Functional Categories and Prosodic Phrasing in English:

Evidence from *That*-Trace Effects and Pronominal Object Shift [*]

Abstract: One central working hypothesis in the Minimalist Program is that the core properties of the language faculty are to be explained in terms of interface conditions. We suggest here 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 cannot form a prosodic phrase on their own. This analysis straightforwardly derives the core paradigm regarding the two phenomena and the well-known exceptions triggered by prosodic strategies including contrastive focalization, adverbs, right-node-raising and auxiliary reduction.

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

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, investigations of the syntax-phonology interface have come to the forefront of the generative enterprise. A wide variety of the phenomena that once were discussed strictly in syntactic terms such as the Empty Category Principle (ECP) within the Government-and-Binding (GB) Theory

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(Chomsky 1981, 1986a, b) have been reanalyzed in recent years with special reference to the way the syntactic computation interacts with the sound-related component (Bošković 2001; Bošković and Lasnik 2003; Merchant 2001; An 2007; Richards 2010). The purpose of this article is to investigate further consequences of this interface-oriented approach to two other phenomena – *that*-trace effects and pronominal object shift – which in our view have steadfastly resisted a purely syntactic explanation despite more than three decades of rather intensive generative research. Specifically, we propose (1) as our central hypothesis. This condition has its roots in Truckenbrodt'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.

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

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

The article is organized as follows. In section 2, we propose that the *that*-trace effect arises due to the violation of (1). This analysis provides a principled explanation for the amelioration effects triggered by a) adverbs, b) contrastive stress, c) right-node-raising and d) auxiliary contraction. We compare our analysis with two alternative analyses presented by Kandybowicz (2006) and Hasegawa (2003). In section 3, we turn to pronominal object shift, another case which has resisted a syntactic explanation. We show that this observation is another consequence of (1). Section 4 is the conclusion.

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

The *that*-trace effect (Perlmutter 1968; Chomsky and Lasnik 1977) is the phenomenon where *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 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 asymmetry has been standardly 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. According to this analysis, object traces are properly governed because objects are head-governed by the verbs. Subject traces are not properly governed because they are not selected by the verbs and the overt C somehow blocks the antecedent government of the original trace in subject position by the intermediate trace. As for the lack of the *that*-trace effect in (2c), Lasnik and Saito (1992) suggest that adjunct traces are licensed only at LF with respect to proper government whereas argument traces must be properly governed by S-Structure. Assuming further that *that* as a semantically vacuous element is erased at LF, the

original trace in (2c) is properly governed by the intermediate trace in the same way that the subject trace is properly governed by the intermediate trace when *that* is eliminated in (2a).

2.1. That-*Trace Effects and the Interface Properties of Function Words*

The ECP analysis is not formulable within the minimalist framework, which attempts to dispense with government and to do away with S-structure. Our interface-oriented analysis correctly predicts the subject vs. non-subject asymmetry in a principled way that does not rely upon government as its central technical premise. Firstly, given the prosodic phrasing of (2a) shown in (3a), where the VP *wrote the book* forms its own phonological phrase to the exclusion of the C, (2a) violates (1). This violation does not occur in (2b, c) where *that* can form a phonological phrase with the lexical word that immediately follows it (i.e., *Bill*), as shown in (3b, c), respectively.

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

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

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

There are two independent arguments showing that the *that*-trace effect is the by-product of the syntax-phonology interface rather than the result of syntactic principles such as ECP. One argument comes from sluicing. Drawing on the classical analysis presented by Ross (1969), Merchant (2001) argues that sluicing constructions in English, illustrated in (4a), are the product of the *wh*-movement followed by TP-deletion in the PF, as shown in (4b).

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

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

Our analysis predicts that the *that*-trace effect is eliminated once the TP that contains the offending phrasing is deleted. As pointed out by Merchant (2001: 183-185), this prediction is borne out. (5a) illustrates the *that*-trace effect. (5b) shows that TP-deletion nullifies the effect.

(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~~].

((5b) from Kandybowicz (2006: 222))

Suppose that the effect here were purely syntactic as it were so deemed in the classical ECP-approach. Then, we would wrongly predict no contrast between (5a) and (5b) because an ECP violation is deemed a strictly syntactic violation (either checked at S-Structure or at LF).

