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IP-RAISING, TONE SANDHI AND THE CREATION OF S-FINAL PARTICLES: EVIDENCE FOR CYCLIC SPELL-OUT

This paper examines how information provided by tone sandhi provides potential insights into processes of movement. The paper focuses on the Taiwanese element *kong* (Mandarin *shuo*) 'say' which is grammaticalizing as a complementizer-type particle in an unexpected sentence-final position. Evidence from tone sandhi phenomena indicates that this results from an operation of IP-raising in which the clausal complement of *kong* is raised to its left after the application of tone sandhi rules. The active grammaticalization patterning offers both a clear insight into the creation of clause/sentence-final particles in SVO languages and also provides strong evidence for the idea of 'cyclic Spell-Out'. It is also argued that a derivational rather than a purely representational model of grammar is required to accommodate the patterns found.

INTRODUCTION

Phonologically reduced grammatical particles are elements which are commonly found in clause- and sentence-final position across a wide range of language types, not just in head-final SOV languages but also in head-initial SVO languages, as illustrated in (1–6) below, Japanese, and Burmese being examples of canonical SOV-type languages, and Thai, Vietnamese, Khmer, and English being regular SVO languages:

(1) Taroo-ga kuruma-o kaimashita yo. Japanese
Taroo-NOM car-ACC bought PRT
'Taroo bought a car.'

(2) U-Win-Win-ga beh thwaa -th -leh? Burmese
U-Win-Win-NOM where go NON-FUT Q-PRT
'Where is U-Win-Win going?'

(3) khun choop lem-nai le? Thai
you like volume-which Q-PRT
'Which one (book) do you prefer?'

(4) Toi da bao ma! Vietnamese
I PAST tell EMPH-PRT
'I told you!' (Nguyen (1997, 167))

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(5) koat nyum bai haiee tee? Khmer
you eat rice already Q-PRT
'Did you eat yet?' (D. Smyth, p.c.)

(6) You're going to London eh?

If particles of this type are taken to instantiate functional heads such as Mood (1, 4) and Q/C (2, 3, 5, 6) due to the functional roles and interpretations they have, the frequent S-final positioning of such elements might seem to require certain explanation in SVO languages. Assuming there to be at least significant pressure for languages to conform with a uniform or canonical direction of selection (Greenberg (1963); Lehmann (1973); Vennemann (1974) and many others), perhaps due to the setting of a Head Parameter (Chomsky (1986)), one might expect that particles instantiating high clausal functional heads such as Mood and Q/C would occur in clause-*initial* head positions in SVO languages in line with the general head-initial direction of selection standardly characteristic of such languages. The fact that Mood/Q-particles linearly *follow* their clausal complements in many SVO languages such as those in (3–6) which are otherwise regularly head-initial is therefore very striking and naturally leads one to wonder if there could be some alternative explanation of the clause-/S-final particle positioning. This paper examines the ongoing creation of a new S-final particle in Taiwanese, the element *kong* illustrated in example (7), and shows how the patterning found offers potentially revealing insights into mechanisms which may underlie the development of particles in sentence-final position in SVO languages:

(7) A-hui liau-chun A-sin si tai-pak lang **kong**.
Ahui thought Asin is Taipei person PRT
'Ahui thought that Asin is from Taipei.'

In contrast with older S-final particles elsewhere where the origin and creation of such elements is often unknown, the source of Taiwanese *kong* is still very clear and the syntax underlying its development is also largely transparent due to patterns of tone sandhi change which occur when *kong* is used. The combination of information available with *kong* is shown to suggest that its sentence-final position in fact results from an operation of clausal raising and that the apparently head-final surface form found with this S-final particle actually conceals a much more regular head-initial structure. A study of Taiwanese *kong* therefore indicates that sentence-final particles may not necessarily signal head-final projections and that one should consequently be wary of interpreting the surface position of similar

particles elsewhere as being completely reliable indications of head-final structures.

The patterning examined in the paper is also shown to lead to the conclusion that IP-raising in *kong* structures takes place derivationally *after* the occurrence of tone sandhi modifications. As such tonal changes are clearly phonological operations, this indicates significantly either that the IP-movement must be assumed to occur after Spell-Out at PF or that a cyclic Spell-Out model as proposed in Chomsky (1998) should be adopted. The paradigm is furthermore argued to provide good empirical evidence for a derivational model of grammar, not being easily accounted for in any fully representational approach.

The structure of the paper is as follows. Section 1 first describes general properties of Taiwanese and the relation of tone sandhi to syntactic structure. Section 2 then begins to examine *kong* and situates it relative to a common process of grammaticalization in which verbs of saying develop into complementizer elements. Pointing to the unusual position of *kong* once its origin is considered, Section 2.2 shows how tone sandhi patterns provide good evidence for an analysis of IP-raising and the conclusion that the IP complement of *kong* is actually base-generated to the right of *kong* in C^0. Section 2.3 then considers the motivation for IP-raising in *kong*-structures and why particles may in general frequently occur in sentence-final position when they undergo grammaticalization. Finally Sections 2.4 and 2.5 show how the *kong* paradigm provides evidence for Chomsky's (1998) idea of 'cyclic Spell-Out.'

1. Taiwanese and Patterns of Tone Sandhi

Taiwanese is a variety of SVO Chinese which is similar to Mandarin in its basic word order and can be shown to have dominant head-initial patterns both in the lexical domain and in the functional domain. In VPs and PPs, verbs and prepositions consistently select their objects to the right as in (8a/b), and in IP and AspP modals/auxiliaries in I^0 and non-affixal aspectual morphemes in Asp^0 also have rightward complements, as in (9a/b):

(8) a. $[_{VP}$ V $[_{DP}$]]

be chhe

buy books

'buy books'

b. $[_{PP}$ P $[_{DP}$]]

tui A-sin

to Asin

'to Asin'

(9) a. [$_{IP}$ Aux/I^0 [$_{VP}$]]
e lai
will come
'will come'

b. [$_{AspP}$ Asp [$_{VP}$]]
A-sin leh khoa chheh.
A-sin ASP look book
'A-sin is reading.'[1]

DPs with demonstratives in D^0, are also head-initial, as shown in (10), and if numerals, classifiers and negative morphemes are assumed to head their own projections in Chinese languages as argued in Cheng and Sybesma (1999) and Cheng and Li (1991), then such projections similarly appear to be head-initial with rightward VP, CLP and NP complements:

(10) a. [$_{DP}$ D [$_{CLP/NP}$]]
hit pun chheh
that CL book
'that book'

b. [$_{NumP}$ Num [$_{CLP}$ CL [$_{NP}$]]]
sa pun chheh
3 CL book
'three books'

(11) [$_{NegP}$ Neg [$_{VP}$]]
A-sin m khi Tai-bak.
A-sin NEG go Taipei
'A-sin is not going to Taipei.'

A singular apparent exception to other head-complement orders in the DP is the positioning of N^0 heads following their genitive/PP complements as in other varieties of Chinese. However, as noted in Tang (1990) for Mandarin, such pre-nominal genitive/PP complements regularly occur separated from the N^0 head by other adjuncts and so are arguably not in their base-generated complement position when found preceding the noun (and such complements are actually not acceptable when immediately prenominal as seen in (12b)). The surface PP > N^0 ordering therefore does not necessarily indicate that NP is a head-final category.

(12) a. A-sin [tui A-hui] giam-tiong e phoe-phing
A-sin towards A-hui severe GEN criticism
'A-sin's severe criticism of A-hui'

b.??/* A-sin giam-tiong (e) [tui A-hui] e
A-sin severe GEN towards A-hui GEN
phoe-phing
criticism

Concerning the relation of C^0 to IP, the occurrence of sentence-final question particles generally in Chinese (and illustrated in (13) with Taiwanese) has

often been suggested to indicate that C^0 follows IP and that CP is therefore a head-final projection. However, there are reasons to be suspicious of such a conclusion. First of all it can be noted that non-particle elements equivalent to instantiations of C^0 in other languages (such as *na-si* 'if') in fact occur before the IP, suggesting that CP is actually head-initial, as shown in (14). Secondly, in Taiwanese the sentence-final Q-particle *bo* is found to be in complementary distribution with another Q-morpheme *gam*, which significantly does not occur in the same sentence-final position but in sentence-initial/second position preceding modals in I^0, as seen in (15). Such a clause-initial positioning of the Q-morpheme *gam* might again seem to indicate that C^0 regularly precedes its IP complement (with the subject in (15) being in a pre-CP base-generated topic-position):[2]

(13) $[_{CP}$ $[_{IP}$] C]?
A-sin u khiau bo?
A-sin AUX clever Q
'Is A-sin clever?'

