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Tone Sandhi in Taiwanese and Phasal Spell-out

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Abstract: The paper examines the C particle *kong* in Taiwanese. Following Simpson and Wu (2002), the paper argues that tone sandhi that *kong* participates in provides an argument for multiple spell-out. It is also shown that the *kong* construction can be used to tease apart different approaches to multiple spell-out and successive-cyclic movement. In particular, tone sandhi with *kong* provides evidence for the approach argued for in Bošković (2016a), which dispenses with the Phase-Impenetrability Condition and where spell-out targets phases and successive-cyclic movement targets phrases above phases. The paper also provides a uniform account of the derivational PF effect regarding tone sandhi in Taiwanese and the derivational PF effect regarding primary stress assignment in English noted in Bresnan (1972).*

Key words: multiple spell-out, phases, stress, Taiwanese, tone sandhi

1. Introduction

Simpson and Wu (2002) provide a very interesting argument for multiple spell-out based on tone sandhi with the C-particle *kong* in Taiwanese. Since the goal of their paper was to discuss in detail a particular construction from Taiwanese, they were not able to comprehensively consider its more general consequences for other constructions and theoretical mechanisms. Given the significance of their argument, it is important to do that, which is one of the goals of this paper. During the discussion we will also see that when fully fleshed out, the argument for multiple spell-out based on tone sandhi with the C-particle *kong* in Taiwanese can be used to tease apart different approaches to multiple spell-out, as well as successive-cyclic movement, given that the two are generally taken to interact (successive-cyclic movement is often taken to take place so that the moving element avoids being sent to spell-out). In particular, this paper will argue that the data discussed by Simpson and Wu provide evidence that what is sent to spell-out is full phases, not phasal complements. More generally, the paper argues that tone sandhi with *kong* in Taiwanese provides evidence for the approach to spell-out and the locality of movement argued for in Bošković (2016a), where spell-out targets phases and suc-

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cessive-cyclic movement targets phrases above phases. The analysis of tone sandhi with *kong* argued for in the paper will also be extended to the interaction between primary stress assignment and movement in English.

The paper is organized as follows. In section 2 I summarize Simpson and Wu's argument for multiple spell-out based on tone sandhi with complementizer *kong* in Taiwanese. In section 3, I consider the argument from the perspective of the standard approach to spell-out and successive-cyclic movement, where what is sent to spell-out is complements of phase heads and successive-cyclic movement targets phasal edges, showing that the argument actually does not work in that system. In section 5 I show that the Simpson and Wu argument can be maintained under the approach to multiple spell-out and successive-cyclic movement from Bošković (2016a). Before doing that, in section 4 I make a digression to summarize the system in question, where spell-out targets phases and successive-cyclic movement targets phrases above phases. This section also discusses Bresnan's (1972) original argument for multiple spell-out based on primary stress assignment in English, since the paper will offer a unified account of derivational tone sandhi licensing in Taiwanese and derivational stress assignment in English. In the appendix I discuss a potential alternative analysis, which treats the double *kong* construction in Taiwanese on a par with Spanish recomplementation. (In general, I will explore several possibilities for the treatment of *kong* in *kong* final constructions (although all the possibilities fit the approach to multiple spell-out and successive-cyclic movement argued for here), in the effort to determine the proper analysis of such constructions.)

2. An argument for multiple spell-out

Taiwanese is a tone language which exhibits a tone sandhi phenomenon, where the lexically-listed citation form of a syllable (note that there are toneless syllables) undergoes a rule-governed modification when preceding another tone-bearing syllable in the same tone sandhi domain. Following Simpson and Wu's (2002) notation, tone sandhi will be indicated in the examples below with a bolded dot, where a syllable that is followed by a bolded dot undergoes tone sandhi change, and a syllable that is not followed by a bolded dot does not.

Simpson and Wu (2002) observe a rather interesting pattern of tone sandhi concerning the C-particle *kong*.[1] In (1), where the IP complement follows the complementizer *kong*, tone sandhi applies between *kong* and the IP complement, as indicated by the dot following *kong*.

(1) A•hui liau•chun• [$_{CP}$ kong• [$_{IP}$ A•sin si• tai•pak• lang]].
A-hui thought KONG A-sin is Taipei person
'A-hui thought that A-sin is from Taipei.' (Simpson and Wu 2002: 79)

The IP complement can also precede *kong*. In such cases, tone sandhi still applies

[1] For discussions of *kong*-constructions, which focus on other aspects of such constructions, see Lien (1988), Chen (1989), Cheng (1997), Hsieh and Sybesma (2007), and Lau (2013).

between *kong* and the IP complement (more precisely, what used to be its IP complement, see the discussion below).

(2) A•-sin si• tai•pak• lang kong•.
A-sin be Taipei person KONG
'A-sin is from Taipei.' (Simpson and Wu 2002: 81)

(3) A•-hui liau•chun• A•sin si• tai•pak• lang kong•.
A-hui thought A-sin is Taipei person KONG
'A-hui thought that A-sin is from Taipei.' (Simpson and Wu 2002: 68)

This is rather surprising since sentence final elements do not undergo tone sandhi, as indicated by the lack of a dot after *ho* in (4).

(4) A•-sin chin• ho. A•-hui ma• chin• ho.
A-sin very good A-hui also very fine
'A-sin is very well. A-hui is also very well.' (Simpson and Wu 2002: 73)

Simpson and Wu argue that the *kong* tone sandhi paradigm provides an argument for multiple spell-out. They show that Taiwanese is a head initial language, which means that the complementizer precedes its IP complement in the underlying structure. (1) and (2)–(3) are then derivationally related in that the underlying structure of (2)–(3) is actually (1), with the IP undergoing movement that leaves *kong* in sentence final position. The argument for multiple spell-out is then rather straightforward.[2] Given that sentence final elements do not participate in tone sandhi, tone sandhi in (2)–(3) cannot take place after the IP undergoes movement. Rather, it must take place before the movement, when (2)–(3) have the same structure in the relevant respect as (1), where tone sandhi indeed applies. This means that the phonology has access not only to the final syntactic structure but also to intermediate syntactic representations. In other words, the derivational point where (2)–(3) have the structure in (1) must be accessible to the phonology, otherwise tone sandhi could not take place here.

As for the movement of the IP, Simpson and Wu argue that IP moves to SpecCP. Additionally, they argue that we are dealing here with a matrix clause phenomenon. This is quite obvious in (2). However, they argue that *kong* in (3) is also a matrix clause C, (3) being derived in the same way as (2) in that the complement of the matrix C, which is *kong*, undergoes movement to SpecCP. As one argument to this effect they point out that (3) can actually have two occurrences of *kong*, as shown in (5). Assuming that the embedded clause in (5) is headed by the sentence internal *kong*, they argue that the sentence final *kong* in (5) must be the matrix C, with its complement IP undergoing movement to matrix SpecCP.

(5) A•hui liau•chun• kong• A•sin si• tai•pak• lang kong•.
A-hui thought KONG A-sin is Taipei person KONG
'A-hui thought that A-sin is from Taipei.' (Simpson and Wu 2002: 80)

[2] Though see Hsieh and Sybesma (2007) for a potentially interfering factor.

(3) and (5) then differ only in that the embedded clause C is not phonologically realized in (3). This is not surprising, since Taiwanese is like English in that embedded clauses need not have an overt C, as shown by (6).[3]

(6) A•hui liau•chun• A•sin si• tai•pak• lang.
Ahui thought Asin is Taipei person
'A-hui thought that A-sin is from Taipei.'

Simpson and Wu further observe that, as in English, there is no semantic difference between the embedded clause in (1), where *kong* is present, and the embedded clause in (6), where *kong* is not present. On the other hand, matrix *kong*, which triggers movement of its IP complement, does have a semantic impact. It brings in an extra layer of meaning, a speaker-related emphatic insertion which can be paraphrased with "I'm telling you X". They draw two conclusions from this state of affairs: the movement in question cannot be PF movement, given its semantic import, and sentence final *kong* needs to be treated differently from sentence internal *kong*, given the difference in meaning. They capture this by assuming that the sentence final *kong* is the matrix C, while the sentence internal *kong* is a subordinating C, with movement to SpecCP taking place in the syntax.

