Functional Categories and Prosodic Phrasing in English: Evidence from *That*-Trace Effects and Pronominal Object Shift [*]

Yosuke Sato
National University of Singapore
ellys@nus.edu.sg

Yoshihito Dobashi
Niigata University
dobashi@human.niigata-u.ac.jp

Abstract: One central working hypothesis in the Minimalist Program (Chomsky 1995) is that the core properties of the language faculty are to be explained solely in terms of interface conditions. As such, various phenomena that once were deemed the exclusive domain for syntactic investigations within the Government-Binding Theory (Chomsky 1981) have thus been subject to reanalysis at the syntax-phonology interface (Richards 2010). Following this hypothesis, we suggest an interface-oriented analysis of the two phenomena – *that*-trace effects and pronominal object shift – which have steadfastly resisted a purely syntactic explanation despite more than three decades of intense generative research. We propose that function words such as complementizers and simplex pronouns cannot form a prosodic phrase on their own. This analysis provides a straightforward account for the core paradigm regarding the two phenomena and the systematic exceptions triggered by contrastive focal stress (Drury 1999), adverbs (Bresnan 1977) and auxiliary reduction (Kandybowicz 2006).

Keywords: prosodic phrasing, that-trace effect, object shift, syntax-phonology interface

---

[*] Acknowledgements

1. Introduction

Since the advent of the Minimalist Program (Chomsky 1995, 2000, 2001, 2004), which attempts to provide a principled explanation for the design of the faculty of language from interface conditions imposed by the language-independent sensorimotor and conceptual systems, investigations of the nature and function of the syntax-phonology interface has come to the forefront of generative linguistic inquiries. Accordingly, a wide variety of the phenomena that once were discussed strictly in syntactic terms, e.g., the Empty Category Principle (ECP), within the Government-and-Binding (GB) Theory (Chomsky 1981, 1986a, b) has been reanalyzed in recent years with special reference to the way the syntactic computation interacts with the PF component (Bošković 2001; Bošković and Lasnik 2003; Merchant 2001; An 2007). To the best of our knowledge, Richards (2010) represents the most comprehensive research to date that seriously investigates an interface approach to certain erstwhile syntactic phenomena. Thus, Richards suggests that whether a language has overt *wh*-movement or not, a parametric property that has been simply stipulated by the strength of the interrogative feature in recent minimalist work (Chomsky 1995), is actually predictable from the position of the interrogative complementizer (initial C vs. final C) and its prosodic alignment structure (right-edge vs. left-edge). He argues that languages attempt to minimize the number of minor prosodic boundaries between a *wh*-phrase and a corresponding complementizer in one of two ways: either by directly manipulating the prosody so that the two words belong in the same prosodic domain or by syntactically

moving the *wh*-phrase as close as possible to the complementizer. The former strategy yields a *wh*-in-situ language such as Japanese whereas the latter strategy yields an obligatory *wh*-movement language such as English.

The purpose of this article is to investigate further empirical and theoretical consequences of this interface-oriented approach to two other phenomena familiar from the literature – *that*-trace effect and pronominal object shift – which in our view have heretofore steadfastly resisted a purely syntactic explanation despite more than three decades of rather intensive generative research. Specifically, we propose (1) as our central hypothesis.

(1) Inactivity of Function Words for Prosodic Phrasing the Syntax-Phonology Interface

Unstressed function words cannot form a phonological phrase on their own.

This prosodic condition has its roots in Trunckenbrodt's (1999: 226) *Lexical Category Condition* and Selkirk's (1984: 226) *Principle of Categorial Invisibility of Function Words,* both of which state that function words are invisible with respect to prosodic algorithms and constraints at the syntax-phonology mapping. We demonstrate that this simple condition provides a straightforward explanation for the core paradigm and systematic exceptions noted in the literature concerning the afore-mentioned two phenomena.

The present article is organized as follows. In section 2, we discuss the *that*-trace effect, a quintessential case of the subject-object asymmetry captured by the ECP within the

GB theory. We propose that this effect arises due to the violation of the condition in (1). When a local subject is extracted from a clause headed by the complementizer *that*, this extraction prevents the complementizer from forming a phonological phrase with a lexical word that immediately follows it. As a result, the extraction creates a configuration at the syntax-phonology interface that violates (1). We show that this analysis provides a principled explanation for the amelioration effects triggered by a) sentential adverbs (Bresnan 1977; Barss and Deprez 1986; Culicover 1993; Browning 1996), b) contrastive focus (Drury 1999: Kandybowicz 2006), and c) auxiliary contraction (Kandybowicz 2006). We also compare our analysis with two recent alternative interface-based analyses presented by Kandybowicz (2006) and Hasegawa (2003). We show that our analysis is superior to these analyses in both empirical and conceptual terms. Empirically, we demonstrate that our analysis can be extended to accounting for obligatory pronominal shift, a move that is not possible in these analyses specifically designed to account for the *that*-trace effect and its exceptions. We further point out that the two analyses cannot capture the observation, originally due to Browning (1996), that the embedded topicalization, unlike adverbs, cannot bring about the amelioration effect. This observation, however, directly falls out from our condition in (1), once we take seriously the particular intonational contour created by topicalization (Nespor and Vogel 1986; Truckenbrodt 1995). Conceptually, both Kandybowicz's and Hasegawa's analyses make a crucial reference to the notion of traces/gaps, but this reference is controversial in the literature. Our analysis is free from this controversy in that it stands on

the independently motivated assumption that function words are invisible at the level of prosodic phrasing. In section 3, we turn to obligatory prononomainl object shift, another case which we believe has resisted a purely syntactic explanation (Johnson 1991: Lasnik 1999). Johnson observes that a particle in verb + particle constructions (e.g., *pick up, make out, turn down*) can occur either before or after a full direct object NP but must precede the particle when the object is pronominal. We show that this observation is a straightforward result given (1) because weak pronouns must form a phonological phrase with a lexical word (namely a verb) that occurs immediately before the pronouns. Section 4 is the conclusion.

