Deriving Phrasal Stress and Compound Stress via Syntax:

An Evaluation on Two Approaches

Zhiyan Gao, George Mason University

Abstract: Cinque (1993) states that the most deeply embedded node within a syntactic structure carries main stress. Kratzer and Selkirk (2007) claims that main stress falls on the least embedded phrase within a spell-out domain. The current study investigates the predicative strength of the two approaches. The analysis shows that the computation proposed by Cinque (1993) is more successful in generating correct stress patterns for English nominal structures than the computation proposed by Krazter and Selkeirk (2007). This result concurs with Ahn (2015) who argues that English phrasal stress does not fall on the highest constituent/phrase within a spell-out domain, but the most deeply embedded one.

1. Introduction

In wide focus (or broad focus) conditions, English nominal structures usually exhibit stress patterns that confirms the *Nuclear Stress Rule* and the *Compound Stress Rule* (Halle & Chomsky, 1968). That is, main stress falls on the right-most constituent of nominal phrases, but on the left-most constituent of nominal compounds. Such stress patterns are illustrated in (1a) and (1b), where the underlined constituents carry main stress.

(1) a. green <u>house</u> Nuclear Stress

b. <u>green</u>house Compound Stress

The computation of phrasal stress is under debate. Some research advocates a strictly syntactic approach, which argues for a direct computation of stress patterns on syntactic structures (Ahn, 2014; Cinque, 1993). Works within prosodic phonology argues for a computation on prosodic domains. Specifically, stress falls on major phrases, which

correspond to lexical syntactic categories such as a Verb Phrase (VP) or an Noun Phrase (NP) (Kratzer & Selkirk, 2007; Selkirk, 1995). The two approaches were termed by Zubizarreta (2016) as the *strictly syntactic approach* and the *prosodic phonology approach* respectively. The current study will adopt Zubizarreta (2016)'s terminology when referring to the two approaches. The strictly syntactic approach was first introduced under assumptions of the X-bar theory (Cinque, 1993), and has later been shown to fit the minimalist program (Ahn, 2014). The prosodic phonology approach proposed by Krazter and Selkirk (2007) adopts the notion of "phase" (Chomsky, 1999), and defines the spell-out domain on a phase as the complement triggered by the phase head [1].

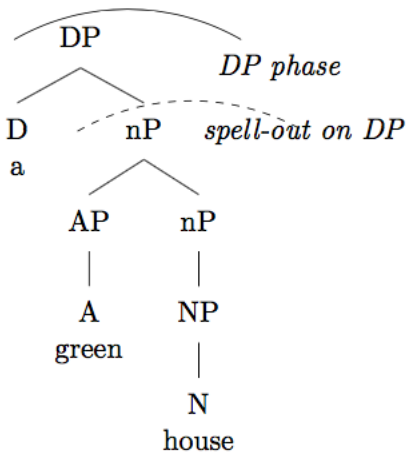
Both the strictly syntactic approach and the prosodic phonology approach relate themselves to syntax. However, the predictions they make are opposite to each other. The strictly syntactic approach predicts that main stress falls on the most deeply embedded node within a given syntactic structure, while the prosodic phonology approach predicts that stress falls on the highest phrase (i.e. the least embedded phrase) within a spell-out domain. Both approaches, although differ in their computation, would indeed achieve the same outcome when a Verb+Object structure is under concern, as long as the Object contains a lexical phrase (e.g. hit John). The reason is that the Object, say a determiner phrase (DP) with an NP daughter (e.g. John), is the only phrase within the spell-out domain on vP. The NP is thus the highest (and the only) phrase within a spell-out domain that could receive main stress. From the perspective of the strict syntactic approach, the DP branches deeper than the verb head.

[1] Two definitions of "spell-out domain" has been put forth. One claims that phase heads trigger the spell-out domain of their complements (Marvin, 2002); the other claims that phase heads trigger the spell-out of their cyclic complements (i.e. the complement of the complement of a phase) (Embick, 2010). Kratzer and Selkirk (2007)'s approach assumes the former definition. The current study will assume the former definition as well.

Therefore, the most deeply embedded terminal node under the DP projection would receive main stress. When the object DP has only one NP daughter, the main stress then falls on the NP.

When nominal structures such as DPs are under consideration, the two approaches might lead to different outcomes. Take (2) as an example, the prenominal modifier *green* appears higher within the spell-out on DP, it thus should receive main stress under the prosodic phonology approach. However, the terminal node N *house* under NP is the most embedded node in the tree structure, it thus should receive main stress under the strictly syntactic approach. These two predictions might lead one to conclude that the prosodic phonology approach is less successful than the strictly syntactic approach given *house* should be the one that receives stress. However, (2) might not necessarily be the correct syntactic structure of DPs. A detailed survey on major proposals of DP structures is thus needed to investigate the predicative strength of the two approaches.

(2)



DP structure proposed by Adger (2003)

The current study aims to compare the predicative strength of strictly syntactic approach and the prosodic phonology approach on DPs with prenominal modifiers. The analysis will show whether the two approaches can generate the right stress pattern with 3

major proposals of DP structures. Nominal compounds (e.g. greenhouse) will also be discussed in the current study to evaluate the applicability of the prosodic phonology approach on compound stress assignment. The following first provides a brief account on the strictly syntactic approach proposed by Cinque (1993) and the prosodic phonology approach proposed by Kratzer and Selkirk (2007), after which the focus will be shift to syntactic structures of nominal phases and compounds. The analysis provides evaluations on the validity of the two approaches under current understanding of nominal syntax.