Putting aside the details of Simpson and Wu's account, the argument for multiple spell-out they provide based on tone sandhi with Taiwanese *kong* is rather strong; it seems quite clear that the only way for *kong* to be affected by tone sandhi in examples like (2)–(3) is for tone sandhi to apply before IP moves. Problems, however, arise when the details of the derivation are examined. As we will see below, the analysis does not work under standard assumptions regarding multiple spell-out, where the heart of the problem is the standard assumption that what is sent to spell-out is complements of phasal heads.[4] Several issues also arise regarding some of the details of Simpson and Wu's account. I will discuss these issues in the following section.[5]

[3] The data not attributed to Simpson and Wu (2002) are due to Seng-hian Lau (personal communication).

[4] Simpson and Wu do not in fact adopt the standard approach to multiple spell-out. The approach they propose (the gist of the approach is that the spell-out domain for phase XP comprises the head, the complement and the inner Spec of XP but not outer Specs of XP, and that the CP phase triggers spell-out, but the vP phase does not) is, however, tailored to the Taiwanese data in question; it has not been confirmed by other phenomena involving spell-out domains, and actually faces problems in accounting for other cases where spell-out domains have been appealed to. (Thus, the Abruzzese examples in (14)–(15), discussed below, indicate that not just the head of XP, but also the Spec of XP, belongs to the same spell-out domain as the complement of X). As a result, in the text I will apply their argument for multiple spell-out to other approaches to multiple spell-out, which have been proposed independently of the Taiwanese paradigm in question.

[5] In the following section, Simpson and Wu's argument for multiple spell-out based on tone sandhi with *kong* will be evaluated with respect to the standard assumption that what is sent to spell-out is the complement of a phasal head, which is not the assumption that Simpson

3. Some problems with the phasal complement spell-out analysis

Under the Simpson and Wu analysis, the IP in examples like (2)–(3) moves to SpecCP. This is an instance of complement-to-Spec movement within a single phrase, which has been argued by a number of authors to be disallowed. More generally, a number of authors have argued for a ban on movement that is too short, referred to as antilocality (see Bošković 1994, 2014, 2016c, Saito and Murasugi 1999, Ishii 1999, Abels 2003, Grohmann 2003, Boeckx 2005, Ticio 2005, Erlewine 2016, among many others). While the authors differ in the precise formulation of antilocality, they all ban movement within a single phrase; i.e. they ban complement-to-Spec movement within a single phrase (e.g. Bošković 2014 argues that movement must cross a phrase).

There is another issue that the IP-to-SpecCP movement analysis raises for the multiple spell-out account of (2)–(3). Under standard assumptions, what is sent to spell-out is the complement of a phasal head. Furthermore, movement to the edge of phase XP is standardly assumed to take place before the complement of X is sent to spell-out. Since what is sent to spell-out is standardly assumed to be inaccessible to the syntax, if YP, which is c-commanded by X, does not move to SpecXP before the complement of X is sent to spell-out, YP would not be able to move to SpecXP. Applying these assumptions to (2)–(3), the IP will have to move to SpecCP before the phase head C, i.e. *kong*, triggers spell-out. This means that we never get a spell-out point where *kong* precedes its IP complement in the same spell-out domain, hence tone sandhi should not apply to *kong*. In other words, under standard assumptions regarding spell-out and movement to phasal edges, *kong* should not be affected by tone sandhi, i.e. *kong* in (2)–(3) should behave in the same way as *ho* in (4) in that neither should be affected by tone sandhi. The Simpson and Wu argument for multiple spell-out based on Taiwanese *kong* thus does not work under the standard assumptions regarding multiple spell-out and phasal edges.

It is worth noting here that to account for (2)–(3), Simpson and Wu essentially redefine the Phase-Impenetrability Condition (PIC) by assuming that the head of phase XP and the complement of X form a spell-out domain, SpecXP being outside of the spell-out domain (SpecXP alone is then the edge of phase XP, not SpecXP and X^0).[6] Given the standard assumption that movement to the edge of phase XP takes place before the spell-out domain of phase XP is sent to spell-out, the assumption will still not help us here, since IP will move outside of the relevant spell-out domain before spell-out.

What we essentially need here is to assume that PF copy deletion takes place after tone sandhi applies. That way, the IP could move to SpecCP and the copy of the IP in the *kong*-complement position would still be able to trigger tone sandhi before it is deleted. However, appealing to strict ordering between tone sandhi and

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and Wu adopt, as noted in fn 4.

[6] Simpson and Wu actually make a distinction between different Specs in this respect (see fn 4), but the distinction does not affect our concerns.

PF copy deletion would not work in all cases, since there are cases where a moved element cannot trigger tone sandhi in the position it occupies prior to the movement. Thus, the object, which undergoes movement in (7), does not trigger tone sandhi on the verb, although prior to the movement it is located in a position in which it could trigger tone sandhi.[7]

(7) A•-sin [tai•oan•oe] kong.
A-sin Taiwanese speak
'Taiwanese, A-sin speaks.

In section 5 below I will propose an analysis which has exactly the right effect, in that it captures both the cases where the moved element behaves as if it is in situ for the purpose of tone sandhi (see (2)–(3)) and the cases where this is not the case (see (7)). Furthermore, the analysis will not require ordering tone sandhi and PF copy deletion.

There is another issue that arises under the IP-movement-to-SpecCP analysis, when combined with the standard assumption that what is sent to spell-out is the phasal complement. The issue is that tone sandhi is not triggered on the last word of the moved IP. Under the standard assumptions, the Spec and the head of phase XP belong to the same spell-out domain. An issue then also arises regarding why the last element of the fronted IP, which is located in SpecCP under the Simpson and Wu analysis, is not affected by tone sandhi.[8]

The final issue to be noted, which is specific to a detail of Simpson and Wu's account of (2)–(3), concerns their claim that *kong* is the matrix C in these constructions. We have already seen that the C-system of Taiwanese is similar to English. As in English, in Taiwanese embedded declarative clauses the complementizer can be either overt or null. In English, the complementizer is never overt in matrix declaratives. Under the Simpson and Wu analysis, Taiwanese behaves differently from English in this respect in that the matrix C can be overt in matrix

[7] The observation is due to Simpson and Wu (2002), though the example they give is more complex than (7), bringing up additional factors.

[8] It should be noted that Simpson and Wu argue that tone sandhi quite generally cannot apply between SpecXP and X. However, the cases they give to motivate this claim involve subjects and topics, adjuncts behaving the same way in the relevant respect. All of these are parsed as separate intonational phrases under standard assumptions regarding prosodic phrasing (i.e. they are followed by an intonational phrase boundary). If intonational phrase boundaries block tone sandhi, as seems plausible (Simpson and Wu in fact suggest that this is the case), tone sandhi is independently ruled out in these cases (even if it can in principle apply between a head and its Spec).

Note that one potentially interfering factor that I will not be able to take into consideration here is the possibility of prosodic factors influencing spell-out domains, which can be implemented through readjustments of the initial prosodic phrasing, which is based on spell-out domains. (Such readjustments often affect DPs in certain positions (especially objects), voiding expected spell-out domain effects, thus giving the appearance of the lack of a spell-out domain with such DPs.)

declaratives. However, the only instance of this is the clause-final *kong*; C is otherwise never overt in matrix declaratives in Taiwanese.[9] This makes such clauses rather special. In the account to be proposed below this will not be the case; Taiwanese will in fact be just like English in that C will be either overt or null in embedded declaratives, and always null in matrix declaratives.

4. On full phase spell-out and successive-cyclic movement

In this section I will summarize the approach to spell-out and successive-cyclic movement from Bošković (2016a), which will be used in the account of the tone sandhi paradigm with *kong* discussed above in section 5.

In early minimalism, it was assumed that what is sent to spell-out is phases. The assumption was later modified in that what is sent to spell-out is assumed to be phasal complements, not phases. This has, however, left us with a rather strange situation. In contrast to phases, phasal complements have no theoretical status, as can be easily seen by comparing the great deal of effort that has gone into coming up with a proper, unified definition of what counts as a phase, with nothing of that sort regarding phasal complements. The reason is of course simple: phasal complements have no theoretical status, only phases do. From this perspective, we have a rather strange situation with the current assumption concerning multiple spell-out: while phases are the crucial units in the framework, for all practical purposes the crucial units are actually not phases but phasal complements, which have no theoretical status. Theoretically, it is obvious that phasal complements should play no role in spell-out; what is transferred to spell-out should be phases, not phasal complements. Bošković (2016a) provides a number of arguments regarding the syntax-phonology interface that indicate that what is sent to spell-out is indeed phases, not phasal complements (see also Ishihara 2007).