2. *That*-Trace Effects and Prosodic Phrasing of Functional Categories

As is well-known, the *that*-trace effect (Perlmutter 1968; Chomsky and Lasnik 1977) is the phenomenon where the complementizer *that* cannot be followed immediately by a trace in languages such as English. Example (2a) illustrates this effect. Direct objects and adjuncts behave differently from subjects in this regard because they do not exhibit the effect, as illustrated in (2b) and (2c), respectively.

(2) a. Who$_i$ do you think [(***that**) t_i wrote the book]? (subject extraction)

b. What$_i$ do you think [(**that**) Bill wrote t_i]? (object extraction)

c. Why$_i$ do you think [(**that**) Bill wrote the book t_i]? (adjunct extraction)

This subject-non subject asymmetry has been stadandardly taken in the GB literature (Lasnik and Saito 1984, 1992) to arise from the Empty Category Principle (Chomsky 1986a, b). This principle states that traces must be properly governed, where proper government is either antecedent-government or head-government by a lexical head. Accordingly to this ECP-based analysis, object traces are properly governed because objects are selected and hence head-governed by the verbs. Subject traces are not properly governed, on the other hand, because they are not selected by the verbs and the overt complementizer *that* somehow blocks the antecedent government of the original trace in subject position by the intermediate trace in the embedded specifier of C. As for the lack of the *that*-trace effect in the case of adjunct extraction in (2c), Lasnik and Saito (1992) stipulate that adjunct traces are licensed only at LF with respect to proper government whereas argument traces must be governed by S-Structure. Assuming further that the complementizer *that* as a semantically vacuous element is erased at LF, the original trace in the base position in (3c) can be properly governed by the intermediate trace in the embedded specifier of C in the same way that the subject trace can be properly governed by is intermediate trace when the complementizer *that* is eliminated in (2a).

2.1. That-*Trace Effects and the Interface Properties of the Complementizer* that

The ECP-based analysis reviewed above is not available, not even formulable within the current minimalist framework, which attempts to dispense with all arbitrary geometric

notions including government and does away with conceptually unmotivated levels of representation such as S-structure. Our interface-oriented analysis, on the other hand, correctly predicts this subject-non-subject asymmetry in a principled way that does not rely upon government as its central technical premise. Firstly, the example in (2a) is ungrammatical with the overt complementizer *that*. According to our analysis, *that* in its unstressed/weak form cannot form a prosodic phrase on its own but instead must form one with a lexical word that follows it. Given the independently observed prosodic phrasing of (2a), shown in (3), where the VP *wrote the book* forms its own phonological phrase to the exclusion of the complementizer, (2a) violates our PF-condition stated in (1).

(3) a. * [$_{PhP}$ Who$_i$ do you think [$_{PhP}$ **that** t_i] [$_{PhP}$ wrote the book]]]

violates (1) because* that *cannot form a prosodic phrase on its own

b. [$_{PhP}$ What$_i$ do you think [$_{PhP}$ (**that**)] Bill wrote t_i]]

***satisfies (1) because* that *forms a prosodic phrase with* Bill**

c. [$_{PhP}$ Why$_i$ do you think [$_{PhP}$ (**that**)] Bill wrote the book t_i]?

***satisfies (1) because* that *forms a prosodic phrase with* Bill**

This violation does not occur with the extraction of direct objects and adjunct elements. In (3b, c), the complementizer *that* can form a phonological phrase with the lexical word that immediately follows it (i.e., *Bill*), as schematically represented in (3b, c), respectively

There is independent evidence suggesting that the *that*-trace effect is the by-product of the syntax-external phonological system rather than the result of purely syntactic principles such as ECP. The relevant evidence comes from sluicing. Drawing on the classical analysis presented by Ross (1969), Merchant (2001) argues that sluicing constructions in English, as illustrated in (4a), are the product of the syntactic *wh*-movement of an interrogative *wh*-phrase followed by the deletion of the TP in the phonological component, as shown in (4b).

(4) a. Somebody just left. – Guess who.

b. Somebody just left. – Guess [$_{CP}$ who [$_{TP}$ ~~t_i just left~~]].

Assuming that Merchant's anlaysis of English sluicing is correct, our interface-based analysis predicts that the *that*-trace effect is eliminated once the TP constituent that contains the offending phrasing like the one in (3a) is deleted by the deletion, because we assume that the effect is essentially prosodic in nature. This prediction is indeed borne out by (5a, b).