2. The Strictly Syntactic Approach

Chomsky and Halle (1968) summarized English stress assignment with the *Compound Stress Rule* and the *Nuclear Stress Rule*. The compound stress rule assigns prosodic prominence to the left-most constituent of a compound. The nuclear stress rule assigns prosodic prominence to the right-most constituent of a phrase. These two rules achieved considerable success with disyllabic nominal structures in English. However, counterexamples emerged when complex or non-nominal structures were taken into consideration. For example, "OV" phrases in both English and German carry initial stress rather than final stress. Sentence (3a) and (3b) demonstrate the placement of stress in English and German "OV" structures, where the underlined words are normally stressed.

(3) a. She had some <u>wall</u> painted. (Wagner, 2005)

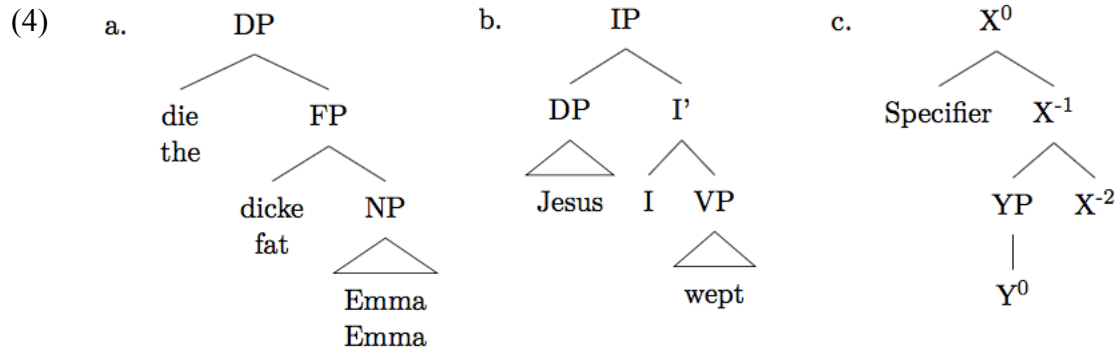
b. Der Arzt wollte einen <u>Pdtienten</u> untersuchen.

The doctor wanted the patient examined. (Wagner, 2005)

The counterexamples motivated a line of research that emphasizes the importance of syntax in the derivation of sentential/phrasal stress patterns (Cinque, 1993; Kahnemuyipour, 2003; Kratzer & Selkirk, 2007). Cinque (1993) argues that stress is assigned to the most

deeply embedded constituent within a given syntactic structure. In the view of X-bar theory, the O in an "OV" verb phrase is a complement that is asymmetrically c-commended by V. The O is thus embedded more deep than the V. The initial stress on "OV" structures in English and German is therefore expected under Cinque's theory. The same analysis can be applied to nominal and sentential stress assignment. For instance, the German DP structure "die dicke Emma (the fat Emma)" will receive its prominence on "Emma" because "Emma" is the most deeply embedded constituent. The unergative structure "Jesus wept" will also receive final stress because "wept" is the most deeply embedded one. (4a) and (4b) demonstrate the syntactic structures of the two examples, where the AP in (4a) is located on the Spec position of a functional category (FP) as assumed by Cinque (1993).

(4)



Cinque (1993) extended his theory to compounds by assuming modifiers are phrasal in modifier+head compounds (e.g. towel rack). The structure of an English modifier+head compound (i.e. Y^0X^0) should thus be $[_{X0}[_{YP}\ Y^0]\ X^{-1}]$ as illustrated in (4c), where the notations X^{-1} and X^{-2} represent the internal structure of the terminal node X^0; the modifier YP is the complement of X^{-1}. Since Y^0 is more deeply embedded than X^{-2} under such analysis, it is therefore prosodically more prominent than X^{-2}. If the YP is on the specifier position of X^0, then X^{-2} will be more deeply embedded than Y^0. The Y^0X^0 sequence will then exhibit final stress on X^{-2}. To illustrate this point, Cinque (1993) suggests that modifier "towel" in the

compound word “towel rack” is the complement, which receives main stress. The modifier “kitchen” in “kitchen towel” is the specifier, which does not receive main stress.

Concerns over Cinque (1993)’s treatment on compounds center around the “phrase-hood” of modifiers. Arregi (2002), in particular, argues that treating modifiers as phrases violates Chomsky’s Bare Phase Structure (BPS, Chomsky, 1994), which requires that 1) a merged item (e.g. YP) should contain two daughters; and 2) a merged item should not contain properties that its daughters do not have (i.e. the inclusiveness condition). As YP in Cinque (1993)’s analysis contains only one daughter (i.e. Y^0) and have a phrasal interpretation that Y^0 does not share, it is thus not compatible with BPS. However, if we assume a BPS treatment, then the modifier and the head of a compound are sisters (i.e. $[_X{}^0\, Y^0X^0]$), who do not differ in their level of syntactic embeddedness, which would render Cinque (1993)’s theory irrelevant in determining compound stress.