The other argument that the *that*-trace effect is an interface phenomenon comes from Ackema's (2010) observation. It is widely acknowledged that parenthetical expressions are invisible to the syntactic well-formedness of the host syntactic structures (Haegeman 1988; Espinal 1991; Potts 2002). For example, *as*-clauses do not disrupt the obligatory adjacency requirement between the verb and its direct object, as shown in (6a). Note that (6a) is grammatical even without any

additional stress on the object, meaning that this example is not created by Heavy DP-Shift. This behavior is in direct contrast with (6b), which is ungrammatical due to the intervening adverb between the verb and its direct object. Ackema observes, however, that *as*-parenthetical clauses, though syntactically inert, do have the ameliorating effect on *that*-trace violations, as illustrated in (7).

(6) a. Susan loves, as we are all aware, silly books.

b. * Susan loves passionately silly books.

(7) Who_i do you think **that**, as we are all aware, t_i loves silly books?

The ameliorating effect observed in (7) is mysterious under a classical syntactic approach. The grammaticality of (7), however, naturally falls out from (1) because the C in (7) can form a prosodic phrase with the parenthetical expression that immediately follows it. Ackema's observation thus further supports our view that the *that*-trace effect is an interface constraint.

2.2. *Salvation Effects Triggered by Adverbs, Focus, Right-Node-Raising and Contraction*

The *that*-trace effect is ameliorated by several other prosodic strategies than sluicing and parentheticals. Firstly, the effect is suspended when a sentential adverb is inserted between the C and the trace (Bresnan 1977; Barss and Deprez 1986; Culicover 1992, 1993; Browning 1996). This observation is illustrated in (8a) with *wh*-movement and in (8b) with relativization.

(8) 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 (1). The adverbs inserted in (8a, b) allow *that* to form a phonological phrase with them, as shown in (9a, b), respectively.

(9) a. Who$_i$ do you think [$_{PhP}$ **that** after years and years of cheating death t_i][$_{PhP}$ finally died]?

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

It is not that all adverbs have the salvation effect. Hasegawa (2003) observes that adverbs such as *just* and *completely* cannot ameliorate the *that*-trace effect, as shown in (10a, b).

(10) 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))

The lack of the ameliorating effect in (10a, b) appears problematic for our analysis but upon a closer examination it in fact further supports our analysis. The adverbs in (10a, b) must occur after the subject. As shown in (11a-d), they must follow their local subjects. Note that the sentential adverbs in (8a, b) can occur before their local subjects, as (12a, b) indicates.

(11) 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))

(12) 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, (10a), for instance, is parsed as in (13). (13) violates (1) because *that* cannot form a prosodic phrase on its own.

(13) Who_i did she say [$_{PhP}$ **that** t_i] [$_{PhP}$ just escaped death]?

One might wonder why *that* can be phrased with adverbials in (9a, b) while it cannot be phrased with the following auxiliaries/verbs in (3a). According to Nespor and Vogel's (1986: 168) relation-based theory of the syntax-phonology mapping, the phonological phrasing of the English syntactic structure in (14a) is as shown in (14b, c). Nespor and Vogel (p. 173) note that the phrasing in (14c) results if the object is a non-branching element.

(14) a. [$_{CP}$ C [$_{TP}$ Subj Infl [$_{VP}$ V Obj]]]

b. (C Subj)$_\Phi$ (Infl V)$_\Phi$ (Obj)$_\Phi$

c. (C Subj)$_\Phi$ (Infl V Obj)$_\Phi$

In typical *that*-trace configurations in (3a), the C cannot be phrased with Infl or V because the latter are outside of (C Subj)$_{\Phi}$. In (9a, b), on the other hand, the adverbials intervene between the C and the subject. Then, we have (C-Adv-Subj)$_{\Phi}$. Thus, the C is adjacent with the adverb within a phonological phrase. Adverbs like *just* and *completely* are part of the same phonological phrase (Infl V)$_{\Phi}$. Thus, these adverbs cannot bring about the ameliorating effect.

Secondly, contrastive focal stress on the verb in the subordinate clause mitigates the *that*-trace violation (Drury 1999; Kandybowicz 2006). (15a, b) illustrate this mitigating effect.