Consider in this respect (8), where XP is a phase and ZP is not, α is the edge of XP (the Spec and the head of XP) and β is the complement X.

(8) $[_{ZP}$ K $[_{XP}$ α [β

Under phasal complement spell-out, we would expect to find PF interaction regarding spell-out domain sensitive phenomena between α, the edge of phase XP, and K, but would not expect to find PF interaction between α (or K) and β, given that K and α belong to the same spell-out domain, but α and β do not. Bošković (2016a), however, discusses a number of PF phenomena which show that PF interaction between α and K, i.e. PF interaction between the edge of phase XP and material outside of phase XP, is not possible, while PF interaction between α and β, i.e. PF interaction between the edge of phase XP and the complement of X, is

[9] It should be noted that there are non-C usages of *kong* that I am putting aside here. Thus, Lau (2013) discusses the topic-marker usage of *kong*. I am also putting aside the usage of *kong* that is restricted to exclamatives, discussed in Hsieh and Sybesma (2007) (in light of their observation that clear complementizers that otherwise cannot occur in matrix clauses can do so in exclamatives, as in the case of Dutch).

possible, which is quite surprising under the phasal spell-out approach. However, this is exactly what is expected if what is sent to spell-out is phases: since the edge of XP and the complement of X belong to the same spell-out domain, but the edge of XP and what is outside of XP do not, it is then expected that α can interact with β, but not with K in (8).

Bošković (2016a) gives a number of cases illustrating both the possibility of interaction between α and β, and the impossibility of interaction between K and α in (8). One case regarding the latter concerns cliticization in Bulgarian (see Franks and Bošković 2001). *Ti* and *go*, which are enclitics, can encliticize to the conjunction in (9), but not in (10), the difference here being that in (10), the enclitics are located at the phasal edge, which is not the case in (9). The conjunct in (10) must be a CP since it contains an interrogative complementizer (*li*). Bulgarian yes-no questions in general involve V-to-C movement (cf. (11)). V and the clitics form an impenetrable cluster, which is standardly analyzed by assuming that they form a complex head,[10] with the verb carrying the clitics along under V-movement as a result of that (see e.g. Bošković 2001, Franks and King 2000, Rudin 1997, Tomić 1996).

(9) …i *ti* *go* dade.
and you.dat it.acc gave
'And (s)he gave it to you.' (Bulgarian)

(10) *…i *ti* *go* dade li?
and you.dat it.acc gave Q
'And did (s)he give it to you?' (Bulgarian)

(11) cf. Dade li pismoto na Petko?
gave Q letter-the to Petko
'Did (s)he give the letter to Petko?'

Ti go are thus located at the CP phasal edge, namely C, in (10), which means that they need to undergo encliticization across a spell-out domain boundary in (10) if phases are spell-out domains (see Talić to appear for evidence that encliticization across spell-out domain boundaries is not possible). Notice also that (10) is acceptable in Macedonian (see (12)), which crucially differs from Bulgarian only in that its clitics are proclitics, as in Romance, not enclitics, so the cliticization across a spell-out domain boundary problem does not arise in (12) (see Bošković 2016a for discussion and the full paradigm, which is based on Franks and Bošković 2001, also the source of the data in question. The enclitic/proclitic difference regarding Bulgarian and Macedonian pronominal clitics is confirmed by (13).)

(12) …i *ti* *go* dade li?
and you.dat it.acc gave Q
'And did (s)he give it to you? Macedonian

(13) a. Včera *ti* *go* dade. Bulgarian: OK Macedonian: OK
yesterday you.dat it.acc gave

[10] Thus, *ti go dade* form a complex head in (9).

'(S)he gave it to you yesterday.

b. *Ti go* dade. Bulgarian: * Macedonian: OK

(10) illustrates the impossibility of PF interaction between the edge of phase XP and material outside of XP. Turning to PF interaction between the edge of phase XP and the complement of X, i.e. α and β in (8), one relevant case is provided by raddoppiamento fonosintattico (RF) in Abruzzese, a spell-out domain sensitive phenomenon (it cannot take place across spell-out domains, see D'Alessandro and Scheer 2015, Biberauer and D'Alessandro 2006, and Bošković 2016a) where the initial consonant of a word undergoes gemination which is conditioned by the properties of the preceding word (a lexically conditioned set of words triggers it). Importantly, complementizer *chə* in (14) is an RF trigger which triggers RF on the first word within its IP complement, and in (15) RF applies between the relative pronoun in SpecCP and the subject. Since RF is spell-out domain sensitive (see the references cited above), the data in question provide evidence that phasal complements are not spell-out domains.

(14) a. Jè mmeje *chə* *vve*.
is better that come.3SG
'It's better that he/she comes.'

b. Jè mmeje *chə* *nni* *vve*.
is better that not come.3SG
'It's better that he/she doesn't come.' (D'Alessandro and Scheer 2015: 614)

(15) lu wagliunə *chə* *ttu* si vistə
the boy whom you are seen
'the boy whom you saw' (D'Alessandro and Scheer 2015: 615)

Bošković (2016a) provides additional cases that confirm the impossibility of PF interaction between the edge of phase XP and material outside of phase XP, as well as the possibility of PF interaction between the edge of phase XP and the complement of X, both of which is expected under phasal spell-out, but not under phasal complement spell-out. Note also that early pre-phasal approaches to prosodic phrasing (e.g. Nespor and Vogel 1986, Selkirk 1986) have anticipated phasal, not phasal complement spell-out. The standard assumption in these approaches is that the left edge of a CP corresponds to an intonational phrase boundary, the correspondence here being with a phase, not a phasal complement. This is natural if spell-out domains correspond to phases. On the other hand, if spell-out domains are phasal complements, we would have a rather strange situation where what is sent to spell-out is the IP below CP and the VP above the CP, but the prosodic correspondence is with the "sandwiched" phrase, namely CP.

Bošković's (2016a) approach to spell-out also has consequences for successive-cyclic movement (SCM), which quite crucially interacts with spell-out. If both multiple spell-out and SCM were to be defined on phases, which is what we would expect theoretically, phases would be spell-out units and SCM would target phases. However, given the standard assumption that what is sent to spell-out is

no longer accessible to the syntax, it is not possible to state the domain for both spell-out and SCM in terms of phases. If SCM were to target spell-out units, K undergoing movement would get frozen with the first step of SCM since it would be part of a spelled-out unit, hence inaccessible for further syntactic operations. Either spell-out or SCM can then be stated in terms of phases, but not both. What is needed is the following: In (16), where XP is the first phrase above YP and XP and YP are affected by SCM and spell-out, YP should be the spell-out domain, and SCM should target XP (with YP spelled out after that movement). Furthermore, only one of these should correspond to phases.

(16) $[_{XP}\ [_{YP}$

The issue is which of the two, XP (the domain for SCM) or YP (the domain for spell-out), should be a phase. For Chomsky (2001), XP is the phase; the domain for SCM is defined on phases, the domain for spell-out is not. In principle, it could be the other way round, with YP being a phase, not XP. Bošković (2016a) argues for such a system, where the domain for spell-out is defined on phases, but the domain for SCM is not. We have already seen some arguments that spell-out domains correspond to phases (i.e. what is sent to spell-out is the phase). Bošković also provides arguments that SCM targets the first phrase above the phase.

The main argument concerns a broad generalization regarding locality of movement where in the double-phase configuration in (17), where YP is the complement of X, movement is not possible out of YP. In other words, we have here (18) (see also Bošković 2016b).

(17) $[_{XP=Phase}\ [_{YP=Phase}]]$

(18) The Phase-over-Phase Constraint: Extraction is banned from phases that function as complements of phasal heads (i.e. the double-phase configuration in (17)).

The starting point in establishing (18) is the generalization reached in Bošković (2015), given in (19).

(19) **The Complex XP Constraint** (where X ≠ non-ergative V)
Extraction out of complements of lexical heads is disallowed.

The generalization is very briefly illustrated with extraction from the clausal complement of lexical heads in (20)–(24) (the relevant heads are underlined). Such extraction is allowed only from a non-ergative V-complement (20), not from an N-, A-, P-, and ergative V-complement (21)–(24).[11]

[11] I ignore V-movement in (20)/(24) since it does not affect anything. Regarding (23), note that prepositions can take CP complements in Spanish.