There are also concerns over Cinque’s theory on sentential stress assginment. Counterexamples in a variety of languages have been brought up by subsequent research, which casted serious doubts on the connection between syntactic embeddedness and prosodic prominence (Kahnemuyipour, 2003; Kratzer & Selkirk, 2007). Sentence (5) is a German example that shows the mismatch between the level of embeddedness and prosodic prominence. In (5), the VP-internal PP is more deeply embedded than other constituents, and yet the stressed constituent is instead the object *eine Géige* (a violin).

(5) *<u>eine Géige</u> an einen Freund schickte*

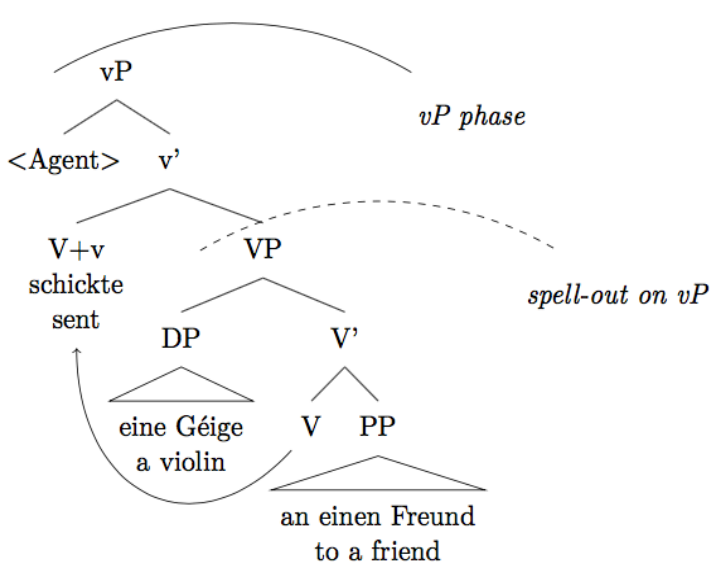
a violin to a friend sent

sent a violin to a friend (Kratzer & Selkirk, 2007)

3. The Prosodic Phonology Approach

Kratzer and Selkirk (2007) proposed a phase-based approach to account for sentential stress patterns exhibited in structures such as (5). This approach, which itself is a revision of Kahnemuyipour (2003), was phrased as the *Highest Phrase Condition on prosodic spell-out.* It states that the highest phrase within a spell-out domain receives stress. Assuming the vP structure as proposed by Adger (2003), the syntax of (5) could be illustrated in (6), where the direct object *eine Géige* (a violin) occurs on the Spec of VP as the theme of the verb *schickte* (sent); the PP *an einen Freund* (to a friend) is the goal, which occurs as the complement of V. The verb on V moves up to v to check the [uV*] feature. The agent is not in vP, as it has moved up to T.

(6)



Kratzer and Selkirk (2007) took the position that phase heads trigger the spell-out of their complement. For vP phases, the spell-out domain is the complement VP. During spell-out, the highest phrase within the spell-out domain on vP (i.e. VP) is the specifier DP "a violin". The *Highest Phrase Condition* thus correctly predicts the main phrasal stress on DP "a violin". Regarding VO structures such as "vP[$_{v}$ study$_{i}$ $_{VP}$[t$_{i}$ $_{DP}$ law]]", the *Highest Phrase*

Condition achieves the same predication as Cinque's theory does, because the DP "ϕ law" is the highest and the only phrase within the spell-out domain VP. Kratzer and Selkirk (2007) provided a phonological interpretation of spell-out structures, in which they claim that the highest phrase within a spell-out domain correspond to a prosodic Major Phrase, which bears phrasal stress. In the spirit of Halle and Chomsky (1968)'s *Nuclear Stress Rule,* Kratzer and Selkirk (2007) similarly proposed that stress should fall on the right-most member of a major phrase. This constraint was termed as Head-Edge$_{Map}$-R.

The phase-based theory seems to be able to account for sentential stress for different types of sentences in a variety of languages (see Kahnemuyipour (2003) for an account on Persian, and Truckenbrodt (2012) on German sentences with indefinite pronouns). However, questions remain as to whether stress patterns of nominal phrases (e.g. a green house) can be analyzed with Krazter and Selkirk (2007)'s proposal. Besides nominal phrases, the *Highest Phrase Condition* has not discussed compound stress. It might not be applicable to stress assignment in compounds, because compound words are not phrases, and their internal structures could be entirely opaque to syntactic derivation. However, If one assumes the position of Distributed Morphology (DM) (Halle & Marantz, 1993), the internal structures of compounds could then be analyzed. It remains to be seen whether the *Highest Phrase Condition* applies to compound stress assignment under the consideration of DM.

4. Deriving Stress Assignment in Nominal Phrase

Nominal phrases investigated in the current study concerns only structures with prenominal modifiers (e.g. a green house). More specifically, the nominal phrases in question are in the order of D+A+N, where A is the modifier of N. There are 3 major proposals for DPs with prenominal modifiers (listed in (7), (8) and (9)).