(5) a. * John said that someone would write a new textbook but I can't remember who$_i$

John said that t_i would write a new textbook.

b. John said that someone would write a new textbook but I can't remember who$_i$

[$_{TP}$ ~~John said that t_i would write a textbook~~].

(Merchant 2001: XXX)

The example in (5a) illustrates the now familiar *that*-trace effect. The example in (5b) shows that TP-deletion in the PF component nullifies the relevant effect. Suppose for the sake of argument that the effect here were purely syntactic as it were so deemed in the classical ECP-approach. Then, we wrongly predict that there would be no contrast in grammaticality between the full-fledged example in (5a) and its elliptical counterpart in (5b). An ECP violation is deemed a strictly syntactic violation (either checked at S-Structure or at LF). Accordingly, we expect that no ellipsis should be able to remedy such a violation. Therefore, the existence of the ameliorating effect caused by PF deletion provides an empirical argument *par excellence* that the *that*-trace effect is indeed a PF-phenomenon.

2.2. *Salvation Effects Triggered by Sentence Adverbs, Contractive Focus and Reduction*

It is well known in the literature that the *that*-trace effect is ameliorated by several other prosodic strategies than sluicing. Firstly, the effect is suspended when a sentential adverb is inserted between the complementizer *that* and the *wh*-trace (Bresnan 1977; Barss and

Deprez 1986; Culicover 1993; Browning 1996). This observation is illustrated in (6a) with the *wh*-movement and in (6b) with relativization.

(6) a. Who$_i$ do you think that **after years and years of cheating death** t_i finally died?

b. the author$_i$ that the editors predict that **for all intents and purposes** t_i will be adored?

(Kandybowicz 2006: 222)

The adverb effect here is a straightforward consequence of our condition in (1). The adverbs inserted in the positions indicated in (6a, b) allow the complementizer *that* to form a phonological phrase with the adverbs, as shown in (7a, b), respectively.

(7) a. [$_{PhP}$ Who$_i$ do you think [$_{PhP}$ that **after years and years of cheating death**] [$_{PhP}$ t_i finally died]]]. ***Satisfies (1) because* that *forms a prosodic phrase with* Adv**

b. [$_{PhP}$ the author [$_{PhP}$ that the editors predict [$_{PhP}$ that **for all intents and purposes** [$_{PhP}$ t_i will be adored]]

It is to be noted at this point that not all adverbs have the salvation effect. Thus, Hasegawa (2003) observes that VP-adverbs such as *just* and *completely* cannot ameliorate the *that*-trace effect, as shown in (8a, b).

(8) a. * Who$_i$ did she say that t_i **just** escaped death?

b. * the army$_i$ that we know that t_i **completely** destroyed the village

(Hasegawa 2003: 242)

It appears at first sight that the lack of the ameliorating effect in (8a, b) is problematic for our proposed analysis but upon a closer examination this fact in fact provides further support for it. As Hasegawa (2003) notes, the adverbs in (8a, b) must occur after the subject; as shown by the examples in (9a-d), the adverbs *just* and *completely* must follow their local subjects. Note that, by way of comparison, the sentential adverbs in (6a, b) can occur before their local subjects, as the grammaticality of the examples in (10a, b) indicates.

(9) a. He **just** escaped death.

b. * **Just** he escaped death.

c. The army **completely** destroyed the village.

d. * **Completely** the army destroyed the village.

(Hasegawa 2003: 242)

(10) a. **After years and years of cheating death** Mary finally died.

b. The editors predict that **for all intents and purposes** the author will be adored.

Given the relative ordering between the VP-adverbs and subjects in mind, the example in (8a), for instance, is parsed as shown in (11).

(11) [$_{PhP}$ Who$_i$ did she say [$_{PhP}$ that t_i] [$_{PhP}$ **just** escaped death]]?

violates (1) because* that *cannot form a prosodic phrase on its own

This representation violates the condition in (1) because *that* cannot form a prosodic phrase on its own. Thus, our analysis correctly excludes examples such as (8a, b) on a par with (2a).

Secondly, contrastive focal stress on the verb in the subordinate clause mitigates the *that*-trace violation (Drury 1999; Kandybowicz 2006). Examples in (12a, b) illustrate this mitigating effect.

(12) a. (?) Who$_i$ do you think that t_i **WROTE** *Barriers* (as opposed to say, *edited* it)?

b. * Who$_i$ do you **THINK** that t_i wrote *Barriers* (as opposed to say, *know*)?

c. * Who$_i$ do you think that t_i wrote *Barriers* **YESTERDAY** (as opposed to *a year ago*)?

(Kandybowicz 2006: 222-223)

In (12a), the contrastive focus stress on the embedded verb *wrote* salvages what otherwise would end up as a *that*-trace violation. Note that it is the verb which immediately follows the *wh*-trace that has this salvation effect. Thus, as shown in (12b, c), focal stress on the matrix

verb *think* or the embedded adverb *yesterday* does not cause any amelioration effect. Again, our analysis is straightforward for the present case. The emphatic stress on *wrote* in (12a) facilitates the prosodic phrasing shown in (13).