(14) $[_{CP}$ C $[_{IP}$]]
$[_{CP}$ na-si $[_{IP}$ A-sin m lai]] . . .
if Asin neg come
'If Asin is not coming . . .'

(15) A-sin gam u lai (*bo)?
A-sin Q AUX come Q
'Did A-sin come?'

Thirdly, it will be seen in Section 2.1 that a regular embedding C^0 complementizer element is in fact developing in Taiwanese (and other varieties of Chinese) and this element again occurs in a pre-IP head-initial position. There is consequently positive evidence for a dominant, head-initial general direction of selection in Taiwanese, and in contrast to NP (where the head-first/-last nature is unclear from the data) and Q-particle-headed CP, the categories CP, IP, AspP, VP, DP, NumP, CLP, NegP all seem to show distinct head-initial patterns.[3]

With regard to its phonology and tonal system, Taiwanese is described as having eight tones.[4] In addition to these distinctive tones there are also syllables which do not carry any tone, this sometimes being referred to as "neutral tone" NT. In the phenomenon of *tone sandhi*, the lexically-listed "citation" tone of a syllable undergoes modification according to fully regular rules when preceding some other tone-bearing

syllable in the same tone sandhi domain. For example, if a syllable with tone 3 precedes another tone-carrying syllable in the same tone sandhi domain, the tone 3 will change into a tone 2, as illustrated in (16):

(16) **khi3** pak8kiang1 → **khi2** pak8kiang1
go Beijing
'go to Beijing'

Table (17) below shows how the full range of these modifications are made. Note that the changes in tone are not triggered or conditioned by the particular type of tone that the following syllable carries so that a syllable with tone 1 will change its tone to tone 7 no matter whether the following syllable has tone 1, 2, or, 3 etc.; the essential requirement for tone sandhi to apply is that the following syllable have some type of lexical tone rather than just 'neutral tone'.

(17) **tone sandhi change in Taiwanese**

(tone . . .	changes to tone . . .)	
1	→	7
2	→	1
3	→	2
4	→	8 when the syllable ends in p/t/k;
	→	2 when the syllable ends in a glottal stop
5	→	7 (southern Taiwan);
	→	3 (northern Taiwan)
6	→	1
7	→	3
8	→	4 when the syllable ends in p/t/k;
	→	3 when the syllable ends in a glottal stop

As mentioned just above, tone sandhi may not occur in a syllable if it precedes a syllable which has only neutral tone/no tone. Consequently *zau* in example (18) may not change its tone-2 when occurring before the toneless element *a*:

(18) **zau2** a-NT → **zau2** a-NT
run already
'already ran'

Similarly, a syllable may not undergo tone sandhi if it occurs sentence-finally. This is due to the fact that tone sandhi is restricted to apply within certain domains and is blocked where a substantial intonational break may occur (as indeed between sentences). In (19) below, the citation tone-2 of

sentence-final *ho* may not be converted into tone-1 even though followed by a syllable A-(hui) which does carry tone because this latter syllable occurs in a separate sentence. Note that from this point on for simplicity of representation we will indicate tone sandhi change by means of a simple bolded dot following the relevant syllable. Thus if a syllable is followed by a bolded dot, this indicates that it undergoes tone sandhi change, and if a dot is absent, no tone sandhi change is possible. In (19) sentence-final *ho* is therefore not followed by a dot as no tone sandhi change can occur in sentence-final position:

(19) 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.'

Sentence-internally there would also seem to be other tone sandhi/TS domains relevant for the operation of tonal change, and broadly-speaking every syllable in such a domain will change its tone unless it is the last tone-bearing syllable. Significantly, tone sandhi change in Taiwanese appears to relate to and reveal the underlying syntactic structure in a way which is not found in tone sandhi phenomena in Mandarin, Shanghainese, and certain other varieties of Chinese. For present purposes it is important to point out the following three significant generalizations:

(20) **Generalization A: a head and its complement occur in the same TS domain**

The presence of an overt complement consistently triggers tone sandhi change on the selecting head, indicating that a head and its complement are in a single TS domain:

(21) a. $V\text{-}NP_{object}$
be• [lng•-pun• chhe]
buy two-CL books
'buy two books'

b. P-NP
tui• [goan• lau•pe]
to my father
'to my father'

(22) a. Aùx/I-VP
e• lai
will come
'will come'

b. Comp/C-IP
na•**si•** [A•sin m• lai] . . .
if Asin neg come
'If Asin is not coming . . .'

(23) **Generalization B: a head and its Specifier do not occur in the same TS domain**

It is found that a head does not trigger tone sandhi change on the final

syllable of its Specifier. Consequently the Specifier of a head constitutes an independent TS domain. In (24) below, the final syllable of the subject does not change its tone, despite being followed by the tone-bearing head *u* 'have':

(24) [A•-**sin**] u• lng• chhing• kho
A-sin have two thousand dollar
'A-sin has two thousand dollars.'

In addition to (24) above with the final syllable of a subject in SpecIP failing to undergo tone sandhi, further examples of Specifiers being isolated TS domains are given in (25) and (26) below, where the DP *tai-oan-oe* 'Taiwanese' occurs as either a moved or base-generated topic relating to the object position. In such a Specifier position, its final syllable *oe* does not undergo any tone sandhi change:

(25) A•-sin [tai•oan•**oe**] be• hiao• kong
A-sin Taiwanese not know speak.
'Taiwanese, A-sin can't speak.'

(26) [tai•oan•**oe**] A•-sin be• hiao• kong
Taiwanese A-sin not know speak.
'Taiwanese, A-sin can't speak.'

(27) **Generalization C: adjuncts are self-contained TS domains**

The final syllable of an adjunct does not undergo tone sandhi even when followed by other tone-bearing syllables. This is illustrated below with the case of a CP adjunct. No tonal change in its final syllable is possible:[5]

(28) [na•si• A•sin m• **khi**], A•hui ma• be• khi
if Asin neg go Ahui also neg go
'If Asin is not going, Ahui will also not go.'

2. The Syntax of Taiwanese kong

2.1. *kong and the Grammaticalization of Verbs of Saying as Complementizers*

We are now in a position to begin examining the nature of Taiwanese *kong*. The origin of this S-final particle element is still very clear and *kong* has (most arguably) grammaticalized in some way from the fully homophonous general verb of saying *kong* (equivalent to Mandarin *shuo* 'to

say, tell'). Elsewhere the element *kong* still occurs as a regular independent verb which can furthermore carry aspectual suffixes such as *-koe* (perfect/experiential aspect, Mandarin *-guo*), as in (29) and (30):

(29) A•-hui kong• A•sin m• lai.
A-hui say A-sin NEG come
'A-hui said A-sin is not coming.'

(30) A•hui u• kong•koe• hit•ku• oe.
A-hui have say-ASP that-CL words
'A-hui had said that sentence before.'

Cross-linguistically it is a well-attested process that such general verbs of communication typically equivalent to English 'to say' may undergo grammaticalization as complementizers when they occur after other more specific verbs of communication or cognitive state such as 'yell', 'whisper', 'think', or 'believe'. Frequently this occurs when a language has serial verb constructions which allow for a sequence of two verbs of communication (one more specific, the second less specific) to become reanalyzed as a sequence of verb + complementizer, schematically as in (31):

(31) Verb1 Verb2 → Verb(1) Complementizer
shout say → shout that

What is of particular interest and relevance here is the position of the verb 'to say' when it becomes grammaticalized as a complementizer. The cross-linguistically common pattern is for the grammaticalized complementizer to occur in the same position that the earlier fully verbal form occurred in. In the many head-initial SVO languages of West Africa and Southeast Asia which show this type of grammaticalization, this means that the new complementizer will occur *preceding* its clausal complement. In Thai, for example, the morpheme *waa* is currently both a verb meaning 'to say' as seen in (32) and also grammaticalized as a complementizer preceding its IP complement as in (33). The fact that *waa* may co-occur with verbs of cognition such as *khit* 'think' in (33), no longer with its literal meaning 'to say', is evidence that *waa* has indeed grammaticalized as a complementizer in such positions and is no longer just a verb-in-series. Such an assumption is further supported by the observation that *waa* may now also occur after *nouns* as in (34):

(32) kae waa arai?
you say what
'What did you say?'

(33) khaw book/khit waa Daeng suay.
he say/think that Daeng be-pretty
'He says/thinks that Daeng is pretty.'

(34) kham-phaasii waa 'tham bun dai bun'
proverb that do good get good
'the proverb (that) "If you do good, you will receive goodness."'