As discussed in Bošković (2015), the generalization in (19) holds for all types of complements, not just CPs. This is illustrated below with extraction out of a DP complement of a noun with Greek (ib), which contrasts with (ia), involving extraction of the complement, with French (iib), which contrasts with (iia), and with extraction out of a DP complement

(20) How$_i$ did you [$_{VP}$ think [$_{CP}$ that [$_{IP}$ a dog bit John t$_i$]]]? (non-ergative VP)
(21) *How$_i$ did you hear [$_{NP}$ rumors [$_{CP}$ that [$_{IP}$ John bought a house t$_i$]]]? (NP)
(22) *How$_i$/Why$_i$ are you [$_{AP}$ proud [$_{CP}$ that John hired Mary t$_i$]]? (AP)
(23) *¿cómo$_i$ se acordó [$_{PP}$ de [$_{CP}$ que [Pedro preparaba
how clitic (s)he. remembered of that Pedro prepared.imperfect
la comida t$_i$]]]?
the food (Spanish, PP)
(24) a. *How$_i$ did it [$_{VP}$ appeal to Mary [that John fixed the car t$_i$]]?
b. *How$_i$ did it [$_{VP}$ depress Mary [that John was fired t$_i$]]? (ergative VP)

(19) reduces to (18) in Bošković's (2015) phasal system, also adopted in Bošković (2016a), where the thematic domain corresponds to a phasal domain, with the highest projection in the thematic domain being a phase. This phasal system does not change anything from Chomsky (2000) when it comes to the "low" phase in transitive structures: vP is still a phase as the highest projection in the thematic domain. However, with ergatives, VP is now a phase as the highest and only projection in the thematic domain (even if vP is present; since vP with ergatives is not a thematic projection, it is not a phase). The same holds for NP, AP, and PP, in the traditional NP, AP, and PP, as discussed in Bošković (2015). All the cases that instantiate (19), given in (21)–(24), then involve the double-phase configuration from (17), hence reduce to (18) (see Bošković 2016a, b for detailed discussion).

Bošković (2016a) further shows that the approach where spell-out targets phases and SCM takes place so that the moving element avoids being sent to

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of an ergative verb in (iii). (The violations are weaker in some of these cases since we are dealing here with argument, not adjunct extraction. Bošković also notes an interfering factor that often arises when checking argument extraction (which makes it a much less reliable diagnostic here), namely reanalysis, which quite generally voids locality violations with arguments, though not with adjuncts (the issue, e.g., arises with P-stranding, see Bošković 2015 for detailed discussion; note that DP is a phase).)

(i) a. tu vivliu$_i$ mu ipes pos dhiavases [$_{DP}$ tin kritiki t$_i$].
the-gen book-gen me said-2s that read-2s the review
'You told me you read the review of the book.' (Horrocks and Stavrou 1987)
b. ?* tu vivliu$_i$ mu ipes pos dhiavases (tin) [$_{NP}$ enstasi
the-gen book-gen me said-2s that read-2s the objection
[$_{DP}$ tis kritikis t$_i$]].
the-gen review-gen
'You told me you read the objection to the review of the book.'

(ii) a. Combien$_i$ a-t-il consulté [$_{DP}$ t$_i$ de livres]?
how-many has-he consulted of books
b. *Combien$_i$ a-t-il consulté [$_{DP}$ (plusieurs/des) [$_{NP}$ préfaces [$_{DP}$ t$_i$ de livres]]]?
how-many has-he consulted several/some prefaces of books
'How many books did he consult several/some prefaces of?'

(iii) a. ?*Who$_i$ did John's embarrassment [$_{VP}$ escape [$_{DP}$ friends of t$_i$]]?
b. ?*Who$_i$ did there [$_{VP}$ arrive [$_{DP}$ (some) friends of t$_i$]] last week?
c. cf. Who did they see [$_{DP}$ (some) friends of t$_i$] yesterday?

spell-out deduces (18), also allowing us to eliminate the PIC.[12] Assume that what is sent to spell-out is phases, not phasal complements. Let us further assume, following Chomsky (2001) and adapting it to phasal spell-out, that a phase is transferred to spell-out when the next phasal head enters the structure. In particular, following Bošković (2014), the transfer takes place as soon as the next phase head is merged. This analysis, which does not require the PIC at all and privileges phases, not phasal complements, for spell-out, deduces (18). The gist of the account is that *wh* in (25) is accessible to Y, a non-phase head, but not to Z, a phase head, because merger of Z triggers immediate spell-out of the XP phase (phases/phase heads are given in bold).

(25) **Z** (Y) [$_{\mathbf{XP}}$ *wh*]

Consider a concrete case, namely (26). Under the current approach to phases, CP and NP are the relevant phases here (NP being the highest projection in its thematic domain). As soon as N, a phase head, is merged, CP is sent to spell-out. As a result, nothing within CP is accessible for movement out of it, hence *how* cannot move out (it does not actually matter whether *how* moves to SpecCP or not).

(26) **N** [$_{\mathbf{CP}}$ …how…]
(*How$_i$ did you hear [$_{NP}$ rumors [$_{CP}$ that John bought a house t$_i$]])

On the other hand, in (20), CP merges with V, which is not a phasal head, in contrast to the head CP merges with in (21). CP is then not sent to spell-out in (27a). This means that *how* is accessible for movement to V. (If its base-generated position is above vP, it is accessible to V in its base-generated position.) *How* then moves to SpecVP.[13] Merger of v triggers spell-out of the CP phase. Since *how* has already moved out of it, it is not affected by the spell-out of the CP in (27), in contrast to (26).

(27) a. V [$_{\mathbf{CP}}$ …how…] (How$_i$ did you [$_{VP}$ think [$_{CP}$ that a dog bit John t$_i$]])
b. **v** [$_{VP}$ how V [$_{\mathbf{CP}}$

[12] For alternative analyses, see Bošković (2015, 2016b).

[13] See here Rackowski and Richards (2005) and den Dikken (2010), who also argue that successive-cyclic movement in (20) does not proceed via SpecCP but VP above the CP. I refer the reader to these works, Bošković (2016a), and references therein for arguments that constructions that have been traditionally analyzed as involving morphological reflexes of successive-cyclic movement via SpecCP have been misanalyzed. In fact, all the relevant cases have also been argued in the literature not to involve successive-cyclic movement through SpecCP; they either involve terminal movement to SpecCP, no movement at all, or successive-cyclic movement via positions other than SpecCP (e.g. the well-known case of agreeing intermediate Cs in Kinande does not involve movement at all; all movement diagnostics, like reconstruction and islandhood, fail there; some cases that have been traditionally assumed to involve intermediate wh-agreement do not even show such agreement; thus, in many languages (e.g. Selayarese) wh-movement affects the agreement relationship between the verb and the intermediate complementizer—it is not the case that the wh-phrase itself agrees with the C).

Under this analysis, phase XP is completely inaccessible when the next phase head is merged. Movement from XP is then possible only if XP is first merged with a non-phase head, which can "pull" the moving element out of XP before the next phase head enters the structure. As a result, *wh* can move from CP in (28) only in the absence of Y. Extraction is thus banned in phase-over-phase configurations, which deduces (18).

(28) **H** L (**Y**) [$_{\mathbf{CP}}$ **C** [$_{\text{IP}}$ wh]]

The account has interesting architectural consequences. What is sent to spell-out is phases. However, what is targeted by successive-cyclic movement (SCM) is not phases, but phrases above them.

Recall now that although theoretically we would expect both spell-out domains and SCM to be defined in terms of phases, given that what is sent to spell-out is inaccessible to the syntax, it is not possible to state the domain for both spell-out and SCM in terms of phases. If SCM were to target spell-out units, the moving element would get trapped and prevented from moving since it would be part of a spelled-out unit. Only one of the two, spell-out or SCM, can then be stated in terms of phases, which is a characteristic of both Chomsky (2001) and Bošković (2016a). In both approaches, XP is sent to spell-out and movement targets YP right above it. In both approaches, one of the two is defined on phases. The difference is which one is defined on phases. For Chomsky, it is SCM: SCM targets phases, spell-out does not.[14] In Bošković (2016a), spell-out targets phases, SCM does not. What we are dealing with here is an issue of primacy: the issue is what should be privileged, spell-out or SCM. By defining the former on phases, with SCM piggy-backing on it, Bošković (2016a) privileges spell-out, while Chomsky (2000) privileges SCM. Many authors have, however, argued that SCM takes place so that the moving element escapes being sent to spell-out, see e.g. Stjepanović and Takahashi (2001), Fox and Pesetsky (2005), Bošković (2007) (as far as I know, no one has ever argued that spell-out depends on SCM in this manner), which in turn argues for a system where spell-out is privileged (by being defined on phases), as in Bošković (2016a). Note also that Bošković (2016a) does not need the PIC at all. All there is is the assumption that phases are sent to spell-out, with SCM taking place so that the moving element avoids being sent to spell-out.[15,16]

[14] Spell-out actually has to target phases in Chomsky's system with matrix clauses (while in Bošković 2016a spell-out consistently targets only phases; see Bošković 2016a for another argument for phasal spell-out regarding labeling; it is shown in Bošković 2016a that Chomsky's 2013 labeling system actually presupposes phasal spell-out).