(13) [$_{IntP}$ Who$_i$ do you think **that**] [$_{IntP}$ t_i WROTE Barriers]

Under this phrasing, the complementizer *that* marks the end of the first intonational phrase. The second intonational phrase then is initiated by the focused element WROTE. Selkirk (1996) observes that in English, monosyllabic function words may appear in either a weak/stressless form or a strong/stressed form depending on their syntactic positions in a clause, unlike a lexical category that always appears in a stressed/unreduced form. Crucial for our current purposes is that function words must take the stressed form at the right edge of a prosodic phrase. Consider examples (14a-d) from Selkirk.

(14)	a.	I can eat more than Sarah ***cán***.	[kæn], *[kən], *[kn]
	b.	Wherever Ray ***ís***, he's having a good time.	[ɪz], *[z]
	c.	What did you look ***át*** yesterday?	[æt], *[ət]
	d.	Who did you do it ***fór*** that time?	[fɔr], *[fr]

(Selkirk 1996: 200)

All the italicized monosyllabic function words in (14a-d) occur in strong versions because they stand at the right edge of their phonological phrases. The complementizer *that* in the phrasing shown in (13) is also obligatorily realized as a strong/stressed form because it marks the right-edge of the first phonological phrase. Thus, (13) does not violate our condition in (1), which only applies to unstressed function words. The examples in (12b, c) also naturally fall out from our analysis. The focal stress on the embedded verb *wrote* or on the embedded adverb *yesterday* does not change the prosodic phrasing in a way that crucially salvages the *that*-trace effect. In both examples, the complementizer *that* is materialized as an unstressed function word. Thus, the examples are bad on a par with standard cases of the *that*-trace violation such as the one illustrated in (2a).

Note that our analysis makes another important prediction at this point. We predict that the *that*-trace effect disappears under Right-Node-Raising (RNR). Our reasoning is as follows. It is well known that the elements that undergo RNR are obligatorily parsed as separate intonational phrases. Under this context, intonational boundaries occur, on one hand, between the first and the second conjunct, and, on the other hand, between the remaining material in the second conjunct and the shared/right-node-raised material, as shown in (15b) for the sentence in (15a).

(15) a. John could have planned, and Mary could have hosted, a huge party.

b. [$_{IntP}$ John could have planned] [$_{IntP}$ and Mary could have hosted] [$_{IntP}$ a huge party]

Given this independent fact, our analysis predicts that the *that*-trace effect disappears when the complementizer *that* occurs at the right-edge of the second conjunct as the result of RNR because it must be realized as a stressed/full form in such a syntactic context as per Selkirk's (1996) observation. This prediction is indeed verified. De Chene (1995, 2000, 2001) points out that the intonational boundary created by RNR ameliorates the *that*-trace violation, as shown in (16a, b).

(16) a. Who$_i$ does John doubt **whether** and Bill suspect **that** t_i cheated on the exam?

b. That's the guy Jim's been wondering **if**, and Tom's been saying **that**, t_i really likes Sue.

(Kandybowicz 2006: 222)

In (16a), for instance, the TP undergoes RNR into the sentence-final peripheral position. Thus, this example receives the intonational phrasing shown in (17).

(17) [$_{IntP}$ Who$_i$ does John doubt **whether** [$_{IntP}$ and Bill suspect **that** [$_{IntP}$ t_i cheated on the exam]]]

In (17), the complementizer *that* occurs at the right edge of the second intonational phrase. Thus, it must be realized as a full/stressed form. Accordingly, our condition in (1) is inapplicable, making the sentence acceptable. A similar story holds for (16b).

Thirdly, Kandybowicz (2006) points out that auxiliary reduction across a trace voids the *that*-trace effect. In (18a), the auxiliary *will* contracts itself to its immediately preceding complementizer *that*, getting rid of what otherwise would yield a *that*-trace violation. A similar amelioration takes place in the relativization context in (18b).

(18) a. (?) Who do you suppose **that'll** leave early?

b. (?) The author that the editor predicted **that'd b**e adored.

(Kandybowicz 2006: 222)

We analyze this observation as follows. It is well known in the literature on auxiliary reduction (King 1970; Lakoff 1970; Bresnan 1971; Kaisse 1983) that auxiliary reduction is blocked when an auxiliary is immediately followed by a gap created either by transformations or by deletion. Examples in (19a, b) illustrate this blocking effect.

(19) a. I am wondering where {**Mary is**/***Mary's**}. (*wh*-movement)

b. Murphy is taller than {**Gabe is**/***Gabe's**}. (comparative deletion)

Bresnan (1971) suggests that this blocking effect immediately falls into place if auxiliaries are proclitics, namely phonological clitics that attach to their following words; the examples in (19a, b) are unacceptable with auxiliary reduction because the auxiliaries then have

nothing on their right to contract onto. Given this suggestion, we assume that the contracted auxiliary *'ll* in (18a) first attaches to the lexical word *leave* and that the unstressed complementizer *that* in turn attaches to the auxiliary +verb complex. Under this view, *that* successfully forms a prosodic phrase together with the following verb *leave* thanks to the prior cliticization of the contracted auxiliary to the verb.

2.3. *Other Alternative PF Analyses*

In this section, we compare our proposed analysis of the *that*-trace effect with two recent alternative analyses developed by Kandybowicz (2006) and Hasegawa (2003), both of which independently pursue a PF-based analysis of the same phenomenon.

Kandybowicz (2006) proposes that in English, the linear sequence <C^0, t> is illicit when C^0 and the trace are adjacent within the same prosodic phrase and C^0 is aligned with a prosodic phrase boundary. Kandybowicz's constraint is defined as follows.

