PhP</sub> *Good Omens*)      à la Kandybowicz (2006a)
- b. (<sub>PhP</sub> that *t*) (<sub>PhP</sub> wrote) (<sub>PhP</sub> *Good Omens*)      à la Sato & Dobashi (2016)
- c. (<sub>PhP</sub> that *t* wrote) (<sub>PhP</sub> *Good Omens*)      as predicted by (8) & (9)

If (10c) is the correct mapping, then it poses a serious challenge to both theories reviewed here. On the one hand, the complementizer should never be aligned with a prosodic phrase boundary and so the \* < C<sup>0</sup>, t > filter in (2) should be reformulated. On the other hand, Sato & Dobashi's (2016) prosodic condition in (5) is trivial and does not hold: there is a lexical element contained within the PhP that also contains the complementizer and the trace. Evidence for the fact that (10c) is the correct mapping comes from sentences that contain pronouns and subject relative clauses with an overt complementizer.

## 2.1 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 (10) 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 prediction is not borne out as shown in (11):

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

- a. \* you said (<sub>PhP</sub> that I) (<sub>PhP</sub> wrote) (<sub>PhP</sub> *Good Omens*) à la Sato & Dobashi (2016)
- b. you said (<sub>PhP</sub> that I wrote) (<sub>PhP</sub> *Good Omens*) as predicted by (8) and (9)

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 I believe his theory would either consider the pronoun as part of the phrase containing the C head or as part of the lower phrase containing the lexical verb.

If phonological phrases are a domain within which segmental phonological processes apply, we can test the well-formedness of (11b) by using a phonological rule like the tap insertion rule or palatalization rule. If one of the environments that conditions the

<sup>4</sup> One could think of this in terms of Optimality Theory (Prince & Smolensky 1993) where The Lexical Category Condition or Prosodic Vacuity are very high ranked markedness constraints that must be satisfied 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)	

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 these rules to apply to sentences like (11).<sup>5</sup> That prediction is borne out:

(12) /t/ → [ɾ] / (<sub>PhP</sub> [V]\_[V])  
 you said (<sub>PhP</sub> tha[ɾaɪ] wrote) (<sub>PhP</sub> *Good Omens*)

(13) /t/ → [tʃ] / (<sub>PhP</sub> [V]\_[jV])  
 I said (<sub>PhP</sub> tha[tʃu] wrote) (<sub>PhP</sub> *Good Omens*)

## 2.2 Subject relative clauses

In addition to this, both theories face some challenge with subject relatives like the one in (14). 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 (14a-14b):<sup>6</sup>

- (14) The demon that saved the world from Armageddon
- the [demon]<sub>2</sub> [<sub>CP</sub> [OP t<sub>2</sub>]<sub>1</sub> that t<sub>1</sub> saved the world from Armageddon]
  - the demon [<sub>CP</sub> OP<sub>1</sub> that t<sub>1</sub> saved the world from Armageddon]

The structure of this sentence is identical to that in (10) where the complementizer is followed by a trace left by a *wh*-operator. Following the same logic as with (10), we should expect a mapping according to which (i) the Complementizer is adjacent to the trace and thus violates the \* < C<sup>0</sup>, t > filter, or (ii) the complementizer should project its own PhP and thus violates the prosodic condition in (5). This is illustrated in (15a) and (15b) respectively. In conclusion, these theories predict that subject relatives like (14) 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 (15c):

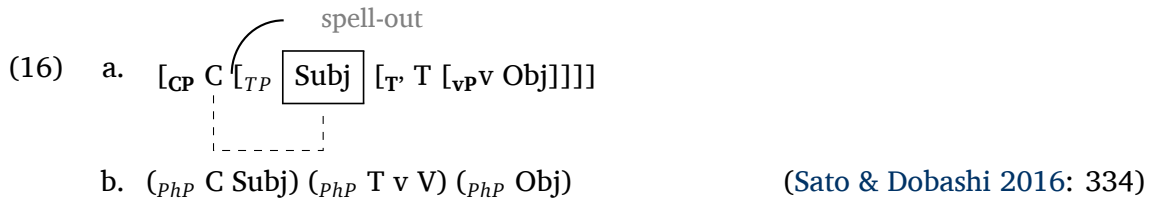
- (15) The demon that *t* saved the world from Armageddon
- \* The demon (<sub>PhP</sub> that) *t* (<sub>PhP</sub> saved the world) (<sub>PhP</sub> from Armageddon)
  - \* The demon (<sub>PhP</sub> that *t*) (<sub>PhP</sub> saved the world) (<sub>PhP</sub> from Armageddon)
  - The demon (<sub>PhP</sub> that *t* saved the world) (<sub>PhP</sub> from Armageddon)