In West African Ewe (Heine and Reh (1984, 252)) it is found that the verb *be* 'say' grammaticalized as a complementizer no longer occurs with the tense-aspect markings or pronoun prefixes which would otherwise be normal for real verbs in serial verb constructions, again indicating rather clearly that a category change from verb to complementizer has taken place. Similarly in Twi (Lord (1993, 176)) the verb *se* 'say' occurring as a complementizer also now no longer takes verbal affixes such as negation concord which would otherwise occur with verbs-in-series, confirming as with Ewe and Thai that a category change from verb to complementizer has taken place.

In Mandarin Chinese and Cantonese, Hwang (1998) argues that the same type of grammaticalization is taking place, and as Mandarin (35) shows, the verb *shuo* 'to say' now optionally occurs following verbs of cognition. As in Thai (33), this element in (35) no longer has its original verbal meaning of 'saying' but instead appears to be functioning as a general embedding complementizer element:[6]

(35) Zhangsan xiang shuo Lisi bu lai le.
Zhangsan think that Lisi NEG come ASP
'Zhangsan thinks Lisi is no longer coming.'

Examples such as (35) are important, as they show that where a complementizer/C^0 is developing in Chinese, it occurs in a pre-IP position and hence conforms with the otherwise dominant head-initial ordering in Chinese noted in Section 1. As pointed out in Section 1, where previous suggestions have been made that CP is a head-final projection in Chinese, this has been based on the occurrence of sentence-final question particles and the assumption that Chinese has no other regular instantiations of C^0 equivalent to English 'that'. Here however one finds that a fairly simple equivalent to English 'that' is indeed beginning to occur and significantly it identifies CP as being head-initial and quite regular in its directionality.

A similar pattern also occurs in Taiwanese, and one finds that the verb *kong* occurs following other verbs of communication and verbs of cognition as in (36):

(36) A•-hui siong• **kong•** A•-sin m• lai
A-hui think KONG A-sin NEG come
'A-hui thought that A-sin was not coming.'

Again, as with Thai *waa* and Mandarin *shuo*, the fact that *kong* occurs without its normal verbal meaning of 'saying' with verbs of cognition strongly suggests that it has grammaticalized away from its original verbal source. This is confirmed by the fact that *kong* in such a position cannot occur with any aspectual suffixes, suggesting that *kong* in these instances has indeed undergone a category change from verb to some other non-verbal category and now occurs as a complementizer:

(37) * A•-hui siong• kong•-**koe** A•-sin m• lai
A-hui think KONG ASP A-sin NEG come

This position preceding the embedded IP in (36) is precisely where one would expect to find *kong* occurring as a grammaticalized complementizer, and *kong* as a new C^0 here seems to be fully parallel to Mandarin *shuo*, Thai *waa*, and equivalents in other SVO serializing languages. However, in addition to forms such as (36), another more interesting pattern is found with *kong*, as briefly noted in the introduction. For no immediately obvious reason, the same element *kong* also seems to occur as a complementizer in clause-*final* position, hence *following* its clausal complement, as in (38) and (7) repeated below:

(7) 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.'

(38) A•-hui siong• A•-sin m• lai **kong•**
A-hui think A-sin NEG come KONG
'A-hui thinks A-sin is not coming.'

As Taiwanese, like other varieties of Chinese, shows evidence of being head-initial (as noted in examples (8–11, 14, 15)), and *kong* otherwise does occur as a genuine grammaticalized complementizer in clause-initial pre-IP position (as in (36)), this apparent clause-final V-to-C grammaticalization of *kong* is rather strange and seems to go against the general headedness specification of the language. It clearly also does not correspond to any serial verb position from which *kong* could have naturally grammaticalized as a complementizer.

In order to explain the puzzle of clause/sentence-final *kong*, we will shortly suggest that the canonical position of the grammaticalized

complementizer *kong* is indeed *preceding* its IP complement as in (36) and show that there is certain rather clear evidence from tone sandhi patterns indicating that the unexpected exceptional order in (7) and (38) is one which is actually *derived*, via a process of IP-raising to SpecCP.

2.2. *Tone Sandhi Patterns with kong*

Considering the ordering of C^0 and IP found in (36), one finds quite regular expected patterns of tone sandhi. The C^0 grammaticalized verb *kong* undergoes tone sandhi in its position preceding the IP complement, this caused by a regular head-complement relation, and the final element in the embedded IP *lai* does not undergo tone sandhi. This is fully anticipated as sentence-final elements do not undergo tone sandhi changes (as seen above in (19) and other examples).

Turning to (7) and (38), with the unusual ordering of IP-C^0 in the embedded clause, one now finds two quite unanticipated tone sandhi patterns. The first of these is that the IP-final elements *lang* in (7) and *lai* in (38) do *not* undergo tone sandhi. If one assumes that the IP is the leftward complement of *kong* in a final C^0 position, this should mean that the IP and the C^0 are in the same tone sandhi domain, and it is expected that the head-complement relation should result in tone sandhi occurring between the C^0 and the element left-adjacent to it in this tone sandhi domain, i.e. the final syllable in the IP, yet this doesn't happen.

The second extraordinary tone sandhi patterning in forms such as (7) and (38) is that the *sentence-final* element *kong* does in fact undergo a tone sandhi change. This is very much unexpected as no other elements in sentence-final position are known to undergo tone sandhi, the sentence being a self-contained tone sandhi domain as noted earlier when discussing example (19). Furthermore, the grammaticalization of *kong* might be expected to result in it either maintaining its citation tone2 or simply reverting to a neutral tone/absence of tone as is commonly found in other cases of grammaticalization (e.g., Mandarin, *de*, *le*, and *-zhe*, and various functional elements in Taiwanese). However, instead of this, *kong* undergoes a fully regular tone sandhi change in sentence-final position. Examples such as (7) and (38) need also not be followed by any other sentence for tone sandhi to occur on *kong* and so it would appear that there is nothing following *kong* which could trigger its tonal change.

Both such patterns can now be argued to have a rather simple explanation. Critically, both of the odd patterns observed in (7) and (38) are exactly parallel to those occurring in "regular" examples such as (36) and

(39) below where the complementizer *kong* occurs preceding its complement IP:

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

In (36) and (39), as just noted, the final syllables in the lower IPs, *lai* and *lang* respectively, do not undergo tone sandhi (as expected), and *kong* preceding its IP complement does undergo tone sandhi (again as expected). Comparing (36)/(39) and (7)/(38) it can therefore be seen that precisely the same tone sandhi patterns occur both when *kong* precedes its complement IP in a regular head-initial C^0 position and when *kong* occurs finally in a rather unusual position:

(40) a. *kong* – IP expected order, expected tone sandhi changes
(i) final syllable in IP does not undergo tone sandhi
(ii) *kong* does undergo tone sandhi

b. IP – *kong* unexpected order, unexpected tone sandhi changes
(i) final syllable in IP does not undergo tone sandhi
(ii) *kong* does undergo tone sandhi

The simple conclusion from such a comparison is that *kong* in its unusual sentence-final position is behaving for tone sandhi purposes exactly as if it occurred in a regular pre-IP position. To capture this striking parallelism syntactically, it can now be suggested that IP-*kong* forms such as (7)/(38) are actually the result of an IP-raising operation applying to underlying fully regular *kong*-IP forms *before* they are converted into IP-*kong* sequences. Such a pair of assumptions allows for a very straightforward explanation of the otherwise unanticipated tone sandhi facts, as follows. Prior to IP raising, the final element *lang*/*lai* in the embedded IP in (7/38) will occur in sentence-final position and *kong* will occur as a regular C^0 preceding an IP-complement. If the tone sandhi rules are applied at this derivational point, the results will be (a) that the final syllable in the IP *lang*/*lai* does not undergo any tone sandhi change, being in sentence-final position, and (b) that *kong* does undergo tone sandhi, being in a head-position preceding its IP complement.

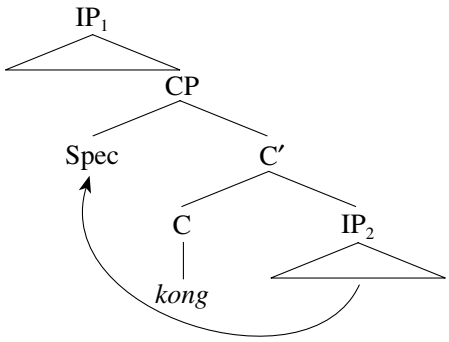
Observing how the assumption of IP-raising will explain both the unusual tone sandhi patterns in *kong*-final sentences and the odd sentence-final position occupied by *kong*, and further noting that *kong* occurs as a regular CP-initial complementizer in embedded clauses such as (36)/(39), it might naturally be assumed that the hypothesized IP-raising operation applies in

the embedded clause in (7)/(38) converting a string such as (41) into (42) (the surface form of (38)). Such a derivation is schematically represented in (43):

(41) A•-hui siong• kong• A•-sin m• lai.
A-hui think KONG A-sin NEG come
'A-hui thought thought that A-sin was not coming.'