(20) PF Anti-Adjacency Filter on Complementizers and Traces

*<C^0, *t*> iff:

i. C^0 & *t* are adjacent within a prosodic phrase AND

ii. C^0 is aligned with a prosodic phrase boundary

(Kandybowicz 2006: 223)

This constraint correctly accounts for the paradigm discussed above. Firstly, (2a) is ungrammatical because *that* and the *wh*-trace are adjacent within a single prosodic phrase Secondly, (6a) and (16a) are both grammatical because *that* and the *wh*-trace are no longer within a single prosodic phrase due to the sentential adverbials and right-node-raised constituents, as shown in (21a) and (21b), respectively.

(21) a. [$_{IntP}$ Who do you think that [$_{IntP}$ **after years and years of cheating death**] ____ [$_{IntP}$ finally died]

b. [$_{IntP}$ Who does John doubt whether] [$_{IntP}$ and Bill suspect **that**] [$_{IntP}$ cheated on the exam]

Thirdly, in (12a), the *that*-trace effect is void because contrastive focal stress on the embedded verb wrote disrupts the adjacency of *that* and the *wh*-trace within a single prosodic phrase. The filter in (20) also correctly predicts that focusing any other material that would not disrupt the adjacency will not save the *that*-trace violation, as shown in (12b, c). The schematic representations for (12a-c) are shown in (22a-c), respectively.

(22) a. [$_{IntP}$ Who did you think that] ___ [$_{IntP}$ WROTE *Barriers* yesterday]]?

b. [$_{IntP}$ Who did you THINK [$_{IntP}$ that ___ wrote] [$_{IntP}$ *Barriers* yesterday]]?

c. [$_{IntP}$ Who did you think [$_{IntP}$ that ___ wrote Barriers [$_{IntP}$ YESTERDAY]]?

Finally, (18a, b) are grammatical, according to Kandybowicz, because auxiliary reduction makes the *wh*-trace internal to C^0; as a result, the complementizer and the trace do not count as adjacent, even though they are in the same prosodic phrase.

The reason why Kandybowicz includes (20ii) in his filter is to account for the observation that the *that*-trace effect fails to obtain in matrix relativization cases such as (23).

(23) $[_{IntP}$ the butler that ___ murdered the maid] (No IntP boundary before C^0)

(Kandybowicz 2006: 220)

Kandybowicz observes that in the case of unembedded subject relativization, there is no intermediate IntP boundary separating C^0 from the embedded clause, as shown in the phrasing given in (23). This example does not exhibit the *that*-trace effect because the complementizer is not aligned with a prosodic phrase boundary. Notice that our analysis also correctly predicts the absence of the relevant effect in (23). The complementizer *that* can form a phonological phrase with its immediately following lexical word *murdered* because no prosodic boundary exists between the complementizer and the verb.

Although our analysis agrees with Kandybowicz's in its fundamental insight that the *that*-trace effect is essentially phonological in nature, we believe that our analysis is free from certain conceptual and empirical challenges that would face Kandybowicz's. Conceptually, it is a controversial assumption that traces, the output of syntactic derivation, are visible at the

level of prosodic boundary formation. It has been commonly held in the literature on prosodic phonology that empty categories, including traces, do not have any effect on the application of prosodic rules. It is true that a number of phenomena, most importantly, *wanna*-contraction (Zwicky 1970; Zwicky and Pullum 1983; Lakoff 1970; King 1970; Bresnan 1971) have been argued to be conditioned by the intervening traces. However, Nesport and Scorretti (1985) have convincingly shown that this process is not affected by the presence of traces and have instead suggested a non-syntactic analysis. Sato (in press) also independently proposes a new analysis of *wanna*-contraction within the Multiple Spell-Out Model of the minimalist framework (Chomsky 2000, 2001, 2004; Uriagereka 1999) that does not require any extra stipulation regarding the visibility of empty categories/traces/copies for the purposes of morpho-phonological adjustments in the PF component.

Empirically, Kandybowicz's filter is limited in its empirical scope in that it is tailored specifically for the *that*-trace effect in English and its systematic exceptions. On the other hand, our proposed condition is not proposed to just cover this pattern but rather should be able to extend to several other ostensibly PF-phenomena that have resisted a purely syntactic explanation in the GB theory. Indeed, in the next section, we show that the obligatory cliticization of a weak pronoun to the verb in verb-particle constructions in English, a pattern which would be mysterious under a purely syntactic account, straightforwardly falls out from our proposed condition.

Furthermore, it is to be noted that under Kandybowic'z analysis, the *that*-trace effect is lifted as long as the complementizer and the trace are not within the same prosodic boundary, an outcome that can be created, for example, by intervening adverbs. However, this analysis cannot capture the observation, first pointed out by Browning (1996), that embedded topicalized arguments, in contrast to adverbs, cannot mitigate the *that*-trace violation. To illustrate this point, consider examples in (24a-d).

(24) a. * Who$_i$ did Leslie think that, **this present**, t_i Kim gave to?

b. * Who$_i$ did Robin say that, **this present**, t_i gave Lee?

(Browning 1996: 250)

In (24a), the complementizer *that* and the topicalized DP *this present* belong into two different intonational domains, as shown in (25).