(15) 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 (15a), the stress on *wrote* salvages what otherwise would result in a *that*-trace violation. Note that it is the verb which immediately follows the trace that has this effect. Thus, as shown in (15b, c), focal stress on *think* or *yesterday* does not cause any improvement with respect to *that*-trace effects. We propose that the amelioration effect here obtains as a result of leftward focus restructuring (Kenesei and Vogel 1990; Frascarelli 1997, 2000). Kenesei and Vogel (1990) suggest that in English, a focused phrase is restructured into a prosodic constituent on its left. This restructuring is illustrated in (16b). In (16b), the focal stress on the possessor

Delaware's serves to remove the left boundary of the phonological phrase so that it is restructured into another prosodic phrase that includes the verb *outclass*.

(16) a. [It's hard]$_{\Phi}$ [to outcláss]$_{\Phi}$ [Délaware's]$_{\Phi}$ [football team]$_{\Phi}$

b. [It's hard]$_{\Phi}$ [to óutclass DÉLAWARE'S]$_{\Phi}$ [football team]$_{\Phi}$

(Kenesei and Vogel (1990), as cited in Frascarelli (2000: 42))

Applying this restructuring to (15a), we get the partial prosodic representation in (17a).

(17) a. Who$_i$ do you think [$_{PhP}$ **that** t_i WROTE *Barriers*]

b. Who do you think [$_{PhP}$ **that** t_i] [$_{PhP}$ wrote *Barriers*]

In (17a), *that* forms a prosodic domain with *WROTE* thanks to prosodic restructuring. This restructuring does not obtain when the verb is not stressed, as in (17b), which violates (1). The focal stress on *think* or *yesterday* does not change the prosodic phrasing in a way that salvages the *that*-trace effect. In both examples, *that* does not form a prosodic phrase on its own, in violation of (1).

Our analysis predicts that the *that*-trace effect should disappear as long as focus restructuring creates a prosodic configuration where the C can form a prosodic phrase with its following constituent. This prediction is confirmed by examples (18a, b), where the embedded focalization ameliorates the *that*-trace effect.

(18) a. Robin met the man who$_i$ Leslie said [$_{PhP}$ **that** to KIM t_i] [$_{PhP}$ had given the money].

b. I asked who you had claimed [$_{PhP}$ **that** on the TABLE t_i] [$_{PhP}$ had put the book].

(Culicover (1992: 98))

This phenomenon receives the same account as that in (15a). As the result of the leftward prosodic restructuring, the stressed PPs in (18a, b) are prosodically integrated into the same phonological phrase with the C, which thereby evades our condition in (1).

Let us now turn to the *that*-trace effect under right-node-raising (RNR) constructions. The elements that undergo RNR are known to be obligatorily parsed as separate intonational phrases, which properly contain phonological 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/RNR-ed material, as shown in (19b) for (19a).

(19) 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]

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 positions in a clause, unlike a lexical category that always appears in a stressed/unreduced form. Crucial for our purposes is that function words must take the strong form at the right edge of a prosodic phrase. Consider (20a, b).

(20) a. [$_{PhP}$ Wherever Ray ***ís***], he's having a good time. [ɪz], * [z]

b. [$_{PhP}$ What did you look ***át***] yesterday? [æt], * [ət] (Selkirk (1996: 200))

The italicized words in (20a, b) occur in strong forms because they stand at the right edge of their phonological phrases. Given this independent fact, our analysis predicts that the *that*-trace effect should disappear when *that* occurs at the right edge of the second conjunct as the result of RNR. This prediction is verified. De Chene (1995, 2000, 2001) observes that the intonational boundary created by RNR ameliorates *that*-trace violations, as shown in (21a, b).

(21) 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 (21a), for instance, the TP undergoes RNR into the sentence-final peripheral position. Thus, this example receives the intonational phrasing shown in (22).

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

In (22), *that* occurs at the right edge of the second intonational phrase. Thus, it must be realized as a full/stressed form. Accordingly, (1) no longer applies.

Finally, Kandybowicz (2006) observes that auxiliary reduction across a trace voids the *that*-trace effect. In (23a), *will* is contracted to the C, getting rid of what otherwise would yield a *that*-trace violation. A similar amelioration takes place in the relativization context in (23b).