(42) A•-hui siong• [$_{CP}$ [$_{IP2}$ A•-sin m• lai]$_i$ kong• t$_i$]

(43)



However, there is actually good reason to believe that this is not exactly how IP_2 and *kong* become re-positioned relative to each other. Although *kong* might seem to bear all the hallmarks of an embedded complementizer grammaticalized from a general verb of communication as in many other languages, further data reveal that *kong* in fact syntactically embeds not just a lower clause but *the entire sentence* in which it occurs sentence-finally.

The evidence that this is so comes in two forms. First of all, in sentences such as (7) and (38) it is possible to have not only a *kong* in sentence-final position, but also a second *kong* in a regular grammaticalized embedded Comp position preceding the embedded IP, as in (44) and (45):

(44) 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.'

(45) A•-hui siong• **kong**• A•-sin m• lai **kong**•.
A-hui think KONG A-sin NEG come KONG
'A-hui thought that A-sin is not coming.'

This indicates that the sentence-final kong does not originate in an embedded

C^0 position, as this position can clearly be filled by a second distinct *kong*. Consequently, the natural assumption to make is that sentence-final *kong* is actually in the matrix C^0 in (7), (38), (44), and (45) and that the entire IP_1 (i.e. the whole sentence consisting of both clauses IP_1 and IP_2) is raised to the Specifier projected by this matrix C^0. Clear confirmation that this is the case comes from the fact that it is possible to have a sentence-final *kong* in *single*-clause sentences, as in (46)–(48). This indicates that *kong* here can only possibly be occurring in a matrix Comp as there is no embedded C^0 in such clausal structures:[7]

(46) A•sin m• lai kong•.
A-sin NEG come KONG
'A-sin's not coming.'

(47) A•-sin bo• khi• tai•pak• kong•.
A-sin NEG go Taipei KONG
'A-sin didn't go to Taipei.'

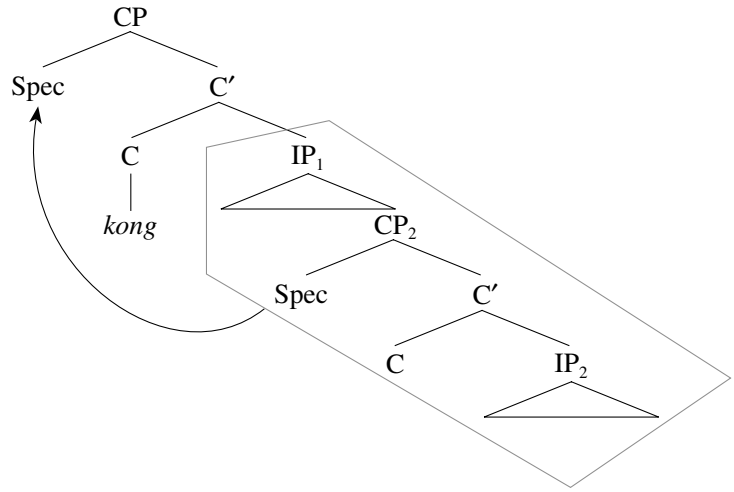
(48) A•-sin si• tai•pak• lang kong•.
A-sin be Taipei person KONG
'A-sin is from Taipei.'

Furthermore, if one compares (38) which has a single sentence-final *kong* with (36) where *kong* occurs preceding the embedded IP, one finds that the interpretation of the two structures is not fully equivalent. Use of *kong* in (36) essentially adds nothing extra to the meaning of the sentence, much in the way that the optional addition of the English complementizer 'that' adds no extra semantic content when it precedes an embedded clause. Use of sentence-final *kong* however does add clear extra meaning to the sentences it accompanies, and encodes speaker-related emphatic assertion of the sentence which in English can often be naturally glossed with the expression 'I'm telling you X!' (where X = the content of the sentence). This emphatic assertion resulting from the use of S-final *kong* in (49) below implies the interpretation that: "A-sin has written in his letter saying he is coming, so why do you, the person listening to me (the speaker) think that he will not come?"

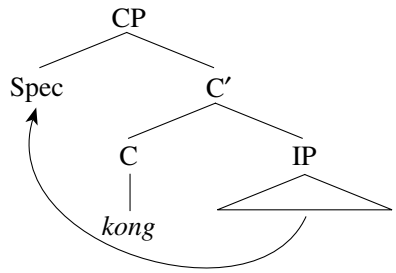
(49) A•-sin e• phoe sia• kong• bin•a•chai beh• lai
A-sin GEN letter write KONG• tomorrow want come
kong•.
KONG
'A-sin wrote that he will come tomorrow.'

As a result of the above observations, it can be suggested that *kong* is indeed a grammaticized C^0 element, but one which critically occurs in matrix clause positions. Quite possibly this restriction results from *kong* being licensed by a speaker-centered propositional attitude (the special emphasis of *kong*) which can only be encoded in matrix clauses where the speaker is the clear source of the information.[8] Assuming *kong* then to be in the matrix C^0, the surface forms found in (42) and (46) can actually be argued to have the underlying derivation and structure indicated in (50) and (51):[9]

(50)



(51)



(50) and (51) will then allow for the basic explanation of the tone sandhi patterns already given. Considering (50) which represents the examples examined in (7) and (38), what needed to be accounted for were the two significant facts that (a) the final syllable in IP_2 does not undergo any tone sandhi change, and (b) that sentence-final *kong* does undergo tone sandhi change. If one assumes that (50) is the underlying structure for (7)/(38) and that the tone sandhi rules apply to (50) before the movement of IP_1 (and IP_2 etc). to $SpecCP_1$, these two patterns are simply explained. The final element of IP_2 will be in sentence-final position when tone sandhi changes

are applied, and so no tonal change will occur as there is no tone-bearing syllable following it at this point. As for *kong* in C^0 of the matrix CP_1, it will be followed by its complement IP_1 at the point of tone sandhi application and so this will naturally cause tone sandhi change on *kong*. The conclusion that *kong* is in the matrix C^0 thus essentially alters nothing in the basic account of the unusual tone sandhi patterns in *kong*-final sentences, and the suggestion that there is IP-raising in such forms is seen to account both for the odd tone sandhi changes with *kong* and its non-canonical sentence-final position.[10]

2.3. *The Grammaticalization of kong and Motivations for IP-movement*

We now turn to consider the obvious question of why IP-raising takes place in *kong* sentences, and also examine a little further how *kong* has undergone grammaticalization in structural terms. Importantly, because IP-final *kong* has grammaticalized into the *matrix* clause C^0, the process of its grammaticalization must actually have been somewhat different from the grammaticalization of other verbs of saying as *embedded* clause complementizers noted in Section 2.1. In the latter cases, the source of the new sequence of verb and complementizer is a serial verb construction consisting of two verbs, as diagrammed in (31). With IP-final *kong* however, the most likely explanation of its grammaticalization as a *matrix* clause C^0 is that this has occurred when earlier two clause structures containing *kong* as the higher clause predicate have over time been re-analysed as single clause structures, as outlined in (52). In such a sequence of development, *kong*, reanalysed as a C^0, will come to occur as the C^0 of the single matrix clause which remains after the collapse of bi-clausal forms into new mono-clausal structures:

(52) Stage 1: 2-clause structure, *kong* a real verb meaning 'to say' with an NP subject and a clausal complement:

$[NP_{subject}$ *kong* $[_{IP} \ldots]]$

Stage 2: the 2-clause structure re-analyses as a single clause; *kong* deverbalizes and loses its NP subject, *kong* grammaticalizes as a new matrix clause C^0

$[_{CP} [_{C}$ *kong* $[_{IP} \ldots]]]$

Stage 3: the IP complement of *kong* raises to SpecCP (motivation for IP- raising discussed below):

$[_{CP} [_{IP} \ldots]_i [_{C}$ *kong* $t_i]]$

Noting also that it is specifically an emphatic assertion of the first-person speaker which is communicated by the use of *kong*, such a first-person restriction can be suggested to have resulted from *kong* in the original two-clause structure having commonly had a first person subject when used as an emphatic assertive form. As part of the grammaticalization process we suggest that the first person subject specification associated with *kong* emphatic forms may have subsequently become re-analyzed and absorbed directly into the element *kong* as an inherent restriction on its use. Such a process of re-analysis has indeed been attested elsewhere in similar cases with the grammaticalization of quotative complementizers and the creation of evidential morphemes. Harris and Campbell (1995, 169), for example, note the Georgian quotative complementizer *metki* can only be used to quote the words of the speaker and point out that *metki* grammaticalized from an original sequence *me vtkvi* which literally meant 'I said (it)'.[11] Similarly, in many American Indian languages, evidential suffixes on verbs have grammaticalized from verbs of seeing and hearing following the collapse of two-clause structures into mono-clausal forms in the same way hypothesized for *kong*. Examining Maricopa, Gordon (1986) notes that the addition of the suffixes – '*yuu* and – '*a* to verbs results in the interpretation that the speaker respectively saw or heard the action described:

(53) lima-'yuu
dance-EV
'He danced (I know because I saw it).'