A priori, for Sato & Dobashi (2016: 343), this does not seem to be a problem because their phasal spell-out forces the complementizer and the trace to belong to two different spell-out domains: 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. They adopt a model of spell-out according to which the initial (or left most element in the structure) is left

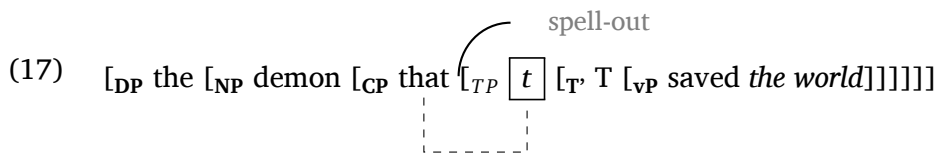
<sup>5</sup> The rules used here are very simplified versions of these rules. I am using them to support the main argument.

<sup>6</sup> 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.

behind and remains accessible to the next application of spell-out (16a). 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) (16b).



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 (16b). And as a result, the structure should be incorrectly ruled out.



Phonological evidence for the mapping in (15c) is found in the successful application of the tap rule in (12). This is illustrated in (18) where the verb *saved* has been replaced with *incinerated*:

(18) the demon tha<sub>[r]</sub>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 specifically concerned with LFR rule in (6).

### 2.3 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: C *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 previous work by Zec (2005)) has convincingly shown that function words can have different subcategorization frames: they can either be left-cliticizing as Tyler argues for weak object pronouns, contracted negation *n't*, and the “very reduced” auxiliaries; or right-cliticizing as Tyler shows it is the case for most prepositions in English, 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 (19) where the complementizer has left-cliticized onto the preceding material.<sup>7</sup>

(19) \* [who did you (<sub>PhP</sub> say that)] [ t (<sub>PhP</sub> wrote) (<sub>PhP</sub> Good Omens)]

Regarding LFR (6), it remains unaddressed what would happen if the focused element inside the embedded clause is an auxiliary verb as in (20a). 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 (20a) we should get the phrasing in (20b):

(20) a. I know you don't know but, who do you think that t COULD write *Good Omens*?

b. (<sub>PhP</sub> that t COULD) (<sub>PhP</sub> write) (<sub>PhP</sub> *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 (5), 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 (5).<sup>8</sup>

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

### 3 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 (21):<sup>9</sup>

(21) The Two-Trace Condition

Do not have two traces/copies of the same moved constituent within the same phonological phrase.

(22) \* who did you say (<sub>PhP</sub> t that t wrote) (<sub>PhP</sub> *Good Omens*) ?

<sup>7</sup> I am very grateful to Jonah Katz for this suggestion.

<sup>8</sup> 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.

<sup>9</sup> Many thanks to Roumyana Pancheva for suggesting this alternative.

An example like (22) respects Prosodic Vacuity (Kandybowicz 2015) and the Lexical Category Condition (Truckenbrodt 1999) but violates the condition in (21). However, a constraint like (21) 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<sup>0</sup>, 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.<sup>10</sup> 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.

## 4 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 phrasing 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 inadequate or impossible to articulate, for it is yet to be understood what the best and more principled theory can provide an explanation to these phenomena. Instead, the squib outlines a series of challenges that a any proponent of a prosody-based theory should consider.

## Acknowledgments

I am incredibly grateful to Roumi Pancheva for long and exhaustive discussions of this topic over zoom, during the worst and early days of the pandemic. None of this paper would exist if it wasn't for her support, feedback and outstanding ideas. I am also indebted to Jonah Katz who, as always, was very kind to give me numerous suggestions over email. Some very important observations included in this squib are his.

<sup>10</sup> Jonah Katz raised this concern and pointed it out to me. I would like to thank him for it.