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

b. (?) The author that the editor predicted **that'd b**e adored. (Kandybowicz (2006: 222))

Halpern (1998: 102) points out that reduced auxiliaries are morphosyntactically proclitic but phonologically enclitic. As is well known in the literature (King 1970; Lakoff 1970; Bresnan 1971; Kaisse 1983), auxiliary reduction is blocked when an auxiliary is immediately followed by a gap created by transformations or by deletion. Examples in (24a, b) illustrate this effect.

(24) 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 falls into place if auxiliaries are morphosyntactically proclitics. (24a, b) are unacceptable with auxiliary reduction because the auxiliaries have nothing on their right to contract onto. On the other hand, Lakoff (1972) and Wood (1979) argue based on voicing assimilation that reduced auxiliaries are phonologically enclitics. Examples (25) show that the auxiliary assimilates in voicing to the preceding, not the following, segment in the same way that the suffix *'s* does in the possessive and plural contexts.

(25)		tense contraction	possessive	plural
	[s]	Jack’*s* boring.	Jack’*s* book	The jack*s* bounced.
	[z]	Ted’*s* tall.	Ted’*s* teacher.	The Fed*s* tried.
	[ɪz]	Liz’*s* tall.	Liz’*s* teacher	The fezze*s* turned yellow.

(Lakoff 1972: 81)

Given these observations, we analyze the examples in (23a, b) as follows. The reduced auxiliary first forms a phonological phrase with the following verb due to its morphosyntactic proclitic nature. The C-auxiliary phrasing, in turn, follows from the phonological enclitic nature of the reduced auxiliary. As a result, the C is forced to be in the same phonological phrase with the auxiliary-verb sequence, yielding the amelioration effect observed here.

It is clear from our analysis above that all the apparently disparate exceptions to the *that*-trace effect (i.e., intervening adverbs, contrastive focal stress on the embedded verb, embedded focus fronting, RNR and auxiliary contraction) in fact can receive a unified explanation as the result of some “forced” prosodic manipulation that happens to evade (1). Intervening adverbs work as hosts for the C. Contrastive verbal focus and embedded focus fronting create a prosodic structure where the C can form a prosodic phrase with these elements. RNR forces the C to surface as its strong form. Auxiliary contraction makes an auxiliary appear in its strong form so that the C can in turn lean on it. The fact that this wide range of exceptions to *that*-trace violations receives a unified explanation clearly speaks in favor of our interface-based approach.

2.3. *Other Alternative PF Analyses*

In this section, we compare our analysis of the *that*-trace effect with two recent alternative analyses developed by Kandybowicz (2006) and Hasegawa (2003), both of which independently pursue a prosodic analysis of the effect. First, Kandybowicz's (2006) analysis is shown in (26).

(26) PF Anti-Adjacency Filter on Cs 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 bad because *that* and the *wh*-trace are adjacent within a single prosodic phrase Secondly, (8a) and (21a) are grammatical because *that* and the trace are no longer within a single prosodic phrase due to the adverbials and RNR-ed constituents, as shown in (27a) and (27b), respectively.

(27) 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, the *that*-trace effect disappears in (15a) because contrastive stress on the embedded verb disrupts the adjacency of *that* and the trace within a single prosodic phrase. The filter in (26) also correctly predicts that focusing any other material that would not disrupt the adjacency will not save the *that*-trace violation, as in (15b, c). The PF representations for (15a-c) are in (28a-c), respectively.

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

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

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

Finally, (23a, b) are grammatical because auxiliary reduction makes the *wh*-trace internal to C; as a result, the C and the trace do not count as adjacent, even though they are in the same prosodic phrase. The reason why Kandybowicz includes (26ii) in his filter is to account for the fact that the *that*-trace effect fails to obtain in matrix relativization cases such as (29).

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

(Kandybowicz (2006: 220))

Kandybowicz observes that there is no intermediate IntP boundary separating C^0 from the embedded clause, as shown in (29). This example does not exhibit the *that*-trace effect because the C is not aligned with a prosodic phrase boundary. Notice that our analysis also correctly

predicts the grammaticality of (29). The C can form a phonological phrase with the lexical word *murdered* because no prosodic boundary exists between the C and the verb.