[15] The analysis thus most naturally fits with approaches where the driving force for SCM is implemented in this way, as in e.g. Bošković (2007).

[16] It is worth noting here that the approach to SCM from Bošković (2016a) can be productively applied to the analysis of the Acehnese object voice construction from Legate (2014), which was not discussed in Bošković (2016a). (i) gives the relevant structure from Legate (2014). Legate assumes that VoiceP (which is a thematic projection) is a phase. DP-theme

Before returning to Taiwanese *kong*, I will discuss how Bošković's system applies to Bresnan's (1972) original argument for multiple spell-out regarding primary stress assignment in English, revived in Legate (2003). Consider (29)–(31) (the relevant word bearing primary stress is underlined).

(29) a. Mary fixed the bike.
b. Mary fixed it. (Legate 2003: 511)
(30) a. Mary liked the proposal that George leave.
b. Mary liked the proposal that George left. (Bresnan 1972: 75)
(31) a. Please put away the dishes.
b. ?Please put the dishes away. (Legate 2003: 512)

Legate (2003) adopts the Nuclear Stress Rule (NSR), which assigns the primary stress to the final (i.e. rightmost) stress bearing element in the VP, as illustrated by the contrast in (29). The NSR is also responsible for stress assignment in (30a). To account for (30b), Bresnan (1972) and Legate (2003) argue that the NSR applies cyclically, applying before *proposal* moves from the most embedded object position in (30b) (see Vergnaud 1974, Kayne 1994), assigning stress to *proposal*. In (31a), the NSR assigns stress to *dishes*. What is interesting here is that in (31b), which is standardly assumed to involve object shift of *the dishes* (see e.g. Johnson 1991, Lasnik 1999, 2001, Gallego and Uriagereka 2007), the NSR assigns stress to *away*. In (30b), then, the NSR applies before the object moves, assigning stress to it, but in (31b) the NSR applies after the object moves, hence it does not assign stress to it. The question is how this difference regarding stress assignment can be captured.

Bošković (2016a) observes that the difference remains unaccounted for under the standard approach to spell-out and SCM. *The dishes* in (31b) is standardly assumed to undergo object shift, moving to SpecvP. Under the standard approach to spell-out and SCM, where vP is a phase and SCM targets phasal edges, the object in (30b) also moves to SpecvP. In both constructions, VP, a phase head complement, is sent to spell-out. Under the standard assumptions regarding SCM and spell-out, (30b) and (31b) then have the same derivation in all relevant respects, making it difficult to account for the difference between (30b) and (31b) regarding stress assignment. ((32) gives the relevant part of the structure: t_i being sentence

moves through SpecVoiceP to SpecIP (IP being split), while the DP-initiator, located in the thematic VoiceP Spec, undergoes spell-out on the VoiceP phase, crucially forming a phonological unit with the verb, which remains low in the structure (in vP), in the phonology (they form a single phonological phrase and a single domain for stress assignment, see Durie 1985 and Asyik 1987).

(i) $[_{IP}$ DP-theme$_i$ …$[_{VoiceP}$ t_i $[_{Voice'}$ DP-initiator $[_{vP}[_{VP}$ $t_i]]]]]$

The analysis can be straightforwardly restated within Bošković's (2016a) approach, capturing the spirit of Legate's analysis. VoiceP being a phase, DP-theme then moves through a phrase above it, and VoiceP is sent to spell-out, which explains why DP-initiator, located at the edge of VoiceP, forms a phonological unit with the material that is not located at the edge of VoiceP (which is surprising under phasal complement spell-out).

(ii) $[_{IP}$ DP-theme$_i$ …$[_{XP}$ t_i $[_{VoiceP}$ DP-initiator $[_{vP}[_{VP}$ $t_i]]]]]$

final, *the dishes/proposal* is in the position to be assigned stress by the NSR before the movement)).

(32) $[_{vP}$ the dishes/proposal$_i$ $[_{VP}$ …$t_i]]$

Interestingly, Legate (2003) proposes an account which is inconsistent with the standard assumptions regarding SCM and spell-out, but straightforwardly fits Bošković's (2016a) approach. On her analysis, the crucial difference between (30b) and (31b) is that object movement in (30b) takes place to a position outside of the lowest spell-out domain, while in (31b) the object moves within the lowest spell-out domain. This means that there is only one copy of the object in the input to PF in the first phase of (30b), while there are two such copies in the first phase of (31b). When the PF operation that deletes non-initial copies within a spell-out domain applies in (31b), it deletes the lower copy of the object. The NSR then assigns stress to *away*, the final element in the spell-out unit. However, since there is only one copy of the object in the first spell-out domain of (30b), the PF deletion operation that deletes non-initial copies does not delete this element when it applies to the first spell-out domain. The NSR then assigns stress to *proposal*, as the final element within this spell-out domain.[17]

Under Legate's analysis, what differentiates (30b) and (31b) is that the object in (30b) moves outside of the lowest spell-out domain, while in (31b) it moves within it, as a result of which there is only one copy of the object in the first spell-out domain of (30b), but two in (31b). This is in fact exactly what happens in Bošković's (2016a) approach to SCM and spell-out. Recall that *the dishes* in (31b) undergoes object shift to SpecvP. However, object movement in (30b) does not target the same position in Bošković (2016a). In contrast to the standard analysis, on which SCM targets phasal edges, in Bošković (2016a) SCM targets phrases above phases. This means that the object in (30b) does not move to SpecvP, but the Spec of the first phrase above vP.[18] The structures of (30b) and (31b) are then (33)–(34).

(33) $[_{XP}$ the proposal$_i$ $[_{vP}$ $[_{VP}$ …$t_i]]]$
(34) $[_{vP}$ the dishes$_i$ $[_{VP}$ …$t_i]]$

In contrast to the standard analysis, (30b) and (31b) have very different derivations in Bošković's (2016a) analysis, which straightforwardly fit Legate's account of the contrast between (30b) and (31b) regarding stress assignment. Given that spell-

[17] At a later spell-out domain, this occurrence of *proposal* is deleted in favor of a higher occurrence, the primary stress being realized on this higher occurrence (i.e. the occurrence that is not deleted; see Legate 2003).

[18] The identity of this phrase not being important, Bošković (2016a) simply uses XP. (Analyses that assume that in some cases English has object shift also assume that V in English moves, though not as high as in Romance, which implies that there is more than one phrase above vP in the inflectional domain; there is in fact a great deal of evidence to this effect, see e.g. Belletti 1990, Stjepanović 1998, Cinque 1999, Bošković 2001, Bobaljik and Jonas 1996, and Bošković 2004 (regarding V-movement, subject positions and floating quantifiers)).

out targets phases, what is sent to spell-out in both (33) and (34) is vP. The object in (30b)/(33) moves to a position outside of the first spell-out domain, while in (31b)/(34) it moves to a position within it. As a result, there is only one copy of the object in the first spell-out domain of (30b) while there are two such copies in (31b), which, as we have seen above, results in the stress assigned by the NSR being realized on the moved object in (33), but not (34).

5. Full phase spell-out analysis

5.1. *Kong* initial clauses

We are now ready to return to tone sandhi with *kong*. In this section I will provide an account of the Taiwanese *kong* paradigm within the approach to SCM and spell-out from Bošković (2016a), also adjusting some aspects of Simpson and Wu's analysis of the *kong* final construction.

The crucial ingredient of Bošković's analysis is that what is sent to spell-out is phases, not phasal complements. Tone sandhi in *kong* constructions provides in fact a rather strong argument for this position.[19] As discussed in Simpson and Wu (2002), tone sandhi is spell-out domain sensitive. Crucially, in constructions like (35) tone sandhi applies between the Comp *kong* and its IP complement. In other words, it applies between a phasal head and its complement.