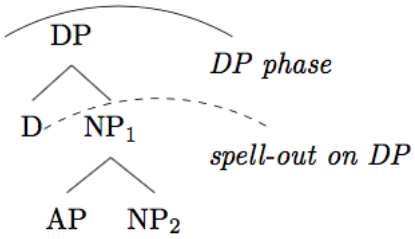
(7) $D^0[_{NP}$ AP NP] AP as adjunct (Adger, 2003)

(8) $D^0[_{FP}$ AP F $[_{NP}$ N]] AP as specifier of a functional projection (Cinque, 1993)

(9) $D^0[_{AP}$ A NP] NP as complement of A (Abney, 1987)

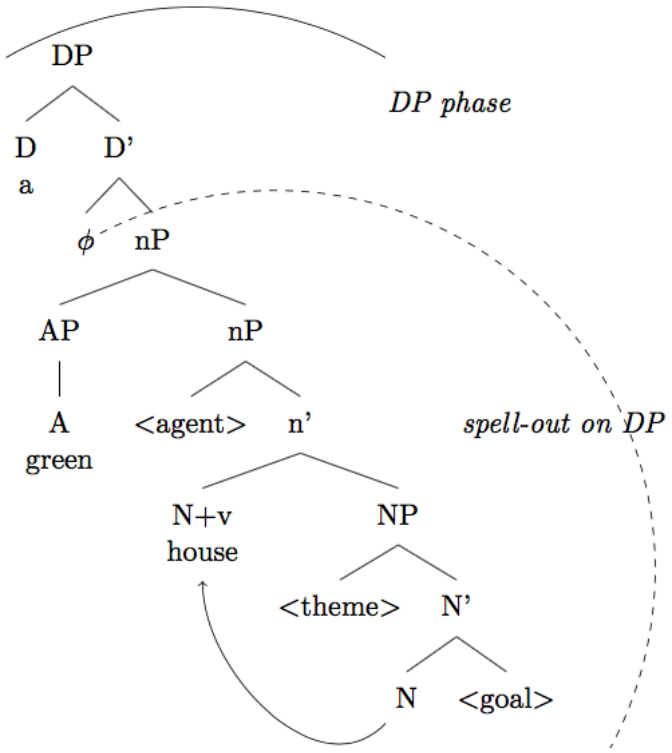
Proposal (7) is illustrated in (10), in which the AP is an adjunct of the higher-level NP_1. The only spell-out domain under this analysis is NP_1. NP_2 should not be the spell-out domain on NP_1, because spell-out domains are triggered by heads, and the adjunct AP is not the head of NP_1. Since NP_2 is not higher than AP, the phase-based analysis proposed by Kratzer and Selkirk (2007) could not predict the stress pattern.

(10)



(10) does not support Cinque's analysis either, because AP and NP_2 do not differ in their level of embeddedness. However, if we assume the theta-roles required by N, then N could instead be more deeply embedded than AP. Such analysis has been laid out by Adger (2003) who draws a parallel between NP and VP, and proposes that N also requires an agent, a theme and a goal, which gives rise to the notion of little *n*. (11) illustrates Adger (2003)'s proposal, in which N is more deeply embedded than A. Cinque (1993) could then correctly predict the main stress on N if (11) is the structure for DPs. The phase-based theory, however, would wrongly predict a main stress on AP as it is the highest phrase during the spell-out on DP.

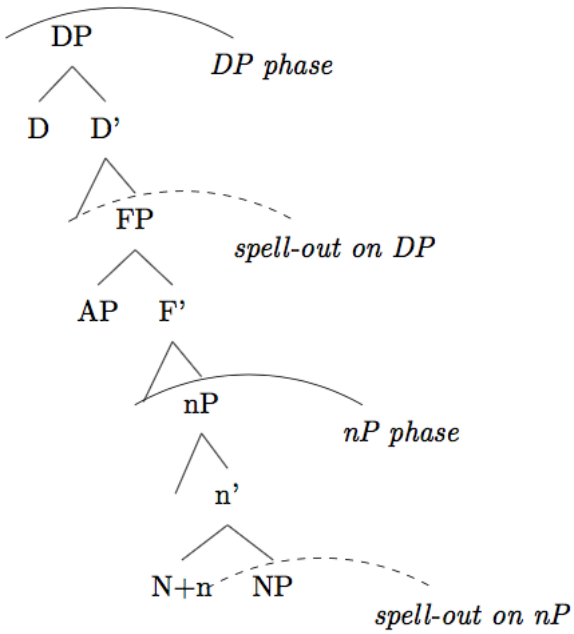
(11)



It would be hasty to reject the phase-based analysis solely based on Adger (2003)'s proposal of DP structures. There are other proposals that might indeed provide better accounts on the syntactic structure of DPs. Cinque (1993), for example, suggests that the modifier AP is the specifier of a functional projection that dominates NP as illustrated below in (12). The primary motivation for such treatment is the ordering effects found among multiple modifiers, which cannot be account for by an adjunction analysis. A functional category analysis instead provides syntactic and semantic principles that could explain the ordering of multiple modifiers (Morzycki, 2005). The precise nature of the functional category in question is still an on-going debate in the literature, and it is beyond the scope of the current study to provide a full account. Therefore, the functional category intervening in

between D and N will simply be referred to as FP (functional phrase) in the following discussion.

(12)



In (12), the spell-out domain on DP is FP, which is triggered by the phase head D. nP could be a phase by itself as it is analogous to vP (Adger, 2003). If (12) is the structure of DPs, the phase-based analysis will predict that AP receives main stress during the spell-out on DP. N will not receive stress since it has moved out of the spell-out domain NP. N will, however, receive main stress during the spell-out on nP if N *does not* move up to *little n* as N would be the only eligible non-silent material within NP (i.e. the spell-out on nP). The *Elsewhere Condition on prosodic spell-out requires* that a spell-out domain with eligible material must contain a major phrase (Kratzer & Selkirk, 2007). Since the major phrase should bear stress, the only non-silent material N within the major phrase should consequently bear stress. In other words, both AP and N will receive stress if N remains in NP. However, whether N is prosodically more prominent than AP is still undetermined.