(25) [$_{IntP}$ Who$_i$ did Leslie think [$_{IntP}$ that,] [$_{IntP}$ **this present**, [$_{IntP}$ t_i] Kim gave to]]]]

C^0 and trace are not adjacent within a single prosodic phrase

Since the two elements are not adjacent within a single prosodic phrase, Kandybowicz's analysis would wrongly predict that the example in (24) should be grammatical. Our analysis, on the other hand, correctly predicts this result. As already indicated in (25), in English, a

topicalized expression constitutes a self-contained intonational phrase (see Nespor and Vogel 1986 and Truckenbrodt 1995). Given this observation, the intonational phrasing for the example in (24a) would be as in (26) under our alternative analysis.

(26) [$_{IntP}$ Who$_i$ did Leslie think [$_{IntP}$ that, [$_{IntP}$ this present], [$_{IntP}$ t_i Kim gave to]]]]?

violates (1) because that cannot form a prosodic phrase with this present

In this representation, the embedded topicalized DP *this present* creates an independent prosodic domain to the exclusion of any other material that precedes or follows it. Note that *that* cannot surface as a strong form since it does not stand at the right-edge of a prosodic phrase. As a result, *that* cannot form a prosodic phrase with the DP, in violation of (1).

Our present analysis, of course, predicts that the violation of (1) does not occur if we have other XPs such as sentential adverbs such as those shown in (6a, b), repeated here as (27a, b), and polarity expressions such as *under no circumstances* illustrated in (27c).

(27) a. Who$_i$ do you think that **after years and years of cheating death** t_i finally died?

b. the author$_i$ that the editors predict that **for all intents and purposes** t_i will be adored?

c. Who$_i$ did John say that **under no circumstances** t_i would run for president?

d. Leslie is the person$_i$ who I said that **under no circumstances** t_i would run for president.

((27d) from Culicover 1993: 558)

The reason is that the adverbs/polarity expressions do not create an obligatory intonational boundary as the topicalized DPs do in English.

Hasegawa (2003) also shares the central idea with our proposed analysis that the true nature of the *that*-trace effect is best understood in phonological terms rather than in syntactic terms. Specifically, Hasegawa argues that the effect obtains in the phonological component due to the idiosyncratic property of the weak complementizer *that* as a learner, i.e., an element that must attach to the word that immediately follows it. As a result, the *that*-trace effect arises whenever this linear adjacency is blocked by the intervening gap. His condition is stated in (28).

(28) Phonological Condition on Complementizers

The complementizer C phonologically depends on the word that immediately follows it. Let us call this C+W (W=word). As a result, it becomes quite difficult (or impossible) to have a gap between the C and the word that immediately follows it.

(Hasegawa 2007: 240)

Let us see how Hasegawa's analysis covers the paradigm discussed thus far in the paper. Firstly, the example in (2a) is bad because the gap created by *wh*-movement blocks the complementizer *that* from leaning onto the verb *wrote* to create *that + wrote* sequence. This disruption does not occur in the examples in (2b, c), on the other hand, which involve extraction of the direct object and adjunct elements, respectively. Secondly, the adverb effect illustrated in (6a, b) is also accounted for because the adverb can serve as the word that immediately follows the complementizer *that*. Finally, Hasegawa suggests that, when the complementizer *that* stands at the right edge of an intonational phrase, it receives weak stress and is realized as an independent prosodic word, an assumption that our analysis also adopts. As a result, his condition in (28) is no longer applicable in such a case. A similar analysis holds for the salavation effect triggered by the contrastive focus on the embedded verb in (12a) where the complementizer is realized in a stressed/full form.

However, it is not clear under Hasegawa's analysis how auxiliary reduction could save what otherwise would end up as a *that*-trace violation. His analysis would wrongly

predict that the examples in (18a, b) should be ungrammatical because the gap between the complementizer and the reduced auxiliary should disrupt the strict linear adjacency between the two elements required for them to form a C+W. Hasegawa's analysis also cannot account for Browning's (1996) observation, illustrated earlier in (24a, b), namely, that the embedded topicalized expressions cannot save a *that*-trace violation. In (24a), for instance, the weak complementizer *that* is adjacent to the lexical word that immediately follows it (i.e., *this present*). Thus, nothing in his condition in (28) would block the complementizer from leaning on the topicalized DP.

We also believe that our analysis is superior to Hasegawa's alternative in terms of conceptual considerations. Hasegawa's analysis leaves it unclear why a complementizer in its weak form must lean onto its immediately following word. Our analysis suggests a deeper explanation for this question; it is due to the prosodic requirement that a function word cannot form a prosodic phrase on its own.

3. Obligatory Pronoun Object Shift and the EPP at the Syntax-Phonology Interface

The nature of the so-called pronominal shift has not been seriously investigated in the generative literature, much less from the perspective of the syntax-phonology interface. In this section, we demonstrate that our proposed condition in (1) can be extended to cover obligatory pronominal object shift, another ostensibly prosodic phenomenon which has resisted a purely syntactic explanation within the GB theory/the Minimalist Program.

The effect of obligatory pronominal shift is observed in the contrast between (29a, b) and (30a, b).