(35) A•hui liau•chun• [$_{CP}$ kong• [$_{IP}$A•sin si• tai•pak• lang]].
A-hui thought C A-sin is Taipei person
'A-hui thought that A-sin is from Taipei.' (Simpson and Wu 2002: 79)

This kind of interaction is unexpected if what is sent to spell-out is a phasal complement (see section 3), but exactly what is expected if what is sent to spell-out is a full phase. The latter approach, but not the former approach, allows PF interaction between the edge of phase XP and the X-complement, which is precisely what we find with tone sandhi in (35), where tone sandhi applies between a complementizer and its IP complement. In this respect, tone sandhi behaves just like RF in Abruzzese (14). Taiwanese (35) and Abruzzese (14)–(15) thus indicate that there is no spell-out domain boundary between the "traditional" edge of phase XP and the complement of X, as expected under the full phase spell-out approach (recall from section 4 that the concept of phasal edge, i.e. the PIC, is also not needed for successive-cyclic movement, which means that it is completely eliminable).

While examples like (35) argue quite strongly for the approach to multiple spell-out from Bošković (2016a), a question arises whether the full paradigm concerning tone sandhi in *kong* constructions can be accounted for in that system.

[19] It is worth noting here that Hsieh and Sybesma (2007) also argue based on the *kong*-construction in Taiwanese that what is sent to spell-out is phases, though based on very different considerations (their argument does not involve tone sandhi or any phonological processes). Hsieh and Sybesma also propose an intriguing approach to successive-cyclic movement, which however differs from the current approach in that it still maintains the PIC.

It turns out that it can, actually rather straightforwardly. In fact, the analysis also resolves the problems noted in section 3 (while still preserving the spirit of Simpson and Wu's analysis).

5.2. *Kong* final clauses

In this section I will discuss how *kong* final clauses can be treated in Bošković's (2016a) system. Recall that Simpson and Wu argue that the word order in such clauses is derived by moving IP to SpecCP. As noted above, the movement raises a problem with respect to antilocality, which disallows complement-to-Spec movement within the same phrase. Given antilocality, the landing site of IP movement should be higher than SpecCP. In Chomsky (2000, 2001), this is simply not possible since in Chomsky's system movement must proceed via phasal edges, given the PIC (which is the result of the assumption that what is sent to spell-out is phasal complements). This is, however, not the case in Bošković's (2016a) system, where what is sent to spell-out is phases, and the PIC is eliminated. As discussed above, in that system movement does not proceed via phasal edges. Instead, successive-cyclic movement targets the first phrase above the phase. I suggest that this is indeed what happens in constructions like (2)–(3). What is the position in question?

There is one fact regarding *kong* that has not been noted so far, but which becomes important at this point. Simpson and Wu observe that *kong* is actually a grammaticalized form of the verb meaning 'say'. This kind of grammaticalization is not that rare crosslinguistically; thus, Simpson and Wu note a number of languages where it has occurred (see also Saito in press). Recall now that sentence final *kong* constructions differ from "intermediate" *kong* constructions in that they add an extra layer of meaning, which can be paraphrased as "I am telling you". Simpson and Wu connect IP movement to the presence of this extra layer of meaning, arguing that it requires topicalization of IP. I will also assume this to be the case. However, I suggest that *kong* is not yet fully grammaticalized in that it always needs to co-occur with a verb. In sentence final *kong* cases there is then a null *say* verb (of the kind Ross 1970 argued for).[20] This then straightforwardly captures the extra "I am telling you" layer of meaning (exactly the kind of meaning Ross 1970 argued for), given that there actually is a *say* verb that yields it in the structure. The IP then undergoes topicalization, as in Simpson and Wu's analysis, which as in Simpson and Wu's analysis is also needed to license the relevant meaning (under the present analysis it can actually also be looked at as a licensing condition on the null *say*), but the topicalization lands outside of the clause headed by *kong* under the current analysis. ((36) gives the structure only up to VP.)

(36) IP_j …[$_{VP}$ t_j [$_{V'}$ $\emptyset_{say}$ [$_{CP}$ kong t_j]]]

[20] See also Saito (in press) for a null *say* in Japanese in the context of the bound morpheme *-teki* 'like' as well as relevant discussion of Japanese *toiu*, which is undergoing grammaticalization from the verb meaning 'say' to a C.

Notice also that under this analysis Taiwanese can be treated just like English when it comes to the overtness of the declarative complementizer. Recall that, as in English, in Taiwanese embedded declarative clauses the complementizer can be either overt or null. In English, the complementizer is never overt in matrix declaratives. Under the Simpson and Wu analysis, Taiwanese behaves differently from English in this respect in that the matrix C can be overt in matrix declaratives. In fact, the clause-final *kong* is the only case where C is overt in a matrix declarative in Taiwanese (see here fn 9). This is not the case under the current analysis. Like English complementizer *that*, *kong* always introduces embedded clauses, which means overt C is present only in embedded clauses. In other words, as in English, declarative C can be either overt or null in embedded declaratives, and is always null in matrix declaratives. There is still a matrix clause restriction, but it is the one that was already argued for in Ross (1970). This kind of performative null *say* can only occur in matrix clauses. I also make a plausible assumption that the complementizer *kong*, a form of the verb *say* that is undergoing grammaticalization, is required for the licensing of the null *say*. In fact, *kong* here functions as both a verb and a complementizer. This can actually be even more straightforwardly captured by assuming that *kong* in such constructions starts under C and then moves to the null V.[21]

(37) $[_{VP}\ \text{kong}_i\ [_{CP}\ t_i\ ]]$

Bošković (2015) argues for a similar account of prepositional complementizers like *for*, where they start under C and then move to a null P.[22] Such analysis straightforwardly captures the intuition that *for* is a prepositional complementizer, since it is in effect both a complementizer and a preposition.

(38) $[_{PP}\ \text{for}_i\ [_{CP}\ t_i\ ]]$

The same may then hold for *kong* under the analysis from (37), where *kong* is then both a C and a verb. This analysis also captures the extra verbal meaning of such constructions, while still uniformly treating *kong* as a subordinator (like English *that*).

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[21] Note that the movement takes place before the CP is sent to spell-out (i.e. before v is merged), hence before the CP is made inaccessible for movement out of it. As a result, this analysis may in fact be restatable in a way that would treat the *kong* in question as still being a verb. What would be special about it is that it would be taking an IP complement and require its movement. Under this analysis, (39) from below would be re-analyzed as in (i) (I have added vP, which is ignored in (39); *kong* would move to v, as an instance of V-to-v movement, and IP would move to the first phrase above vP, in accordance with the current approach to successive-cyclic movement. vP would be the first phase/spell-out domain.)

(i) $\text{IP}_j\ [_{XP}\ t_j\ [_{vP}\ \text{kong}_i\ [_{VP}\ t_i\ t_j]]]$

The analysis presented in the text below can be restated in these terms (thus, the point from footnote 23 can be restated with vP (not CP) being the relevant spell-out domain).

[22] Bošković (2015) shows that some peculiar locality effects that are present in the *for*-as-a-C construction can be captured that way.

Putting all of this together, examples like (2) are then derived as follows (I only show the VP layer of the matrix clause (*kong* would actually move to v, assuming standard V-to-v movement; recall also that the IP undergoes topicalization into the matrix clause).

(39) IP_j …[$_{VP}$ t_j [$_{V'}$ $kong_i$ [$_{CP}$ t_i t_j]]]

Below, I will ignore the possibility of this additional *kong*-movement to V, simply assuming the structure in (36), though nothing would change if this movement is taken into consideration.[23]

We have already seen that the above analysis resolves the antilocality issue and captures the behavior of *kong* more straightforwardly in that *kong* is always a subordinator. Since what is sent to spell-out is phases, not phasal complements, the analysis also captures why the IP triggers tone sandhi on *kong*. Derivational spell-out is still crucially involved since tone sandhi is licensed when the embedded CP is sent to spell-out in (36) (as well as (39), see fn 23), the IP being located in the C-complement position at this point of the derivation. The analysis also explains why the last word of the IP does not undergo tone sandhi. For that, it is in fact crucial that the IP does not move through the embedded SpecCP; if it were to move through that position, when this CP is sent to spell-out the IP would be in a position where tone sandhi could be triggered on the final word of this IP.

I turn now to the contrast regarding the derivational PF effect between English examples like (40), Bresnan's (1972) original argument for multiple spell-out (see section 4), where the moved wh-phrase behaves as if it does not move with respect to stress assignment (it is assigned stress, indicated with underline, by the NSR, which assigns stress to the most deeply embedded element; see section 4)), and Taiwanese constructions like (7), characterized by the lack of tone sandhi between the verb and the moved object (the object does not behave as if it is in situ in PF in (7)). We will see that under the current analysis, the derivational PF effect regarding tone sandhi from (2) as well as the lack of it in (7) can actually be captured in exactly the same way as the derivational PF effect regarding stress assignment from (40).