(54) ashvar-'a
sing-EV
'He sang (I know because I heard it).'

The restriction that it is the speaker who has the visual or aural evidence for the truth of the proposition simply results from the fact that these suffixes are derived from the first person singular verbal forms of the verbs *yuu-k* 'to see' and *av-k* 'to hear' (the prefixed element ['-] being a first person singular marker). As the morphemes '*yuu* and '*a* are synchronically no longer verbs but clause-final particles, it can be assumed that the first person subject specification has become re-analysed as an inherent property of these X^0 heads, restricting their use and resulting in the interpretation that it is specifically the speaker who has the visual/aural evidence for the proposition. In Taiwanese, IP-*kong* forms are here suggested to have developed from two-clause structures in a similar way, with *kong* as the higher clause

verb undergoing deverbalization and incorporating a first-person speaker-related interpretation from its former syntactic subject.[12]

Assuming this much, we can now outline two possible explanations for the IP-raising which has accompanied grammaticalization of *kong* as a C^0 element, one phonological, the other syntactic. The first phonological possibility is that as *kong* has grammaticalized into a particle-like element; like other particles it has become increasingly more clitic-like and dependent and in need of some kind of phonological support.[13] Normally in Chinese such support should critically come from an element to the particle's *left*, as stress in most varieties of Chinese including Taiwanese is phrase-initial and commonly leads to encliticization rather than the occurrence of proclitics. One potential explanation of IP-raising with *kong* is therefore to suggest that the tendency for functional clitic-like elements to attach to their left may directly trigger movement of the IP complement of *kong* to a position to its left in order to provide *kong* as an enclitic with phonological support.[14]

A second possible syntactic explanation of the IP re-positioning is to suggest that this movement occurs as the result of the particular informational structure of *kong* sentences. Recall that in Section 2.2 it was noted that S-final *kong* adds to the proposition expressed in its IP complement an assertive interpretation equivalent to English: 'I'm telling you IP!' or 'Why do/would you doubt IP?' When S-final *kong* is used, it importantly seems to imply that the hearer may already entertain the proposition expressed in the IP, but perhaps be somewhat doubtful of it for no good reason in the speaker's opinion. Use of *kong* by the speaker then expresses the speaker's strong endorsement of the truth of the proposition, in a way similar to the use of 'I'm telling you!' in English as in (55):

(55) He's gone, I'm telling you!

In S-final *kong* sentences then the proposition encoded in the IP is a possibility which may be entertained as true by both speaker and hearer but with different degrees of certainty. In this sense the IP therefore represents old, topic-like information largely presupposed by the participants in the conversation, and the clear focus of attention and force of *kong* sentences lies in the *assertion* of the proposition by the speaker via the explicit use of *kong*. Because of this topic-like property of the IP and the strong focus on the asserting act with *kong*, an alternative to the encliticization account of IP-raising is therefore to suggest that movement of the IP takes place in order to topicalize the IP, placing the IP in sentence-initial topic position and leaving *kong* in prominent sentence-final position

where it is naturally interpreted as being in focus. In such a syntactic analysis the IP-raising in *kong* sentences would essentially be an operation of defocusing, or 'p-movement' in Zubizarreta's (1998) terms, carried out in order that a secondary element (*kong*) is cast into focus in a prominent position (sentence-finally here).

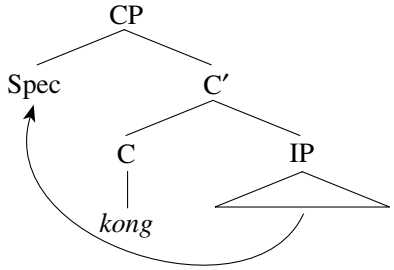
Both of the above two possible explanations of IP-raising in *kong* sentences we believe may in fact be plausible as quite general causes of S-final particle creation in SVO languages. If bi-clausal structures may regularly collapse into mono-clausal forms with higher clause predicates grammaticalizing into particles in the way outlined, we suggest that either encliticization or topic-focus reasons might then in many cases lead to the displacement of IP-like clausal constituents in a leftward direction resulting in the creation of S-final particles. Both phonology and information structure may therefore be genuine forces underlying the frequent occurrence of particles in S-final position in different instances. Considering the particular case of *kong* however, it would seem that an explanation in terms of defocusing is most likely to be the real motivation for the IP-movement, accounting as it does for the particular topic-focus interpretation of *kong*-final forms, and encliticization/phonology taken as a potential trigger for the movement would seem to miss this link with the meaning of *kong* sentences. We therefore now assume that in the case of *kong*, IP-raising does indeed take place for defocusing reasons and turn to see how such a conclusion interacts with a consideration of the *derivational timing* of IP-movement.

2.4. *Evidence for PF Movement*

An important part of the IP-raising account of the tone sandhi patterns in *kong*-final sentences has been the suggestion that tone sandhi changes are made at a particular point in the derivation of such sentences when the IP-complement of *kong* in C^0 is still *in situ* and has not yet been raised to SpecCP. Only if the tone sandhi rules are applied at this point can the unusual patterns be given a principled explanation in line with other tone sandhi patterning in Taiwanese.[15] Concerning the essential nature of tone sandhi, given that tone sandhi rules alter the phonetic interpretation of an element and so apply to specifically phonetic features, it is most natural to assume that such rules are indeed *phonological rules* and consequently apply in the PF component after Spell-Out. This being so, it can be shown that one seems to be led to the further conclusion that the hypothesized IP-raising operation itself significantly has to occur in the PF component too.

The critical sequence in the derivation of *kong*-final sentences is that underlying forms such as (56), repeated below, are created in the syntactic component and then *prior to IP-raising* presented for tone sandhi alternation. Assuming that tone sandhi is a phonological process, under standard assumptions it should take place only after a syntactic sequence has entered the PF component. Now, because the IP-raising operation has to take place *after* the tone sandhi rules have applied, it seems that one therefore should conclude that the IP-raising also occurs in the PF component and hence is importantly an instance of movement in PF rather than syntactic movement.

(56)



Under such assumptions, the derivation of a *kong*-final sentence such as (46) can be schematized as in (57):

(57) $[_{CP}\ [_{C}$ kong $[_{IP}$ A-sin m lai]

↓

Spell-Out

↓

PF – tone sandhi rules apply (changing the tone on *kong* and maintaining the citation tone on *lai*)

$[_{CP}\ [_{C}$ kong• $[_{IP}$ A-sin m• lai]]]

↓

IP-raising

$[_{CP}\ [_{IP}$ A-sin m• lai$]_{i}$ $[_{C}$ kong•] $t_{i}]]$

The tone sandhi patterns of kong-final sentences therefore might appear to offer positive empirical support for the possibility that not all movement operations are necessarily syntactic and that the re-positioning of certain constituents may perhaps take place in the PF component too. However, further reflection reveals that a serious problem is also introduced by the conclusion that IP-raising occurs after the application of tone sandhi and hence apparently in PF. Elsewhere in the past where claims have been made

that movement occurs in PF, such suggestions have importantly been made when the visible repositioning of certain constituents appears to have no impact on *interpretation*. In such cases it is suggested that if the relevant movement is assumed to take place only in PF after the derivation has left the syntactic component, its effects will not be present in the structure presented for interpretation at LF, and the fact that the movement is semantically vacuous can be simply explained. Operations of PF movement are therefore clearly expected not to have an impact on the meaning of a sentence and not to be associated with a particular interpretation. Considering the IP-raising on *kong*-final sentences, such movement does however appear to be associated with a particular interpretation, and structures in which an IP is raised before *kong* are regularly interpreted as topic-focus forms with the IP instantiating old information and *kong* encoding a highlighted assertive focus, similar to other structures generated by operations of defocusing p-movement. Such a connection between IP-movement and the creation of a particular interpretation therefore suggests that IP-raising should be assumed to take place not in PF but actually during the course of the syntactic derivation in order to be present in the input to LF. The patterns with *kong* consequently lead to an apparent contradiction. On the one hand there is evidence that IP-raising follows the application of phonological rules and so should be taken to be PF-movement yet on the other hand there are interpretative effects indicating that the movement should in fact be assumed to occur in the syntax. As there is no obvious way of resolving such a paradox in a traditional T-model of grammar, the patterns with *kong* may therefore seem to suggest that there is actually a rather different interaction between syntax and phonology than assumed in such a model, and that a solution to the *kong* dilemma should lie in somehow allowing phonology greater access to mid-derivational syntactic structures. Discarding the possibility of a PF movement analysis of the *kong* patterns, we will now see how the conflicting properties of *kong* sentences can in fact be naturally reconciled with Chomsky's (1998) idea of cyclic Spell-Out and that the *kong* paradigm consequently provides positive, good support for such an approach to the phonology-syntax connection.