(29) a. Mikey looked **the reference** up.

b. Mikey looked up **the reference**. (Johnson 1991: 593)

(30) a. Mikey looked **it** up.

b. * Mikey looked up **it**. (Johnson 1991: 594)

The contrast here illustrates that a full DP object of the particle in verb + particle constructions can appear either before or after the particle (29a, b) whereas a pronominal object of the same particle can only occur before the particle (30a, b). The same distributional contrast also obtains in *make-out* constructions. As the comparison of the examples in (31a, b) and (32a, b) illustrate, a full DP can appear on either side of the particle, unlike a simplex pronoun, which must appear before the particle.

(31) a. Mikey made out **George** to be a liar.

b. Mikey made **George** out to be a liar. (Johnson 1991: 595)

(32) a. Mikey made **him** out to be a liar.

b. * Mikey made out **him** to be a liar. (Johnson 1991: 595)

Lasnik (1999) suggests a purely syntactic account for this contrast. The EPP-assignment to trigger overt object shift (i.e., the movement of a direct object into [Spec, AgrO] in his system) is optional for full NPs but obligatory for simplex pronouns. However, this analysis is far from satisfactory because it is a mere re-statement of the underlying issue in technical terms. This suggests that a syntactic explanation of the pattern is not viable.

We propose instead that the contrastive distribution with regards to the position of full NPs vs. simplex pronouns in verb + particle constructions is best explained as a further empirical consequence of our condition in (1). Recall that function words in their unstressed/weak forms cannot form a prosodic phrase on their own. Accordingly, let us hypothesize that a simplex pronoun, being prosodically deficient, must be parsed in the same prosodic phrase with a lexical word, just as the unstressed complementizer *that* must form a prosodic phrase with its following lexical word such as sentential adverbs. Under this analysis, (32b) is ungrammatical because *him* cannot prosodically attach to a lexical word (i.e., *made*) due to the intervention of the particle *out*. This prosodic deficiency is removed in the alternative V + pronoun +particle order shown in (32a), where the pronoun can attach to the preceding verb. On the other hand, this restriction does not hold for full NPs such as

George, as shown in (31a, b), because the condition in (1) does not apply to an independent lexical word. Essentially the same approach can apply to the other examples in (29-30).

At this point, our analysis makes one important prediction. According to our hypothesis, the obligatory pre-particle position of simplex weak pronouns is due to the fact that they cannot form a prosodic phrase on their own and hence must attach themselves to the preceding lexical word. Given this observation, we predict that simplex pronouns should be able to occur in the post-particle position as long as they are realized as stressesed/full words This prediction is indeed borne out. Johnson (1991) observes that simple pronoun can stay in the post-particle position under three conditions: either a) when they receive contrastive focus stress, b) when they occur in a coordinate structure, or c) when they are replaced with a demonstrative element such as *that*. These three strategies are illustrated in (33a-c), respectively.

(33) a. Mikey made out **THEM** to be liars! (contrastive focus/stress)

b. Mikey made out **her and him** to be liars. (coordination)

c. Mikey made out **that** to be false. (complex demonstrative)

(Johnson 1991: 595)

The pattern observed here is exactly what is predicted under our current analysis. Firstly, the contrastively focused pronoun *them* can occur in the V + particle +pronoun order because

them is not a reduced function word in this context. Secondly, an otherwise simplex pronoun can prosodically lean on the following material making the whole behaves as an independent prosodic word. Finally, the demonstrative *that* can occur after the particle if we assume that English demonstratives are complex, where the initial consonant actually represents the definiteness (Chomsky 1995: 338; see also Leu 2008 for independent evidence for this claim).

4. Conclusions

This article has suggested an interface approach to two phenomena – the *that*-trace effect and obligatory pronominal shift – which have long been deemed the exclusive empirical domains of syntax for the last few decades of generative research. We have argued, however, that the true nature of these phenomena can best be revealed once we investigate them from the perspective of the syntax-phonology interface. Following the insights from Selkirk (1984) and Truckenbrodt (1999), we have proposed that weak function words cannot form a prosodic phrase on its own. We have shown that this condition provides a principled explanation for a wide variety of the traditional observations regarding the *that*-trace effect and pronominal shift in English which have resisted a purely syntactic explanation in the generative literature. It remains to be seen whether our condition can be extended further to cover many other empirical areas (e.g., the distribution of null complementizers in English; Bošković and Lasnik 2003) that hint at the relevance of prosodic factors both within English and across languages. We leave this important task for further investigations.

References

An, Duk-Ho. 2007. Syntax at the PF interface: Prosodic mapping, linear order, and deletion. Doctoral dissertation, University of Connecticut, Storrs.

Barss, Andrew and Viviane Deprez. 1986. On extractions and affective triggered inversion. Ms., MIT.

Bošković, Željko. 2001. On the nature of the syntax-phonology interface: Cliticization and related phenomena. Amsterdam: Elsevier.

Bošković, Željko and Howard Lasnik. 2003. On the distribution of null complementizers. *Linguistic Inquiry* 34: 527-546.

Bresnan, Joan. 1971. Contraction and the transformational cycle in English. Ms., MIT.

Bresnan, Joan. 1977. Variables in the theory of transformations. In Peter Culicover, Thomas Wasow and Adrien Akmajian (eds.), *Formal syntax*, 157-196. New York: Academic Press.