(40) John asked <u>what books</u> Helen had written. (Simpson and Wu 2002: 91)

Below I apply the assumptions from the derivation of (40), discussed in section 4, to (2)/(36), referring to the system summarized in section 4 as the current analysis for ease of exposition.

Recall that under the current analysis, what is sent to spell-out is phases and what is targeted by movement is phrases above phases. The IP, which undergoes topicalization into the matrix clause in (2), then moves successive-cyclically not through SpecCP, but VP, as in (36). When the matrix v enters the structure, the

[23] Tone sandhi on *kong* in (39) would be licensed within the CP phase/spell-out domain (note that the lowest copies of *kong* and the IP are not deleted at this point of the derivation, i.e. when the CP is sent to spell-out, given the discussion in section 4 and below).

embedded CP phase is sent to spell-out.

(41) $[_{vP}$ v $[_{VP}$ IP_j $[_{V'}$ $ø_{say}$ $[_{CP}$ kong $t_j]]]]$

Since there is only one copy of the IP in the CP that is sent to spell-out, the PF operation that deletes non-initial copies within a spell-out domain does not delete this copy. When the CP phase is sent to spell-out, a copy of the IP is then present in this spell-out domain, in fact in the unmoved position, a configuration where the IP triggers tone sandhi on *kong*. When the higher phase, matrix vP, is sent to spell-out this copy of the IP is deleted since at that point the copy of IP in situ is a non-initial copy. However, the copy has already licensed tone sandhi.

Recall now that under the standard assumptions regarding spell-out and successive-cyclic movement, the effect in question can be captured if we stipulate an ordering where tone sandhi applies before PF copy deletion. The proposed analysis actually has that effect, but without any stipulations. The reason why tone sandhi appears to apply before PF copy deletion in this case is that tone sandhi applies at the level of the CP phase while PF copy deletion applies (to the IP) at the level of the vP phase (it cannot apply to the IP at the level of the CP phase for a trivial reason: there is only one copy of the IP in this phase).

The derivation of (2)/(41) is essentially the same as the derivation of (40) in the relevant respect, only the phasal levels are different here. Recall that, as discussed in section 4, (40) is derived as follows: assuming that vP is a phase, *what books* in (40) moves not to SpecvP but the first phrase (in the split IP domain) above vP.

(42) $[_{XP}$ what $books_i$ $[_{vP}$ $[_{VP}$ …$t_i]]]$

When C enters the structure, the vP phase is sent to spell-out. Since there is only one copy of the wh-phrase in this spell-out domain, the PF operation that deletes non-initial copies does not delete this copy of the wh-phrase. As a result, since this copy of the wh-phrase is the most embedded element within the spell-out domain, it is assigned stress by the NSR. This copy is later deleted in favor of a higher copy, with the stress assigned by the NSR realized on the higher copy. (2)/(41) and (40)/(42) are thus treated in the same way; more precisely, the derivational PF effect regarding tone sandhi from (2)/(41) and the derivational PF effect regarding stress from (40)/(42) are captured in the same way.

Consider now (7), repeated in (43), where Taiwanese appears to behave differently from English.

(43) A•-sin [tai•oan•oe] kong.
A-sin Taiwanese speak
'Taiwanese, A-sin speaks.'

What is curious about (43) is that the direct object does not trigger tone sandhi on the verb (*kong* is a verb here). To capture this, Simpson and Wu argue that tone sandhi cannot apply at the vP phase level, otherwise the object would trigger tone sandhi on the verb *kong*. This led Simpson and Wu to assume that the vP phase does not trigger spell-out, in contrast to the CP phase. (43) does appear

to be different from (2)/(41) as well as (40)/(42) in that in (2)/(41) and (40)/(42) the moved elements behave as if they are located in situ for the purposes of the relevant PF operations, which is not the case with (43), where the moved element behaves as if it is not in situ for the purpose of the relevant PF operation. Recall, however, that there are constructions of that sort in English too. As discussed in section 4, *the dishes*, which undergoes object shift in (44b), for the purpose of stress assignment is not treated as being in situ in (44b), but in the moved position, hence the NSR assigns stress to *away* in (44b), in contrast to (44a), as the most deeply embedded element.

(44) a. Please put away the dishes.
b. ?Please put the dishes away. (Legate 2003: 512)

As discussed in section 4, the different behavior of the moved elements in (40) and (44b) with respect to stress assignment follows quite straightforwardly from the current analysis. As standardly assumed, *the dishes* undergoes object shift to SpecvP. *What books* crosses the vP phase while undergoing successive-cyclic movement in (40). Under the standard analysis, successive-cyclic movement proceeds via phasal edges, which means *what books* in (40) also moves to SpecvP. As discussed in section 4, as a result, the standard analysis fails to capture the different behavior of the moved element in (40) and (44) with respect to stress assignment. On the other hand, the difference is straightforwardly captured under the current analysis, where successive-cyclic movement does not proceed via phasal edges, but through phrases above phases. *What books* in (40) then does not move to SpecvP (see (42)), as a result of which it behaves as if it is in situ when the vP phase is sent to spell-out, as discussed above. (44b) is different in this respect. Here, the object moves to SpecvP. As a result, when the vP phase is sent to spell-out there are two copies of *the dishes* in this spell-out domain. The PF deletion operation that deletes non-initial copies deletes the non-initial copy, which leaves *away* as the most deeply embedded element hence the NSR assigns stress to *away*.

(45) $[_{vP}$ the dishes$_i$ $[_{v'}$ … away $t_i]]$

Above, we have treated Taiwanese (2)/(41) on a par with (40)/(42). I suggest that (43) also has its counterpart in English, but its counterpart is (44b). While in both Taiwanese (2) and English (40) the moved element behaves as if it is in situ for the purposes of tone sandhi and stress assignment respectively, in both Taiwanese (43) and English (44b) the moved element behaves as if it is in the moved position. Taiwanese (43) can then be captured if the moved object is located within vP. For concreteness I will assume that it is located at the edge of vP, like *the dishes* in (44b). When the vP phase is sent to spell-out, since there is more than one copy of the moved object within this spell-out domain, the lower copy is deleted, as a result of which the PF input that tone sandhi receives does not have a copy of the object following the verb, hence tone sandhi cannot affect the verb here.[24]

[24] Alternatively, one could treat (43) in terms of generation of the object in its surface posi-

tion, in which case there would be only one copy of the object here to start with. However, such base-generation analysis seems more likely for elements located in the sentence initial position than those in the middle field. It is also possible that the final landing site of IP in (2) is the same as the position where the object is located in (43) (given the null matrix VP in (2)). This would not change anything in the above account of (2). There would still be only one copy of the IP in the CP phase, which is a spell-out domain, hence this IP would still behave as if it is in situ for tone sandhi. Note that tone sandhi also does not take place with sentence initial topicalization (the observation is due to Simson and Wu, though their example is slightly more complicated than (i)). I assume that example (i) either involves base-generation, or if it does involve movement, that the movement needs to pass through the position where the object is located in (43), in which case (i) would be derived in the relevant respect just like (43), hence tone sandhi on the verb would not be licensed. (Note that Simpson and Wu treat examples like (i) and (43) as involving topicalization.)

(i) [tai•oan•oe] A•-sin kong.
Taiwanese A-sin speak
'Taiwanese, A-sin speaks.'

There is actually an alternative account for both (43) and (i) based on Chomsky's (2013) proposal that object shift involves movement to SpecVP, not SpecvP. (The proposal is incompatible with antilocality hence would require dispensing with it. It can, however, be modified along the lines of Legate 2014 (see footnote 16), where there are three phrases in the thematic domain, VoiceP, vP, and VP. Object shift can then involve movement to SpecvP, obeying antilocality, with the verb moving to Voice, the head of the projection where the external θ-role is assigned. I will disregard this possibility below). Suppose Taiwanese actually always has object shift, with the object moving to SpecVP and the verb to v. Now, it is well-known that movement to SpecIP cannot feed movement to SpecCP; if a subject needs to move to SpecCP it does not move to SpecIP (for a number of crosslinguistic arguments to this effect, see Bošković 2016c and references therein). Suppose the same holds for object shift; if an object needs to undergo wh/A'-movement, it does not pass through SpecVP (the counterpart of SpecIP for objects). Kinande provides strong evidence for this assumption; object agreement that is associated with objects that do not undergo wh-movement must be dropped under wh-movement (see Bošković 2008, 2016c, Schneider-Zioga 1995), which can be accounted for if object agreement is a reflex of movement to SpecVP (i.e. object shift) but wh-movement cannot proceed via SpecVP (see Bošković 2016c for such an analysis), parallel to the situation with subjects noted above. Then, in topicalization cases, Taiwanese objects would move through the phrase above vP, as required by the current approach to successive-cyclic movement, but they would not pass through SpecVP. Under this analysis, cases involving topicalization would have the structure in (ii) and cases where the object does not undergo A'-movement would have the structure in (iii) (given object shift). What is sent to spell-out in both cases is vP.