2.5. *An Alternative – Cyclic Spell-Out*

In contrast to earlier GB and Minimalist models, Chomsky (1998) suggests there is in fact no single point of Spell-Out where the phonetic features of a sentence are fed off to PF and phonology, but that sub-parts of a derivation may be given phonetic interpretation during the course of a single

derivation and before a structure is finally completed. A single syntactic derivation may therefore be spelled out in a number of successive cycles. The cycles which Chomsky suggests are relevant for cyclic Spell-Out are the "phase" constituents, which are CPs and *v*Ps. Thus the tentative suggestion is that once a phase has been syntactically created, it may (possibly) also be spelled out phonetically before being merged into a higher syntactic unit.

The tone sandhi patterns investigated here can be argued to provide good evidence in support of such a cyclic Spell-Out approach and also allow for a better understanding of certain aspects of the process of cyclic Spell-Out.[16] The critical patterning in *kong*-final sentences in need of some account is the fact that IP-movement seems to have to take place *after* the application of a phonological process, the tone sandhi changes. This led us above to the initial hypothesis that IP-raising perhaps takes place at PF, but such a possibility was then rejected on the grounds that the movement seems to be associated with interpretative effects. However, if a model incorporating cyclic Spell-Out is adopted and it is assumed that sub-parts of syntactic structure may be given phonetic interpretation mid-way in the course of a derivation, a rather simple second explanation for the sequencing of tone sandhi and IP-raising automatically becomes available which does not require the assumption of movement at PF. Significantly *kong* is taken to occur grammaticalized in C^0 and hence instantiate the head of a phase-type constituent, CP. It can therefore be suggested that after construction of the phase CP with *kong* in C^0 merged with its complement IP to the right (i.e. [$_{CP}$ kong [$_{IP}$ . . .]]), this sequence is given phonetic interpretation and spelled out in PF. Entering PF the tone sandhi rules will apply to the sequence and cause a tone sandhi alteration in *kong* but not in the final element in the IP, resulting in the surface attested tone sandhi patterns. Following this, the syntactic derivation will then continue, with the IP undergoing raising to a Specifier position to the left of *kong*. On completion of the full syntactic derivation, the sequence will then be spelled out and will surface with the linear sequence [[$_{IP}$ . . .] kong]. In such a cyclic Spell-Out approach the IP-raising will therefore occur as a fully regular *syntactic* movement occurring in the syntactic part of the derivation, and movement at PF need not be assumed. The apparent paradox that IP-movement must take place in the syntactic component yet after the application of certain phonological rules can consequently be captured rather simply with the idea of cyclic Spell-Out, and to the extent that *only* such an approach seems able to capture the patterning found with *kong*, the *kong* paradigm then clearly offers good support for such a view of syntax and phonology.

The Taiwanese tone sandhi patterns also allow for certain other conclusions about cyclic Spell-Out and a finer understanding of the nature of phase constituents. A first point concerns the input form to cyclic Spell-Out. Quite generally, Chomsky (1998) suggests that there is a distinction between Specifiers that are semantically selected by a head and "extra" Specifiers which it is argued are licensed with the categories C, T and *v* in addition to any selected external argument (EA). Non-selected Specifiers of this second type are taken to host the subject (SpecTP), raised *wh*-phrases (SpecCP), and shifted objects (Spec*v*P). Projections of the "core functional categories" C, T and *v* are accordingly schematized as in (58), with H being the head, YP its complement, EA a semantically selected Specifier, and XP the extra non-selected Specifier:

(58) [XP [(EA) H YP]]

The outer Specifier XP is furthermore suggested to be a position which is critically visible to syntactic heads which occur higher than a CP or *v*P phase, allowing for an element in XP to raise to satisfy the EPP requirements of a higher head. Elements inside the inner pair of square brackets in (58) are taken to be largely invisible to higher positions due to the opacity of phases ("phase impenetrability"). The outer Specifier is therefore a position which is in a sense importantly not inside the phase proper and not part of the phase's core.

Turning back to Taiwanese and *kong*-sentences now, it has been suggested that the IP complement of *kong* raises to a Specifier associated with *kong* after the sequence *kong*-IP has been spelled out. Such a Specifier (SpecCP) is not semantically selected and is therefore of the extra "outer" type just described (XP in (58)). It can therefore now be argued that the input to cyclic Spell-Out may quite possibly be the inner core of phases consisting of the head of a phase, its complement YP and any external argument Specifier (EA), but not necessarily a phase's outer phase-peripheral Specifier XP. Such a Spec position is perhaps created only after the inner core of a phase has been sent to Spell-Out. In *kong* sentences then, the inner core of the phase headed by C^0 (*kong*) is created resulting in the linear sequence [kong IP/TP] and then this is spelled out phonologically, critically also undergoing tone sandhi alteration at this point. Following Spell-Out of the inner core of the phase, an outer Specifier position is created and the IP (TP) complement of *kong* is moved to this position. Finally, the full and final syntactic structure is presented to the phonological component again and the linear order [IP/TP kong] is pronounced.[17] This sequencing is now diagrammed in (59) below (using example (46) again):

(59) **Syntactic creation of the inner core of phase headed by C^0 *kong*:**

↓

[kong [$_{IP/TP}$ A-sin m lai]]

↓

Spell-Out of the inner core + application of tone sandhi rules:

↓

[kong• [$_{IP/TP}$ A-sin m• lai]]

↓

Syntactic raising of the output of mid-derivational Spell-Out → IP/TP raising to outer phase-peripheral Spec of the phase CP:

↓

[$_{CP}$ [$_{IP/TP}$ A-sin m• lai]$_i$ kong• t_i]

↓

Final syntactic form is pronounced (as above)

Such conclusions about the input forms to cyclic Spell-Out can be argued to be further strengthened and confirmed by an independent pattern found in English, the interaction of wh-movement and sentential stress discussed in Bresnan (1971), which largely anticipates the idea of cyclic Spell-Out. In this work, Bresnan convincingly shows that *wh*-phrases which appear raised in surface forms in fact behave as if they were *in situ* for purposes of sentential stress assignment. Bresnan notes that whereas sentential stress is normally placed on the final element in a sentence, in *wh*-questions and relative clauses it is placed on a raised *wh*-phrase, as in (60), with 'what books' receiving the sentential (non-contrastive) stress:

(60) John asked what BOOKS Helen had written.

Bresnan argues that in order to explain the stress on the *wh*-phrase and the lack of stress on the sentence-final verb, sentential stress must be assigned when the *wh*-element is *in situ* in sentence-final object position prior to raising to SpecCP. As sentential stress is a phonological rule and this must apply before syntactic raising of the *wh*-phrase to SpecCP, Bresnan concludes that phonological rules apply to each transformational cycle in syntax before further syntactic operations occur in higher cycles, and that phonology will therefore be interwoven with syntax in a single derivation (i.e., there is cyclic phonological Spell-Out). Here we can point out two significant points relating to the *wh* data Bresnan presents. First of all, if sentential stress as a phonological rule is naturally applied to a CP con-

stituent, then importantly it applies to the CP *before* the SpecCP position is created by raising of the *wh*-phrase (i.e., sentential stress applies to the object *wh*-phrase in its *in situ* position before any raising). This therefore seems to result in the same conclusion arrived at on the basis of Taiwanese IP-raising that the mid-derivational input to Spell-Out and phonology is indeed the inner core of a CP phase without its external outer Specifier position.[18]

A second important point results from a comparison of Bresnan's patterns with object topicalization in Taiwanese, a construction whose tone sandhi patterns independently require some re-consideration here. As mentioned in footnote 15, and seen in example (26) repeated here below, tone sandhi is not triggered in the verb which precedes the object in the underlying form of an object topicalization sentence (i.e., *kong* in (26)):

(26) [tai•oan•**<u>oe</u>**]$_i$ [goan• lau•pe] be• hiao• kong t_i.
Taiwanese I old-father not know speak.
'Taiwanese, my father can't speak.'