Although our analysis agrees with Kandybowicz's in its insight that the *that*-trace effect is phonological in nature, we believe that our analysis is free from certain conceptual and empirical challenges that would face his analysis. Conceptually, it is controversial that traces, the output of syntactic derivation, are visible at the level of prosodic phrasing. Kandybowicz assumes that (26) is "a PF anti-adjacency constraint on Cs and traces" (p. 223). However, this assumption begs the question why syntactic constructs such as traces ever affect what is essentially a post-syntactic phonological phenomenon because PF has been standardly assumed within the Minimalist Program to be a pure representation of the sound of a sentence derived from its syntactic structure via certain mapping algorithms (Selkirk 1984; Truckenbrodt 1999). This point is clarified in the following definition of PF provided by Chomsky (1995):

> PF is a representation in universal phonetics, with no indication of syntactic elements or relations among them (X-bar structure, binding, government, etc.). To be interpreted by the performance systems A-P, π must be constituted entirely of legitimate PF objects, that is, elements that have a uniform, language-independent interpretation at the interface. In that case we will say that π satisfies the condition of Full Interpretation (FI). If π fails FI, it does not provide appropriate instructions to the performance system. We take FI to be the convergence condition: if π satisfies FI, the derivation that formed it converges at PF; otherwise, it crashes at PF.
>
> (Chomsky (1995: 194))

Under this conception, traces do not count as a legitimate object at PF, a conclusion that directly contracts Kandybowicz's central thesis that the *that*-trace effect is a PF phenomenon. This problem won't arise under our theory. Our theory suggests that the effect is captured at the interface level

between syntactic derivation and PF where the syntactic structure is converted into a sequence of sounds with appropriate prosodic adjustments. Our analysis also does not make any reference to traces. Instead, all that matters for the *that*-trace effect in our system is whether the weak/reduced C can form a prosodic phrase with a lexical word that follows it. The assumption that empty categories, including traces, do not have any effect on the application of prosodic rules is also a commonly held assumption in the literature on prosodic phonology (Nespor and Scorretti 1985; Nespor and Vogel 1986; Borsley and Tallerman 1996; Tokizaki 2007). True, 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 (a certain subtype of) traces. However, Nespor and Scorretti (1985) have shown that this contraction process is not affected by traces and have instead suggested a non-syntactic analysis for the phenomenon.

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 condition is not proposed to just cover this pattern but rather should be able to extend to several other ostensibly prosodic phenomena that have resisted an exclusively syntactic explanation in the GB theory. Indeed, in section 3, we show that the obligatory cliticization of a weak pronoun to the verb in verb-particle constructions, a pattern which would be mysterious under a purely syntactic account (Johnson 1991; Lasnik 1999), straightforwardly falls out from our proposed condition. Furthermore, it is to be noted that under Kandybowicz's analysis, the *that*-trace effect is lifted as long as the C 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 (30a, b).

(30) 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 (30a), *that* and the topicalized DP belong into two intonational domains, as shown in (31).

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

Kandybowicz's analysis thus would wrongly predict that (30a) should be grammatical. Our analysis correctly predicts this result. As indicated in (31), a topicalized expression constitutes a self-contained intonational phrase (Nespor and Vogel 1986). Then, the intonational phrasing for (30a) would be as in (32) under our alternative analysis.

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

Here, the topicalized DP constitutes 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. Thus, *that* cannot form a prosodic phrase

with the DP. 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 (8a, b), repeated here as (33a, b), and polarity expressions such as *under no circumstances* illustrated in (33c, d).

(33) 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.

((33d) 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) argues that the *that*-trace effect obtains at PF due to the idiosyncratic property of the weak C *that* as a leaner that must attach to the word that immediately follows it. As a result, the effect arises when this adjacency is blocked by the gap. His condition is stated in (34).