Under Cinque (1993)'s analysis, however, N receives main stress due to its deeper level of embeddedness.

There is a phonological component within the prosodic phonology approach. However, the phonological interpretation on spell-out as proposed by Kratzer and Selkirk (2007) would not seem to be able to rescue the analysis. With respect to DP structures in (11) and (12), where APs are an adjunct of nP and the specifier of FP, APs are the highest within the spell-out on DPs. APs are thus qualified as a major phrase which bear phrasal stress. NP would be a minor phrase if N remains in NP. During linearization in the phonological form (PF), NP adjoins to AP to form a bigger major phrase. The Head-Edge$_{Map}$-R then comes into effect, assigning phrasal stress on the right-most minor phrase within a major phrase, which is the NP. Since AP is itself a major phrase, it will receive phrasal stress as well. (15) shows the stress assigning process, which demonstrates that AP and NP should receive equal stress in the major phrase. Such stress pattern is illegal under the assumption of the Head-Edge$_{Map}$-R constraint, which demands the phrasal stress to be on the right-most member of a major phrase.

(15)	((	*	)	*	)	Major Phase
	(	*	)	(	*	)	Minor Phrase
	(	*	)	(	*	)	Prosodic Word
		AP			NP		

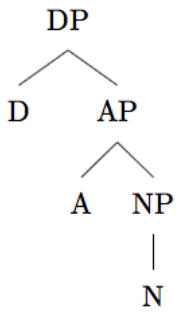
If N moves to little n, then N will not qualify as a minor phrase. The phrasal stress would fall solely on the AP, which is not the correct stress pattern. (16) illustrates such stress assignment.

(16)	((	*	)			)	Major Phase
	(	*	)				Minor Phrase
	(	*	)	(	*	)	Prosodic Word
		AP			N		

The third proposal for DP structures considers NP a complement of AP. A^0 selects an AP with the relevant features as its complement (Abney, 1987). This proposal was originated from Abney (1987)'s intuition that English APs can project an NP/DP. For example, (13) is allowed in Abney's dialect of American English. Abney (1987) thus formulates English DP structures as (14). This treatment has been proved to be fruitful in accounting for determiner spreading in Greek (Androutsopoulou, 1995) and definite article lowering in Swedish and Bulgarian (Embick & Noyer, 2001).

(17) Too big (of) a house.

(18)



(Abney, 1987)

There are disagreements on whether (18) is the correct structure for DPs and whether it can truly account for various DP internal movements/agreements in world languages (Alexiadou, 1998; Kramer, 2010). However, assuming (18) is correct, then the spell-out domain on DP is the AP as triggered by the phase head D. Since A is a terminal node, the highest and the only phrase within AP is the NP. The *Highest Phrase Condition* could thus correctly predict the main stress on NP. However, the phase-based analysis is not fully validated since NP is the only lexical phrase during spell-out. Cinque (1993)'s theory would also correctly predict the main stress on NP, as the N is the most deeply embedded node.

In summary, among the 3 proposals for DP structures with prenominal APs, Cinque (1993)'s analysis is compatible with all three. Kratzer and Selkirk (2007)'s phase-based analysis, on the other hand, is only arguably compatible with one. The strictly syntactic approach proposed by Cinque (1993) seems to be more successful in deriving the correct stress pattern for nominal phrases.

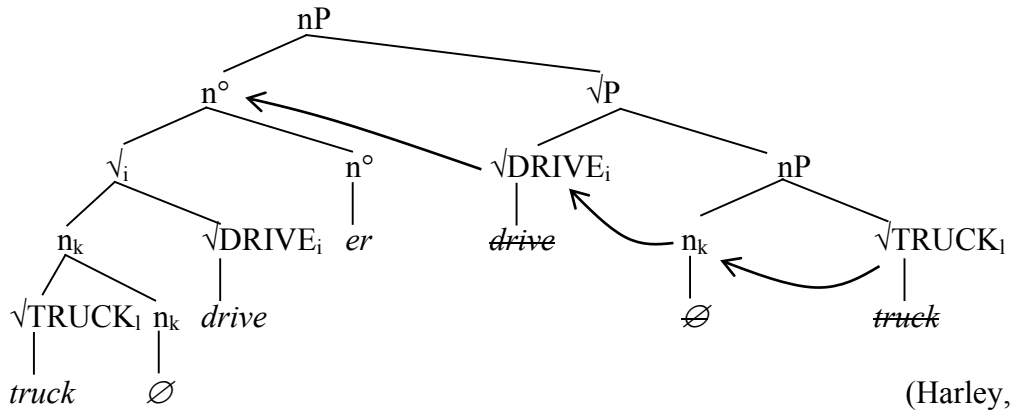
5. Deriving Compound Stress

Cinque (1993) discussed compound stress assignment in detail. He proposed that the prenominal modifier in a Noun-Noun (NN) or an Adjective-Noun (AN) compound is phrasal, which branches deeper than the head noun. Since the terminal node of the modifier is embedded deeper than the terminal node of the head noun, the modifier thus receives stress. As discussed in the introduction of this paper, Arregi (2002) objected to Cinque (1993) by pointing out the incompatibilities between Cinque's proposal and the BPS framework. The current study will adopt the DM framework when discussing word internal structures because the particular DM analysis adopted in this study obeys the BPS. In addition, internal structures of words under a DM analysis display levels of embeddedness and contains phases (Embick, 2010; Marvin, 2002), which enables the evaluation of both the strictly syntactic approach and the prosodic phonology approach.