Browning, Maggie. 1996. CP recursion and *that-t* effects. *Linguistic Inquiry* 27: 237-255.

Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.

Chomsky, Noam. 1986a. *Knowledge of language: Its nature, origin, and use*. New York: Praeger.

Chomsky, Noam. 1986b. *Barriers*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1995. *The minimalist program*. Cambridge, MA: MIT Press.

Chomsky, Noam. 2000. Minimalist inquiries: The framework. In Roger Martin, David Michaels and Juan Uriagereka (eds.), *Step by step: Essays on minimalist syntax in honor of Howard Lasnik*, 89-155. Cambridge, MA: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In Michael Kenstowicz (ed.), *Ken Hale: A life in language*. 1-52. Cambridge, MA: MIT Press.

Chomsky, Noam. 2004. Beyond explanatory adequacy. In Adriana Belletti (ed.), *Structures and beyond: The cartography of syntactic structures, vol. 3*, 104-131. Oxford: Oxford University Press.

Chomsky, Noam and Howard Lasnik. 1977. Filters and control. *Linguistic Inquiry* 8: 425-504.

Culicover, Peter. 1993. Evidence against ECP accounts of *that-t* effect. *Linguistic Inquiry* 24: 557-561.

De Chene, Brent. 1995. Complementizer-trace effects and the ECP. Geneva Generative Papers 3: 1-4. Départment de Linguistique Générale, Université de Genève.

De Chene, Brent. 2000. Prosody and subject traces. Ms., Waseda University.

De Chene, Brent. 2001. Prosody and trace-licensing: Complementizer-trace effects and beyond. Poster presented at the Workshop on Prosody in Processing, Utrecht University, OTS, July 6.

Drury, John E. 1999. The mechanics of π-derivations: An alternative "direction" for syntactic theory. In Sachiko Aoshima, John E. Drury, and Tuomo Neuvonen (eds.), *University of Maryland Working Papers in Linguistics* 8, 180-212. University of Maryland, College Park: Department of Linguistics.

Hasegawa, Kinsuke. 2003. Seiseibumpoo no hoohoo: Eigo toogron no sikumi. (Methodologies in generative grammar: Mechanisms of English syntax). Tokyo: Kenkyusha.

Johnson, Kyle. 1991. Object positions. *Natural Language & Linguistic Theory* 9: 577-636.

Kaisse, Ellen M. 1983. The syntax of auxiliary reduction in English. *Language* 59: 93-122.

Kandybowicz, Jason. 2006. Comp-trace effects explained away. In Donald Baumer, David Montero and Michael Scanlon (eds.), *Proceedings of the 25th West Coast Conference on Formal Linguistics*, 220-228. Somerville, MA: Cascadilla.

King, Harold V. 1970. On blocking the rule for contraction in English. Linguistic Inquiry 1: 134-136.

Lakoff, George. 1970. Global rules. *Language* 46: 627-639.

Lasnik, Howard. 1999. *Minimalist analysis*. Oxford: Blackwell.

Lasnik, Howard and Mamoru Saito. 1984. On the nature of proper government. *Linguistic Inquiry* 15: 235-289.

Lasnik, Howard and Mamoru Saito. 1992. *Move alpha: Conditions and its application and output*. Cambridge, MA: MIT Press.

Leu, Thomas. 2008. The internal syntax of determiners. Doctoral dissertation, New York University.

Merchant, Jason. 2001. *The syntax of silence: Sluicing, islands, and the theory of ellipsis*. Oxford: Oxford University Press.

Nespor, Marina and Mauro Scorretti. 1985. Empty elements and phonological form. In: Jacqueline Guéron, Hans-Georg Obenauer and Jean-Yves Pollock (eds.), *Grammatical representation*, 223-235. Dordrecht: Foris.

Perlmutter, David. 1968. *Deep and surface structure constraints in syntax*. New York: Holt, Rinehart and Winston.

Richards, Norvin. 2010. *Uttering trees.* Cambridge, MA: MIT Press.

Ross, John R. 1969. Guess who. In Robert Binnick, Alice Davison, Georgia Green and Herry Morgan (eds.), Papers from the 5th Regional Meeting of the Chicago Linguistic Society, 252-286. Chicago, IL: Chicago Linguistic Society.

Sato, Yosuke. In press. Multiple spell-out and contraction at the syntax-phonology interface. *Syntax.*

Selkirk, Elizabeth. 1984. *Phonology and syntax: The relation between sound and structure*. Cambridge, MA: MIT Press.

Selkirk, Elizabeth. 1996. The prosodic structure of function words. In Morgan James and Katherine Demuth (eds.), *Signal to syntax: Bootstrapping from speech to grammar in early acquisition*, 187-213. Mahwah, NJ: Lawrence Erlbaum Associates.

Truckenbrodt, Hubert. 1999. On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30: 219-255.

Uriagereka, Juan. 1999. Multiple spell-out. In Samuel D. Epstein and Norbert Hornstein (eds.), Working Minimalism, 251-282. Cambridge, MA: MIT Press.

Zwicky, Arnold M. 1970. Auxiliary reduction in English. *Linguistic Inquiry* 1: 323-336.

Zwicky, Arnold M. and Geoffrey K. Pullum. 1983. Cliticization vs. inflection: The case of English n't. *Language* 59: 502-513.