If it is assumed that objects are necessarily topicalized to the same SpecCP position that IP-raising targets in *kong*-final sentences, this lack of tone sandhi in the verb would be rather surprising. One might expect that the object would first trigger tone sandhi on the preceding verb during cyclic Spell-Out of the CP phase and then undergo raising to the phase's outer Spec. Because tone sandhi does not, however, occur in the sentence-final verb it can be suggested that this may indicate that object topicalization actually does *not* target SpecCP but some other lower adjoined/Focus-phrase position located in the inner core of the CP phase, and that this will explain lack of tone sandhi in the verb. Any topicalization/focus-raising to a position lower than C^0/SpecCP will critically take place *before* the CP phase is spelled out and objects raised and phonetically interpreted in such a higher position will consequently not be able to cause tone sandhi in the lower selecting verb. Good empirical support can also importantly be given for such an explanation of the lack of verbal tone sandhi with object topicalization. If it is assumed that IP-*initial kong* is grammaticalized as an embedding C^0 as argued in Section 2.1, this allows one to test whether object topicalization occurs to a SpecCP position preceding *kong* in C^0 or to an adjoined/Focus position following C^0. As seen in the contrast in (61) and (62) below, object topicalization can legitimately occur only to a position below *kong* in C^0 and consequently inside the CP's inner core:

(61) A•-sin siong• **kong•** [hit• pun• chheh]$_i$ A•-hui m•
A-sin thinks C that CL book A-sin NEG
be t_i
buy
'A-sin thinks that A-hui doesn't want to buy that book.'

(62) * A•-sin siong• [hit• pun• chheh]$_i$ **kong•** A•-hui m•
A-sin thinks that CL book C A-hui NEG
be t_i.
buy

The lack of parallelism between IP-raising and object topicalization with regard to tone sandhi change on the sentence-final element therefore has a reasonable and simple explanation. It also has an interesting consequence when explored a little further in comparison with English *wh*-movement and sentential stress patterns.

Note that Bresnan's *wh*-sentential stress patterns could in fact be given a slightly different explanation from the one offered immediately above. Supposing that the input to cyclic Spell-Out could possibly be phases of either CP or *v*P type, it could be suggested that sentential stress is actually assigned to an object *wh*-phrase when *v*P rather than CP is input to cyclic Spell-Out, the object *wh*-phrase occurring unraised in *v*P-final position at such a point and hence in the necessary position to be assigned the relevant stress.[19] The patterns found with Taiwanese object topicalization now importantly seem to exclude this as a possibility and suggest the conclusion that *only* CP phases can occur as the input to cyclic Spell-Out. The reason for this is that if *v*P phases could occur as the input to cyclic Spell-Out, one would expect (incorrectly) that Taiwanese topicalized objects would indeed be able to trigger tone sandhi on their selecting verbs, as at the hypothetical point of *v*P cyclic Spell-Out, such objects would occur *in situ* following the verb in VP.[20] The fact that tone sandhi does not occur in the verb in such cases, therefore, clearly suggests the broad conclusion that phonology has access to mid-derivational syntactic forms only at the clausal level after CPs have been constructed, and does not apply directly to smaller syntactic cycles such as *v*P phases.[21]

The Taiwanese *kong* paradigm thus generally both adds interesting positive empirical support for the idea of cyclic Spell-Out itself and also allows one to understand more precisely what may be involved in such a process, indicating that the input to cyclic Spell-Out is a clausal CP constituent prior to the creation of its external Specifier position.[22]

3. Concluding Remarks

This paper began as a simple investigation of the syntax underlying the element *kong* and set out to answer the question of why it is that not only descriptively head-final languages but also dominantly head-initial languages develop sentence-final particles. The paper suggested that in SVO languages such elements may be created when bi-clausal structures first collapse into mono-clausal forms with the verb in the higher clause grammaticalizing as a functional head in the new simplified structure. Increased phonological dependency and aspects of topic-focus structure were then argued to be possible causes triggering an inversion of the original linear order and raising of the functional head's clausal complement to its Specifier position. Critically in the case of *kong* such IP-raising is revealed in the patterns of tone sandhi still found and is also well-supported by knowledge of the origin of *kong* as a verb selecting a clausal complement. Combined with other patterns of grammaticalization seen with Mandarin *shuo* and Taiwanese embedded (IP-initial) *kong*, this offers clear support for the conclusion that Chinese is not in fact head-final in its CP (or possibly Mood/QP) constituents despite the occurrence of question particles in S-final position. Generally, the *kong* patterns indicate that the surface position of particles relative to their complements may not always be a reliable indication of underlying head-complement directionality, and that in order to arrive at more robust conclusions concerning the base order of high clausal heads and their complements, one should instead focus on those instantiations of functional heads which are not particle-like and dependent, as only then can one be sure to factor out the interfering role that phonology and other factors relating to grammaticalization may play in the relative positioning of such elements. The paper later also showed how the *kong*-paradigm may be interpreted as providing good empirical evidence for Chomsky's (1998) proposals for cyclic Spell-Out and explored how the patterns found offer valuable information about the operation of cyclic Spell-Out and its application to phases. Finally the *kong* paradigm has also been suggested to provide a positive argument in favor of a derivational model of grammar and to be difficult to account for in a purely representational approach.

Notes

[1] Taiwanese *e* and *leh* are equivalent to Mandarin *hui* and *zai*, respectively.

[2] Note that for some possibly older generation speakers it may be possible (though certainly not common) for *gam* and *bo* to co-occur. For the majority of modern generation speakers however *gam* and *bo* are in complementary distribution and may not be used together,

clearly suggesting that they instantiate the same Q-head. For speakers who may be able to accept the co-occurrence of *bo* with *gam*, *bo* may possibly occur as an emphatic reinforcement of *gam* in the lower part of a QP-shell structure similar to Neg and D focus-shells discussed in Simpson and Wu (2000).

[3] With regard to the ordering of PPs and V and the relation of this to the SVO head-initial status of Chinese, see further good discussion in Mulder and Sybesma (1992).

[4] Two of the 'eight' traditionally recognized tones, tone2 and tone6 are actually identical in phonological terms – both are high-falling 5-1.

[5] Note that a quite different approach to the description of tone sandhi generalizations is offered in Cheng (1968), (1973). Rather than stating (Taiwanese-type) Min dialect tone sandhi as a set of phonological rules which apply to major syntactic units as input (i.e., specifiers, heads, complements and adjuncts), Cheng suggests that such tone sandhi is instead sensitive to the particular *categorial type/label* of a syntactic constituent, and that tone sandhi is a process which is blocked and fails to apply if a syllable occurs specifically at the end of an NP, a VP, IP, sentential AdvP, or CP. Such a categorial-based approach is however criticised in Chen (1985). Chen points out that truly productive phonological processes such as tone sandhi are nowhere else found to be directly sensitive to and restricted by particular categorial labels and phonological rules instead seem to be blind to categorial distinctions (for example, one never finds cases of other phonological processes such as vowel harmony, palatalization, spirantization, etc. being restricted by categorial type, and therefore only occurring in AdjPs or PPs, or NPs and AdjPs etc., although such processes may be subject to other more general boundary conditions). Chen argues it would consequently be implausible to assume the exceptional existence of rules which do refer to a subset of such labels just in the case of Min tone sandhi. In contrast to the lack of such category-specific phonological rules however, Chen notes that cross-linguistically there are many phonological processes which are sensitive to *more general* syntactic divisions in sentential structure, indicating that phonology (potentially) does recognise distinctions between arguments and adjuncts and other major syntactic relations, and that such more general distinctions are more likely to be relevant for Min tone sandhi. We agree with Chen that phonological rules should be assumed to be unable to refer to specific category labels and would like to thank Monik Charette, Moira Yip, and Jean-Roger Vergnaud for useful discussion and confirmation of this point. The paper consequently continues to assume that Taiwanese tone sandhi is indeed a function of more general syntactic structure and the generalizations suggested in the text and is not a result of categorial labels. For further discussion of how Min tone sandhi patterns are sensitive to argument/adjunct type syntactic relations, see Chen (1990) and Chen (2000).

[6] Note that informants have indicated the use of Mandarin *shuo* as a complementizer is considerably widespread, occurring in the Mandarin spoken in Taiwan, Beijing, Shanghai, and various other areas of China.

[7] Note that IP-final *kong* can also not occur embedded inside a complex NP, further indicating that IP-final *kong* is indeed a root/matrix clause phenomenon. Thanks to a reviewer for this point.

(i) A-sin u tia^{n}-tioh A-hui m lai (*kong) e siau-sit.
A-sin AUX hear A-hui NEG come KONG GEN news
'A-sin heard the news that A-hui was not coming.'