Research on English compounds agree that most NN and AN compounds in English carry initial stress, with a few exceptions (Giegerich, 2004; Liberman & Prince, 1977; Liberman & Sproat, 1992). The following discussion will focus only on English NN and AN compounds with the assumption that the examples to be discussed all carry initial stress. Harley (2009) proposed a DM analysis of English compounds, in which the modifier and the head of a compound are in a complement-head relationship. The head takes the modifier as

its internal argument. Such relationship is most evident for syntactic compounds (i.e. truck-driver). (19) demonstrates Harley (2009)'s proposal, which involves a series of head-to-head movements. In the deep structure, the Root √DRIVE takes the Root √TRUCK as its internal argument. The Root √TRUCK first merges with the nominalizer head n_k, because *truck* in *truck-driver* has a noun reading. The nPs in Harley (2009)'s framework thus represent nouns, rather than noun phrase. The complement noun *truck* then merges with the Root √DRIVE to form a complex Root √P. The Root √P then merges with the nominalizer n^0. Vocabulary item insertion takes place in the PF form, which results in the compound word *truck-driver*.

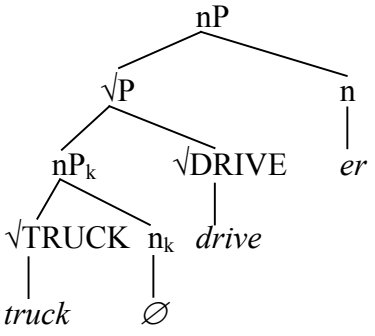
(19)



(Harley, 2009)

For the convenience of illustration, the structure in (19) could be simplified as in (20):

(20)



Based on the structure in (19) and (20), Cinque (1993) would immediately predict √TRUCK as the candidate for main stress, because it is the most deeply embedded node.

Since *truck-driver* indeed carries initial stress, Cinque (1993)'s computation again succeeds in generating the correct stress pattern. To evaluate Krazter and Selkirk (2007)'s phase-based theory, two additional assumptions should be made. (1) Category-assigning heads (e.g. *n, v, a*) are phase heads (Marvin, 2002); (2) phase heads trigger the spell-out domain of their complements.

Under the first assumption, nominalizers in (20) are phase heads. Roots are not phase heads. Under the second assumption, the complex root √P is the spell-out domain on nP phase. The phase-based approach requires the highest phrase to receive main stress. The only allegeable stress-receiver is the nP_k, because it is the highest (and the only) phrase within the spell-out domain √P. Therefore, nP_k should receive main stress. One might object to the notion that $[_{nP}$ n √TRUCK] is the highest "phrase", because nP_k is part of a compound "word", which corresponds to a prosodic word. The phase-based approach requires the highest phrase to correspond to a major phrase, which is a larger prosodic unit than a prosodic word. It would be indeed impossible to explain how a prosodic word (e.g. truck-driver) may contain a prosodic phrase. Such conflict results from the specific theoretical assumption Kratzer and Selkirk (2007) is based on. In the DM framework, there should not be a distinction between words and phrases. To extend the phase-based theory into the analysis of compound words, one might amend the *Highest Phrase Condition* by proposing a rule that is compound-specific. The rule could be phrased as in (21).

(21) The Phase-based Compound Stress Rule:

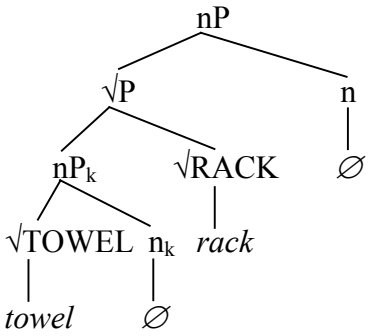
The Highest categorized constituent within a spell-out domain receives stress.

The highest (and the only) categorized constituent in (20) is nP_k, because √TRUCK has been categorized as a noun by merging with the nominalizer n_k. The rule in (21) should

not be in conflict with the *Highest Phrase Condition*, because the highest "phrase" under Kratzer and Selkirk (2007)'s analysis would inevitably contain a categorized constituent (e.g. a noun).

For the compound *truck-driver*, the Root √TRUCK is a theme of the Root √DRIVE. It is thus reasonable to assume that √DRIVE takes √TRUCK as its internal argument. However, for compounds such as *towel rack* or *greenhouse*, the left-most members are not arguments of the right-most members, but modifiers. Harley (2009) discussed this issue within the framework of Bare Phase Structures. She proposes that the modifiers are still sisters of the heads in the absence of an internal argument. Therefore, modifier-head compounds will have the same syntactic structure as syntactic compounds. The structure for *towel rack*, for example, can be illustrated in (22).