(ii) $\text{Topic}_j\ [_{vP}\ V_i\ [_{VP}\ t_i\ t_j]]$
(iii) $[_{vP}\ V_i\ [_{VP}\ \text{Object}_j\ t_i\ t_j]]$

Note now that a trace intervenes between V and the object-trace/object in (ii), but not (iii). If tone sandhi requires strong adjacency in that even traces cannot intervene, the relevant pattern can be accounted for under the structures in (ii-iii): only the object that does not undergo wh-movement would trigger tone sandhi on V. (Note that this analysis would eliminate the *kong*-as-the-verb option explored in footnote 21.)

6. Conclusion

The paper has examined the Taiwanese *kong*-construction, focusing on tone sandhi that the C-particle *kong* participates in. Following Simpson and Wu (2002), it was argued that tone sandhi with *kong* provides an argument for multiple spell-out, since tone sandhi with *kong* cannot be accounted for by merely paying attention to the surface positions of the relevant elements; i.e. tone sandhi needs to apply to the representations created during the syntactic derivation, which is only possible if PF can access syntax during the syntactic derivation. However, we have seen that the tone sandhi paradigm with *kong* cannot be accounted for under the standard approach to spell-out and successive-cyclic movement, where what is sent to spell-out is complements of phasal heads, and successive-cyclic movement targets phasal edges. On the other hand, the paradigm in question can be rather straightforwardly accounted for under the approach to multiple spell-out and successive-cyclic movement from Bošković (2016a), which dispenses with the PIC and where what is sent to spell-out is phases and what is targeted by successive-cyclic movement is phrases above phases. We have also seen that this approach provides a uniform account of the derivational PF effect regarding tone sandhi in Taiwanese and the derivational PF effect regarding primary stress assignment in English noted in Bresnan (1972), which was the original argument for multiple spell-out.

Appendix

In this appendix I briefly consider the possibility of a uniform analysis of the recomplementation construction in Romance, illustrated by Spanish (46), and Taiwanese (5), involving two *kong*-s.[25]

(46) a. Susi dice que a los alumnos que les van a dar regalos.
Susi says that DAT the students that cl. go to give presents
'Susi says that they are going to give the students presents.'
(Villa-García 2015: 18)

b. Dice que si llueve, que vienen.
says that if rains that come$_{3\text{-PL.INDIC.}}$
'S/he says that they will come (here) if it rains.' (Villa-García 2012: 263)

There is an obvious superficial similarity between (5) and (46): there are two identical complementizers, and embedded clause material is sandwiched between the two complementizers. Under the analysis presented in Villa-García (2012, 2015), both *que*-s in (46) belong to the embedded clause, but they are located in different positions in the left periphery, the traditional CP being split here. The sandwiched

[25] The sandwiched element in (46) is interpreted as a topic (see Villa-García 2012, 2015). The topic *kong* discussed in Lau (2013) could then also be relevant in the context of discussion in this appendix though the topic *kong* does not seem to be allowed in this particular configuration in Taiwanese, see Lau (2013: 64); for discussion relevant to this appendix, see also Hsieh and Sybesma (2007).

element, *a los alumnos* in (46a), is then also located in the left periphery of the embedded clause. If (5) is to be analyzed on a par with (46), an analysis that does not sound implausible given the similarity between the two, both *kong*-s would be located within the embedded clause, which means that the IP would also be located within the embedded clause. Notice also that it is not possible to have two *que*-s in Spanish unless other material is sandwiched between them (see Villa-García 2012, 2015 for an account of (47)), which means that the impossibility of two *kong*-s occurring next to each other does not necessarily rule out a unified analysis for the recomplementation construction in Spanish and the double *kong* construction.

(47) *Me gritaron que que se cancela la fiesta si llueve.
cl. shouted that that cl. cancel the party if rains
'They told me (by shouting) that the party will be cancelled if it rains.'
(Villa-García 2015: 43)

Recall that double and single *kong* constructions differ in their semantics. This is also not necessarily an impediment to a unified analysis considered in this appendix, since under this analysis double and single *kong* constructions have a different left periphery. In particular, at least one projection, where the lower *kong* is located, needs to be present in double *kong* constructions that is not present in single *kong* constructions. It is then possible that this projection is responsible for the additional layer of meaning (the presence of this projection could be tied to the fact that *kong* used to be a verb; also a speaker-oriented operator could be located in this projection, which could be responsible for the additional meaning).[26]

There are, however, some differences between the Spanish recomplementation construction and the double *kong* construction. For one thing, Villa-García (2012, 2015) argues that the sandwiched element in the former is base-generated in its surface position on the grounds that it does not reconstruct for the purposes of binding and scope. This could not be the case for the double *kong* construction since we would then lose the account of tone sandhi on the lower *kong*. However, Villa-García (2012, 2015) also observes that there is a contrast between (46) and its counterpart with a null C (for the lower *que*) in that reconstruction is allowed with the latter, while Martínez Vera (2017) observes that in Latin American Spanish, the dislocated element cannot reconstruct even when the lower C is null. It apparently must be possible to derive the relevant configuration via either base-generation or movement of the sandwiched element, the precise conditions under which only one of the strategies is available being unclear (the overtness of the C not being the decisive factor).

Furthermore, a variety of elements can appear in the sandwich in Spanish, while in Taiwanese the sandwiched position is apparently limited to the IP. The

[26] There is in fact some controversy in the literature regarding whether the verb or the complementizer is responsible for this kind of semantic effects (see Messick 2017 and references therein), which would not even arise here given that *kong* is basically both.

restriction could, however, be tied to the status of *kong*, by assuming that this *kong* is not fully grammaticalized, which could require the full clausal complement, not part of the complement, to occur in the sandwiched position.

An issue would, however, arise regarding the tone sandhi effect, as well as antilocality. To maintain the above account of the tone sandhi effect and to avoid violating antilocality, the IP would not move to the Spec of the second *kong*. Furthermore, the projection where the second *kong* is located, which is the source of the additional semantics associated with the *kong* construction, would need to function as a phase (this means that the left periphery could not correspond to a single phase here, which, however, could be tied to lower *kong* not being a strictly functional element yet). We would then have a derivation like (48) for (5), where for ease of exposition the lower *kong* projection is referred to simply as KongP, and the higher one as CP (only the embedded clause is represented in (48). Under this analysis, the *kong* from (2) would be the lower *kong* from (48), hence the identical semantic effect in (2); true subordinating *kong*, which is not associated with this semantic effect, would then still occur only in embedded clauses and only in C).

(48) $\ldots[_{CP}$ kong $[_{XP}$ IP$_j$ $[_{KongP}$ kong t$_j$]]]

KongP being a phase, when this phase is sent to spell-out there would be only one copy of IP within it. This copy of IP then would not be deleted at this point, hence it would trigger tone sandhi on *kong*.

I will leave more detailed exploration of the viability of the analysis outlined in this appendix for future research.

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【要　旨】

台湾語の連続変調とフェイズのスペルアウト

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本論文は，台湾語における C 要素の kong について考察する。Simpson and Wu (2002) に従い，kong がかかわる連続変調が多重スペルアウトを支持することを論じるとともに，kong 構文の考察が，多重スペルアウトと連続循環的移動に対する異なるアプローチを区別する根拠となること，具体的には，Phase-Impenetrability Condition を廃止し，スペルアウトはフェイズに適用され，連続循環的移動はフェイズの上にある句をターゲットにするという Bošković（2016a）のアプローチを支持する証拠となることを示す。また，台湾語の連続変調に関する派生的 PF 効果と，Bresnan（1972）が指摘した英語の第一強勢付与に関する派生的 PF 効果について統一的な説明を与える。