[8] Note this is similar to the observation that various propositional attitude adverbs in English and other languages cannot occur in embedded contexts:

(i) John said that (*/??frankly) Mary was crazy.

Embedding the adverb under a higher clause subject seems to block the speaker's control of the propositional attitude expressed by the adverb, a licensing requirement which appears to be necessary for the use of certain adverbs.

[9] A reviewer suggests that the analysis of IP-raising would be further supported if it could be shown that extraction of an element from the IP could not licitly occur, as extraction from within a leftward Spec position (as opposed to from within a complement position) might be expected to violate Subjacency. Unfortunately because IP-final *kong* is a root/matrix clause C^0, such tests cannot be constructed, as there is no higher position in the clause that an element could be legitimately extracted to. Note however that it might be suggested that the unacceptability of *wh* elements in *kong* sentences could be due to Subjacency applying to LF extraction in some way:

(i) *A-sin be sia-mih kong?
A-sin buy what KONG

We suggest though that the *wh* elements actually cannot co-occur with IP-final *kong* because *kong* instantiates a declarative and hence non-interrogative value of C^0, *kong* functioning to emphatically assert the IP. If the C^0 is non-interrogative it will simply not be able to license *wh* elements (and the unacceptability of cases such as (i) will therefore not be due to any LF Subjacency violation). In this regard note furthermore that yes/no question particles can also not co-occur with *kong*:

(ii) *A-sin u lai bo kong?
A-sin AUX come Q KONG

Such complementary distribution of *kong* and question particles can be taken as indication that *kong* and interrogative X^0 elements occur as alternative competing instantiations of the same basic C^0 head position with *kong* and question particles encoding opposite semantic values – declarative assertion vs. interrogative +Q.

[10] Concerning the question of whether other older S-final particles in Taiwanese also result from IP-raising, when one examines these (e.g., aspectual *-a* (Mandarin *le*)), one finds that they are now phonetically reduced to the extent that they no longer carry any positive tone which could undergo tone sandhi. Such a lack of possible tone sandhi does not indicate that IP-raising does not occur with these particles, and shows only that any (hypothetical) raising can no longer be made visible by possible tone sandhi. Essentially then it is necessary to catch a particle at a particular point in its development in order to be fully confident about its underlying syntax, Taiwanese *kong* being especially clear and revealing here in still having both an obviously recognizable source as the verb 'to say' and the positive tone which allows it to undergo tone sandhi.

[11] *Me* is the pronoun 'I' and *v-tkv-i* is the first person singular subject (*v-*) aorist indicative (*-i*) of the verb 'say'. Note that in the case of Taiwanese, as Taiwanese subjects can be phonetically null (i.e., *pro*), there is no necessary phonetically overt reflex/trace of the incorporation of the first person specification into the reanalysed *kong* (unlike in Georgian).

[12] Speculating a little on why bi-clausal structures might collapse into simplified mono-clausal forms in this way, it can be suggested this perhaps takes place when there is no longer any pressure to see the content of the higher clause predicate as instantiating a highlighted discrete event.

[13] See Bybee et al. (1994, 107) for discussion of the fact that grammaticalization frequently leads to phonetic reduction, causing phonological dependency and cliticization.

[14] See here Grosu (1988) and Giusti (1997) for clear evidence that dependent enclitic definite determiners in Romanian attract elements to D^0/SpecDP in order to support them phonologically; hence this kind of attraction for phonological support is indeed attested elsewhere.

[15] The *kong* paradigm therefore seems to provide a clear argument in favor of a *derivational* model of grammar, and would not seem to be easily accounted for in any fully representational approach. In a non-derivational approach, *kong* sentences would have the (single) representation in (i) with the IP in its surface position relating to a trace/copy following *kong*:

(i) [[IP]$_i$ *kong* t$_i$]

The problem here is that the element following *kong* in (i) is phonetically null and therefore should not be able to trigger tone sandhi in *kong*. Elsewhere it is clearly only phonetically overt elements (which furthermore must have non-neutral tone) that can trigger tone sandhi on a preceding element (hence, for example, an object *pro* does not cause tone sandhi on a verb). Note that it is also not possible to allow for copies of movement (as opposed to base-generated empty categories) to exceptionally cause tone sandhi, as the copies left by other types of movement such as object topicalization do not cause tone sandhi on the elements which precede them. There would therefore seem to be no obvious way to account for the tone sandhi patterns with *kong* without assuming a derivational approach where the overt IP triggers tone sandhi on *kong before* raising to its left.

[16] Our thanks to both Joseph Aoun and David Pesetsky for pointing out to us how the tone sandhi patterns might be considered evidence for cyclic Spell-Out.

[17] It can be assumed that such an end-of-derivation re-presentation of the completed syntactic form to the phonology will not result in any second application of tone sandhi rules and that tone sandhi alterations occur only once to any phase.

[18] Note that as with IP-raising, there are clear interpretational effects associated with *wh*-movement indicating that it cannot be analyzed as PF movement and that a cyclic Spell-Out approach is therefore necessary instead.

[19] Note that Chomsky (1998) suggests that prior to *wh*-movement to SpecCP, *wh*-phrases may have to raise to Spec*v*P. However, if such an outer Spec is not created until after the *v*P phase has been interpreted by cyclic Spell-Out (as argued above with CP), then a *wh*-object will indeed still be *in situ* at the point that cyclic Spell-Out may hypothetically apply to a *v*P.

[20] Again, as noted in footnote (19) raising of an object to Spec*v*P and higher positions should only come after the **v**P is spelled out.

[21] Such conclusions also have a further potential consequence for the hypothesis in Chomsky (1998) that *wh*-movement to SpecCP occurs cyclically via Spec*v*P. The latter assumption seems to lead one to expect that when the inner core of a CP phase is phonetically interpreted by cyclic Spell-Out, an object *wh*-phrase will occur raised and phonetically spelled out in Spec*v*P, as schematized in (i):

(i) [$_{CP}$ [$_{TP}$ Subject [$_{vP}$ Object$_{WH}$ [$_{VP}$ V]]]]

This however raises a problem for the assignment of sentential stress to the object, as the object is no longer CP-final and in the appropriate position to receive sentential stress. In order to maintain the claim that *wh*-movement does proceed via Spec*v*P, it will have to be assumed that this movement occurs after Spell-Out of the inner core of the CP and that a *wh*-object will actually be fully *in situ* when sentential stress applies to the CP phase as in (ii):

(ii) [$_{CP}$ [$_{TP}$ Subject [$_{vP}$ [$_{VP}$ V Object$_{WH}$]]]]

[22] Two reviewers suggest that if one assumes a more articulated structure in the left periphery/C-domain, perhaps as in Rizzi (1997), it might be possible to suggest that IP-raising in Taiwanese takes place to a Specifier position which is higher than the Specifier of the projection headed by *kong*. If this were to be so, one needs to ask to what extent the conclusions reached here might possibly be different. We believe the main conclusions would essentially not be much changed, and largely just be re-presented with a somewhat different labelling. The basic thrust of the argumentation has been to suggest that the input to cyclic Spell-Out is a clausal constituent which is actually (just) less than a full CP – a CP lacking an outer Specifier in the terms used here. If one now concludes that *kong* is perhaps the head of a Mood/QP which encodes the assertive-declarative/interrogative force of the clause (*kong* occurring in complementary distribution with other Q-morphemes and not

allowing for the licensing of *wh*-elements, see footnote (9)), and if its IP complement perhaps raises to a higher TopP/CP, then the generalization in essence remains as before but makes use of different terms: The input to cyclic Spell-Out is a clausal constituent which is somewhat less than a full clause, being a Mood/QP and not a full TopP/CP.

There may however be a good reason for wishing to maintain the original generalization in the text. What needs to be captured are the observations in (i) and (ii) below:

(i) The XP input to cyclic Spell-Out in Taiwanese is optionally headed by an X^0 (*kong*) which encodes declarative force in alternation with interrogative Q-morphemes.

(ii) The XP input to cyclic Spell-Out in English *cannot* be the *full* XP headed by the X^0 which encodes interrogative force (as the input occurs before *wh*-phrases undergo raising to Spec of this XP).

If it is reasonable to assume that cross-linguistically there is a uniform input to cyclic Spell-Out, the two generalizations above indicate that this input form must be (at least) an XP headed by a declarative/interrogative head (due to the Taiwanese evidence with *kong*), but that it cannot be a full XP of this type (due to Bresnan's English *wh* patterns). An obvious way of capturing these two generalizations is therefore to maintain the suggestions in the text that the input to cyclic Spell-Out is indeed a CP (or perhaps a Mood/QP) which has not yet projected its external Specifier position.

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