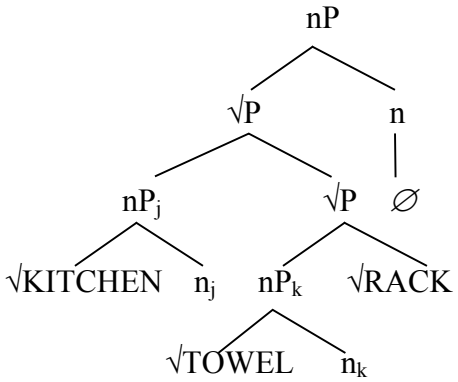
(22)



The phase-based compound stress rule will correctly predict a main stress on nP_k, as it is the highest (and the only) categorized constituent. Cinque (1993) will predict a main stress on √TOWEL as well, because it is the most deeply embedded node. Both theories, thus, achieve the same correct outcome. The phase-based analysis has so far been successful. However, problems emerge when tri-constituent compounds are under consideration. (23) is a right-branching tri-constituent compounds. The underlined word normally carries main stress. Assuming Harley (2009)'s approach, the structure of (23) could be illustrated in (24).

(23) [kitchen [towel rack]]

(24)



In (24), the highest categorized constituent within the spell-out domain on nP is nP_j. The phase-based analysis would predict that nP_j should carry main stress. However, the main stress instead falls on nP_k. In other words, the phase-based analysis fails to predict the correct stress pattern. Cinque (1993), however, would correctly predict the correct stress pattern, because √TOWEL is the most deeply embedded node. All the analyses above therefore demonstrate that the strictly syntactic approach is more successful in deriving compound stress.

6. Other Explanations for Stress Assignment

There are several other theories that might also explain stress assignment. The one that most relevant to the current study is probably the *metrically-interpreted syntactic (or MI-S) approach*, which states that if a non-head is an argument of its sister head, then the non-head receives main stress; otherwise, stress falls on the right-most constituent node in the phrase (Zubizarreta, 2016). For a modifier-noun phrase (e.g. green house), the MI-S approach would allow stress to fall on the noun when the modifier is considered an adjunct (i.e. not an argument). The MI-S approach cannot account for stress assignment in modifier-noun

compounds (e.g. greenhouse), because the left-most constituents are modifiers, which are not arguments of the nouns; yet stress falls on the left-most constituents.

Another explanation for stress assignment could be that stress assignment is language-specific. Phrasal stress might fall on the most embedded constituent in some languages, but the least embedded constituent in others. For example, in both Arabic and Scottish Gaelic, APs in DPs come after NPs. However, Arabic stresses the nouns, while Scottish Gaelic stresses the adjective. Examples are shown in (25a) and (25b).

(25) a. an cu <u>mor</u>
the dog big
the big dog Scottish Gaelic (Adger, 2007)

b. al- <u>bait</u> al- akhdar
the house the green
the green house Najdi Arabic[2]

To explain post-nominal modifiers such as (25a) and (25b), Cinque (1994) proposed that DPs with post-nominal modifiers share the same structure with DPs with prenominal modifiers. NPs simply raise past the modifier in DPs with post-nominal modifications. For example, (25a) could be analyzed as $[_{DP}$ an $[cu_i$ [<u>mor</u> $t_i]]]$. The noun *cu* raised up to some position higher than the adjective *mor*, making *mor* the most deeply embedded node, which receives stress. The same analysis, however, could not generate the correct stress pattern for Najdi Arabic, because the less embedded node *bait* is the one that receives stress. It is, therefore, possible that stress assignment in world languages is parameterized. Main stress

[2] I wish to thank Omar Alkhonini for providing the Najdi Arabic data.

might fall on the most embedded constituents in some languages, but the least embedded one in others.

7. General Discussion

The current study investigated two proposals on stress assignment. The results show that the prosodic phonology approach proposed by Kratzer and Selkirk (2007) is less successful in generating stress patterns of English nominal structures than the strictly syntactic approach. In fact, nominal structures might not be the only area where the prosodic phonology approach could face challenge. Previous studies have often found that sentential stress does not always follow the *Highest Phrase Condition* (Ahn, 2015; Féry, 2011; Zubizarreta, 2016; Zubizarreta & Nava, 2011). According to the *Highest Phrase Condition,* the Direct Object (DO) in (26) should receive stress, because the DO is the highest phrase within the spell-out on vP. Féry (2011) argues that both the DO and the PP in (26) receive pitch accent. She further claims that the PP is in fact a nuclear stress bearer. The stress pattern in (26) is thus another example showing that main stress falls on the lowest phrase (i.e. the DP under PP *in die schule*), rather than the highest one (i.e. *kinder*),

(26) …dass Maria kinder in die schule fuhr. (Féry, 2011)
…that Maria children in the school drove.
…that Maria drove children to the school.

Similar counterexamples also exist in English. For example, PP arguments in (27a) and (27b) receives main stress in the presence of a DO (Ahn, 2014).

(27) a. He locked his bike to Ken.
b. He locked his bike to itself. (Ahn, 2014)

The many counterexamples to Krazter and Selkirk (2007)'s approach prompted Ahn (2015) to conclude that English phrasal stress does not fall on the highest phrase within a spell-out domain, but the most deeply embedded one. The current study agrees with Ahn (2015)'s assessment. However, only English nominal structures are analyzed in the current study. The universality of Cinque (1993)'s theory remains unclear. Phrasal stress in languages such as Mandarin (Duanmu, 1990) and Scottish Gaelic (Adger, 2007) seem to fall on the most embedded node, but stress patterns in languages such as Persian (Kahnemuyipour, 2003) and Arabic might in fact fall on the least embedded one. A detailed survey on stress patterns in world languages is thus needed to further validate Cinque (1993)'s theory.