## References

- Abney, Steven. 1987. *The English noun phrase in its sentential aspect*. Massachusetts Institute of Technology dissertation.
- Bennett, Ryan, Emily Elfner & Jim McCloskey. 2016. Lightest to the right: An apparently anomalous displacement in Irish. *Linguistic Inquiry* 4(2). 169–234.
- Bhatt, Rajesh. 2002. The raising analysis of relative clauses: evidence from adjectival modification. *Natural Language Semantics* 10(1). 43–90.
- Brillman, Ruth & Aron Hirsch. 2016. An anti-locality account of English subject/non-subject asymmetries. In *Proceedings of CLS 50*.
- Chene, Brent de. 2000. Prosody and subject traces. Ms., Waseda University.
- Chomsky, Noam. 1977. On wh-movement. In P Culicover, T Wasow & A Akmajian (eds.), *Formal syntax*. New York, New York: Academic Press.
- Chung, Sandra & James McCloskey. 1983. On the interpretation of certain island facts in {GPSG}. *Linguistic Inquiry* 14(4). 704–713.
- Culicover, Peter. 1993. Evidence against {ECP} accounts of the that-t effect. *Linguistic Inquiry* 24(3). 557–561.
- Elfner, Emily. 2012. *Syntax-prosody interactions in Irish*. Amherst, MA: University of Massachusetts dissertation.
- Erlewine, Michael Yoshitaka. 2020. Anti-locality and subject extraction. *Glossa* 5(1). 1–38.
- Heim, Irene & Angelika Kratzer. 1998. *Semantics in generative grammar*. Malden, MA: Blackwell.
- Kandybowicz, Jason. 2006a. Comp-trace effects explained away. In Donald Baumer, David Montero & Michael Scanlon (eds.), *25th west coast conference on formal linguistics*, 220–228. Somerville, MA: Cascadilla.
- Kandybowicz, Jason. 2006b. On Fusion and Multiple Copy Spell-Out: The Case of Verb Repetition. In Jairo Nunes & Norbert Corver (eds.), *The copy theory of movement on the {pf} side*. Oxford University Press.
- Kandybowicz, Jason. 2015. On prosodic vacuity and verbal resumption in Asante Twi. *Linguistic Inquiry* 46. 243–272.
- Kayne, Richard. 1994. *The Antisymmetry of Syntax*. Cambridge, Massachusetts: MIT Press.
- Kenesei, Istvaan & Irene Vogel. 1995. Focus and phonological structure. Ms., University of Szeged & University of Delaware.
- Perlmutter, David M. 1968. *Deep and Surface Structure Constraints in Syntax*. Ph.D. dissertation, Massachusetts Institute of Technology dissertation.
- Pesetsky, David. 1982. *Paths and categories*. Massachusetts Institute of Technology dissertation.
- Pesetsky, David. 1995. *Zero syntax*. Cambridge, Massachusetts: MIT Press. 351.
- Prince, Alan & Paul Smolensky. 1993. Optimality Theory: Constraint interaction in generative grammar. In *Technical report rucss tr-2, center for cognitive science*. Rutgers University, New Brunswick, NJ. Published, Malden, MA: Blackwell (2004).
- Ritchart, Amanda, Grant Goodall & Mark Garellek. 2016. Prosody and the That-Trace Effect: An Experimental Study. In Kim Kyeong-min, Pocholo Umbal, Trevor Block, Queenie Chan, Tanie Cheng, Kelli Finney, Mara Katz, Shopie Nickel-Thompson & Lisa Shorten (eds.), *33rd west coast conference on formal linguistics*, 320–328. Somerville, MA: Cascadilla.
- Sato, Yosuke & Yoshihito Dobashi. 2016. Prosodic phrasing and that-trace effects. *Linguistic Inquiry* 46(1). 1–42.
- Selkirk, Elisabeth. 1986. On Derived Domains in Sentence Phonology. *Phonology* 3. 371–405.

- Selkirk, Elisabeth. 1995. Sentence prosody: intonation, stress and phrasing. In J A Goldsmith (ed.), *The handbook of phonological theory*, 550–569. London: Blackwell Publishers.
- Selkirk, Elisabeth. 1996. The prosodic structure of function words. In James Morgan & Katherine Demuth (eds.), *Signal to syntax: bootstrapping from speech to grammar in early acquisition*, 187–214. Mahwah, NJ: Erlbaum.
- Selkirk, Elisabeth. 2005. Comments on intonational phrasing in English. In Sónia Frota, Marina Vigário & Maria João Freitas (eds.), *Prosodies*, 11–58. Berlin: Mouton de Gruyter.
- Selkirk, Elisabeth. 2011. The syntax-phonology interface. In John Goldsmith, Jason Riggle & Alan Yu (eds.), *The handbook of phonological theory*, 435–483. Oxford: Blackwell.
- Toquero-Pérez, Luis Miguel. 2020. Revisiting extraction and subextraction patterns from arguments.
- Truckenbrodt, Hubert. 1999. On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30(2). 219–255.
- Tyler, Matthew. 2019. Simplifying Match Word: Evidence from English functional categories. *Glossa: a journal of general linguistics* 4(1). 1–32.
- Vergnaud, Jean-Roger. 1974. *French Relative Clauses*. Massachusetts Institute of Technology dissertation.
- Weir, Andrew. 2012. Left-edge deletion in English and subject omission in diaries. *English Language and Linguistics* 16(1). 105–129.
- Zec, Draga. 2005. Prosodic differences among function words. *Phonology* 22(1). 77–112.