(34) Phonological Condition on Cs

The 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 (2003: 240))

Let us see how Hasegawa's analysis covers the paradigm discussed so far. (2a) is bad because the gap created by *wh*-movement blocks *that* from leaning onto *wrote* to create *that* + *wrote* sequence. This disruption does not occur in (2b, c), which involve extraction of the direct object and adjunct elements, respectively. The adverb effect in (8a, b) is also accounted for because the adverb can serve as the word that immediately follows *that*. Hasegawa suggests that, when *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, (34) is no longer applicable. However, it is not clear under Hasegawa's analysis how auxiliary contraction saves a *that*-trace violation. His analysis wrongly predicts that (23a, b) should be ungrammatical because the gap between the C and the auxiliary should disrupt the adjacency between the two elements. His analysis also cannot account for the observation that the embedded topicalized expressions cannot save a *that*-trace violation. In (30a), the weak C *that* is adjacent to the lexical word that immediately follows it (i.e., *this present*). Thus, (34) would not block the C from leaning on the topicalized DP. We also believe that our analysis is conceptually superior to Hasegawa's alternative. His analysis leaves it unclear why a C 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 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 (35a, b) and (36a, b).

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

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

(36) 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 whereas a pronominal object of the same particle can only occur before the particle. The same contrast obtains in *make-out* constructions. As the comparison of (37a, b) and (38a, b) illustrates, a full DP can appear on either side of the particle, unlike a simplex pronoun, which must appear before the particle.

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

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

(38) 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 syntactic account for this contrast. The EPP-assignment to trigger overt object shift (i.e., the movement of a direct object into [Spec, AgrO]) 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 promising. We propose instead that the contrastive distribution with regards to the position of full NPs vs. simplex pronouns in verb + particle constructions is better explained as a further consequence of (1). Recall that function words in their unstressed/weak forms cannot form a prosodic phrase on their own. Let us thus hypothesize that a simplex pronoun, being prosodically deficient, must be parsed in the same prosodic phrase with a lexical word, just as the unstressed C must form a prosodic phrase with its following lexical word such as sentential adverbs. Under this analysis, (38b) is ungrammatical because the verb + particle complex constitutes a prosodic phrase to the exclusion of the pronoun (cf. Nespor and Vogel (1986: 178, 179); see also Selkirk (1978)), as shown in its phonological phrasing in (39a). This phrasing violates our condition in (1). This violation is removed in (38a) because the pronoun is integrated in the same phonological phrase that contains the verb + particle combination, as shown in its phonological phrasing in (39b).

(39) a. Mikey [$_{PhP}$ made out] [$_{PhP}$ **him**] to be a liar.

b. Mikey [$_{PhP}$ made **him** out] to be a liar.

At this point, our analysis makes one 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 in principle be able to occur in the post-particle position as long as they are realized as strong forms. This prediction is borne out. Fraser (1976) and Johnson (1991) observe that simplex pronouns 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 such as *that*. These three strategies are illustrated in (40a-c), respectively.

(40) a. Mikey made out **THEM** to be liars!

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

c. Mikey made out **that** to be false. (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 behave 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. In Lieu of Conclusion

This article has proposed an interface-based analysis of the *that*-trace effect and pronominal object shift which have steadfastly resisted a purely syntactic explanation in the generative literature. We have proposed that the core properties and apparent exceptions regarding these phenomena can be straightforwardly derived if stressless function words cannot form a phonological phrase on their own. In his description of the Minimalist Program, Marantz (1995) envisioned that the minimalist enterprise would be going to announce the end of syntax as a sub-field of linguistics. Marantz (p. 180) continued that "Chomsky's vision of the end of syntax should have the positive consequence of forcing syntacticians to renew their interface credentials by paying serious attention to the relevant work in phonology and semantics." Our assessment of the current minimalist practice is that the majority of minimalist works have yet done due justice to this re-orientation of the mode of inquiry envisaged there. The lack of appreciation for interface studies is understandable in light of the syntactico-centric grammatical architecture of the generative enterprise (Jackendoff 1997, 2002) wherein syntax is postulated as the only fundamentally generative component of the human language faculty and the sound/meaning components blindly interpret the outputs of the core syntactic computation. Due to this predominant mode of the generative inquiry, we have not seriously asked the question what the form and function of linguistic interfaces is, much less what topics could plausibly fall within the range of minimalist interface inquiries. We hope that our article serves as a case study that proves the fruitfulness of an interface approach to what have long been deemed the exclusive territory of syntactic research and, more generally, that it will help reorient researchers to the exciting yet unexplored possibility of minimalist interface explorations.

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