References

Abney, S. (1987). *The English noun phrase in its sentential aspect* (Doctoral dissertation). Massachusetts Institute of Technology.

Adger, D. (2003). *Core syntax: A minimalist approach* (Vol. 33). Oxford University Press Oxford.

Adger, D. (2007). Stress and phasal syntax. *Linguistic Analysis*, *33*(3–4), 238–266.

Ahn, B. (2014). *Giving reflexivity a voice: Twin reflexives in English* (Doctoral Dissertation). University of California, Los Angeles.

Ahn, B. (2015). *There's Nothing Exceptional about the Phrasal Stress Rule*. Retrieved from http://ling.auf.net/lingbuzz/002458

Alexiadou, A. (1998). Adjectival modification and multiple determiners. In A. Alexiadou & C. Wilder, *Possessors, Predicates and Movement in the Determiner Phrase* (pp. 303–332). John Benjamins Publishing.

Androutsopoulou, A. (1995). The licensing of adjectival modification. In *Proceedings of WCCFL* (Vol. 14, pp. 17–31).

Arregi, K. (2002). *Focus on Basque movements* (Unpublished doctoral dissertation). Massachusetts Institute of Technology.

Chomsky, N. (1994). *Bare phrase structure*. MIT Press.

Chomsky, N. (1999). Derivation by phase. *MIT Working Papers in Linguistics*, *18*.

Cinque, G. (1993). A null theory of phrase and compound stress. *Linguistic Inquiry*, *24*(2), 239–297.

Cinque, G. (1994). On the evidence for partial N-movement in the Romance DP. In G. Cinque, J. Koster, J.-Y. Pollock, L. Rizzi, & R. Zanuttini, *Paths towards universal*

grammar. Studies in Honor of Richard S. Kayne (pp. 85–110). Washington, DC: Georgetown University Press.

Duanmu, S. (1990). *A formal study of syllable, tone, stress and domain in Chinese languages*. Massachusetts Institute of Technology.

Embick, D. (2010). *Localism versus globalism in morphology and phonology* (Vol. 60). MIT Press.

Embick, D., & Noyer, R. (2001). Movement operations after syntax. *Linguistic Inquiry*, *32*(4), 555–595.

Féry, C. (2011). German sentence accents and embedded prosodic phrases. *Lingua*, *121*(13), 1906–1922.

Giegerich, H. J. (2004). Compound or phrase? English noun-plus-noun constructions and the stress criterion. *English Language and Linguistics*, *8*(1), 1–24.

Halle, M., & Chomsky, N. (1968). *The sound pattern of English*. New York: Harper & Row.

Halle, M., & Marantz, A. (1993). Distributed morphology and the pieces of inflection. In K. Hale & S. J. Keyser, *The view from Building* (Vol. 20, pp. 111–176). The MIT Press.

Harley, H. (2009). Compounding in Distributed Morphology. In R. Lieber & P. Štekauer, *The Oxford Handbook of Compounding*. Oxford University Press.

Kahnemuyipour, A. (2003). Syntactic categories and Persian stress. *Natural Language & Linguistic Theory*, *21*(2), 333–379.

Kramer, R. (2010). The Amharic definite marker and the syntax–morphology interface. *Syntax*, *13*(3), 196–240.

Kratzer, A., & Selkirk, E. (2007). Phase theory and prosodic spellout: The case of verbs. *The Linguistic Review*, *24*(2–3), 93–135.

Liberman, M., & Prince, A. (1977). On stress and linguistic rhythm. *Linguistic Inquiry*, *8*(2), 249–336.

Liberman, M., & Sproat, R. (1992). The stress and structure of modified noun phrases in English. In A. Szabolcsi & I. Sag, *Lexical matters (Center for the Study of Language and Information - Lecture Notes)* (pp. 131–181). Center for the Study of Language and Information.

Marvin, T. (2002). *Topics in the stress and syntax of words* (Doctoral dissertation). Massachusetts Institute of Technology.

Morzycki, M. (2005, January 1). *Mediated *modification: Functional structure and the interpretation of modifier position* (Doctoral Dissertation). University of Massachusetts - Amherst.

Selkirk, E. (1995). Sentence prosody: Intonation, stress, and phrasing. In J. Goldsmith, *The Handbook of Phonological Theory* (pp. 550–569). London: Blackwell.

Truckenbrodt, H. (2012). Effects of indefinite pronouns and traces on verb stress in German. In Toni Borowsky, Shigeto Kawahara, Mariko Sugahara, & Takahito Shinya, *Prosody Matters. Essays in Honor of Lisa Selkirk* (pp. 487–513). London: Equinox Publishing.

Wagner, M. (2005). *Prosody and recursion* (Doctoral dissertation). Massachusetts Institute of Technology.

Zubizarreta, M. L. (2016). Nuclear stress and information structure. In Caroline Féry & Shinichiro Ishihara, *The Oxford Handbook of Information Structure*. Oxford University Press.

Zubizarreta, M. L., & Nava, E. (2011). Encoding discourse-based meaning: Prosody vs. syntax. Implications for second language acquisition. *Lingua*, *121*(4), 652–669.