# There's Nothing Exceptional about the Phrasal Stress Rule*

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**Abstract**

Since the beginning of generative work on phrasal stress, it has been convincingly argued that syntax generates structure, and the phrasal-stress assignment operation takes syntactic output as its input. In addition, it has long been assumed that there are exceptions to the phrasal-stress assignment operation, caused by certain lexical or interpretive properties. This paper demonstrates that having such exceptions to the rule is not only undesirable on purely theoretical grounds, but is also unsuccessful on empirical grounds.

Instead, this paper argues that putative examples of exceptionality are in fact produced by an exceptionless model, extending logic in Wagner 2006 and Ahn 2015. Specifically, the model rethinks the nature of the system that predicts phrasal stress placement. Instead of a linear-based rule with exceptions, evidence is found in favor of an exceptionless and structure-based phrasal stress assignment operation in the vein of Cinque 1993 and subsequent works such as Zubizarreta 1998. The proposed theory allows phrasal-stress assignment to conform to Minimalist assumptions, simplifies the task of language acquisition, and provides theoreticians and the learner with evidence for a more articulated syntax that is transparently interpreted at the interfaces.

## 1 Introduction

Since Chomsky and Halle 1968's The Sound Pattern of English (SPE), it has been known that syntax plays a crucial role in determining the location of phrasal stress:

> "Once the speaker has selected a sentence with a particular syntactic structure and certain lexical items (largely or completely unmarked for stress, as we shall see), the choice of stress contour is not a matter subject to further independent decision"
>
> (SPE:25)

This is formulated in SPE's Nuclear Stress Rule (NSR), which operates on the linearized output of syntax:

(1) Linearization-Based Nuclear Stress Rule (SPE, English):
The rightmost primarily-stressed vowel in a domain receives the highest stress

Since syntax strictly determines linear order of a structural domain, and linear order determines phrasal stress, syntax indirectly determines phrasal stress.[1] Not only is this determination indi-

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[1] It is the case that phonological constraints may re-order certain constituents, but only on the basis of phonological primitives (e.g., clitic ordering, Harizanov 2014, or infix placement). In addition, processing and phonological

rect, but there is also a loophole: Chomsky and Halle's characterization allows "certain lexical items" to affect the placement of phrasal stress. In this vein, there is a common, long-standing assumption in the literature: there are systematic exceptions to the NSR – regardless of the formulation of NSR assumed (e.g. Bresnan 1971, Williams 1997, Zubizarreta 1998, Kahnemuyipour 2004, Adger 2007, Kratzer and Selkirk 2007, among others). In this paper, I demonstrate that such an assumption is not only theoretically undesirable, it is empirically unsupported.

To be specific, it has been assumed that lexical/interpretive properties such as those in (2) may cause exceptions to the NSR.

(2) Properties Claimed to Cause Prosodic Exceptions
   a. Givenness
   b. Anaphoricity
   c. Indefiniteness
   d. Function-word status

In (3) below, there are some prototypical examples of the "exceptionality" of these types of items. (In all examples, phrasal stress is marked with *underlined italics* and an accent on the stressed syllable.[2])

(3) a. (Chicken was cheap today. So...) Frank *áte* chicken. [Given material]
   b. Hazel glued *Kén* to herself. [reflexive anaphors]
   c. We will *cóok* something. [indefinites]
   d. (After Sue came home...) Walter turned my *rádio* on. [verb particles]

The "exceptionality" approach meets its first (and perhaps most serious) problem in the fact that it cannot account for the fact that such phrases are not always exceptional. Consider the minimal pairs for (3) below:

(4) a. (Chicken was cheap today. So...) Frank ate beans and *chícken*. [Given material]
   b. Hazel glued Ken to *himsélf*. [reflexive anaphors]
   c. We will cook some *fóod*. [indefinites]
   d. (After Sue bought me a radio...) Walter turned my radio *ón*. [verb particles]

As such, if there are true exceptions to the NSR, the ways in which the stipulated list of exceptions is defined must be rather complex. This elucidates the first of two theoretical problems:

(5) Problem of Acquiring Exceptions
   How ought a learner go about acquiring this list of exceptions and the rules of when to appeal to it?

This is problematic in that it weighs down the theory of phrasal stress assignment and its exceptions, in a way that is not in line with the Minimalist architecture of language, and it sub-

factors may influence which word order is optimal on a larger level (e.g., genitive alternation, Shih 2014); to do so, they must influence which syntactic structure is employed, as syntactic structure strictly determines word order.

[2]Generally, only the most prominent stress (i.e. the Nuclear Stress) is marked. There may be other phrasal stresses in the examples, but we will consider the location of only the Nuclear Stress.

stantially complexifies the learning task.[3]

It has long been known that the prosodic signal reflects some aspects of the syntactic structure that it externalizes. For this reason, it should not be surprising that a learner would make use of these cues in syntactic acquisition – in the same way that linear order can be taken as evidence for uncovering the abstract and hidden syntactic structure, so can prosodic cues ("prosodic bootstrapping", Pinker 1984, Morgan and Demuth 1996, Christophe et al. 2003, Höhle 2009, among many others). However, if prosodic cues like phrasal stress are subject to an unprincipled list of exceptions, another problem similar to (5) appears:

(6) Problem of Obfuscation
The prosodic cues in the signal are unreliable as cues for syntactic structure.

Under the assumption that there are exceptions to the syntax-prosody interface, one would have to say that prosody and syntax only sometimes line up, and knowing when the prosody can be a cue for syntax relies on first acquiring the complex formulation of exceptions.[4] In fact, one may wonder why a learner would even try to posit a connection between syntax and prosody if the cues are so unreliable.

Together, these two problems mean that every time a child is presented with a data point, she must make a decision. If the pattern is normal, then it could be used to formulate the correct NSR, and to bootstrap the syntax. If it is aberrant, then it cannot be used to formulate the NSR, nor to bootstrap the syntax; instead, it should be used to generate the list/system of exceptions. This is represented in the flowchart in Figure 1.

But how does the child, from the beginning, know what is normal and what is aberrant? Answering this question is not trivial. If, on the one hand, we assume the child has a working hypothesis for how the prosodic signal and the syntax should align, why would the child assume there is ever a case of misalignment? It might seem reasonable that a child could posit some underlying representation of the input that aligns the perceived prosodic signal with a hypothesized syntactic representation to match perfectly. On the other hand, if we assume the child has only a weak working hypothesis for how the prosodic signal and the syntax should align, how would the child know which data should be used to build up the NSR, and which should be used to build up the exception system? The child might posit a system where too many items are exceptional, not achieving a target-like grammar.

In either case, whether the child assumes a data-point to be normal or aberrant completely changes how she makes use of it to build her grammar. For this reason, this might lead to instability in the patterns across the population of English speakers. Imagine the child is presented with the novel sentence below with the prosodic pattern in (7).

[3] One way in which complex systems of exceptions of this sort have been said to be learned straightforwardly has been through models in which violable phonological constraints limit (but do not exclude) exceptional forms (most notably, theories like Prince and Smolensky 1993's Optimality Theory). However, it will be shown that the apparent exceptions to the phrasal stress rule, and the exceptions to exceptions, are defined in syntactic terms. It is for this reason that we do not pursue a solution within the system of Phonology.

[4] Even the most isomorphic characterization of syntax and prosody must allow for phonological principles to influence prosodic outputs. This will lead to mismatches between syntax and prosody, but *principled* mismatches, which are independently motivated (thereby lacking stipulative properties of approaches with a list of exceptions).

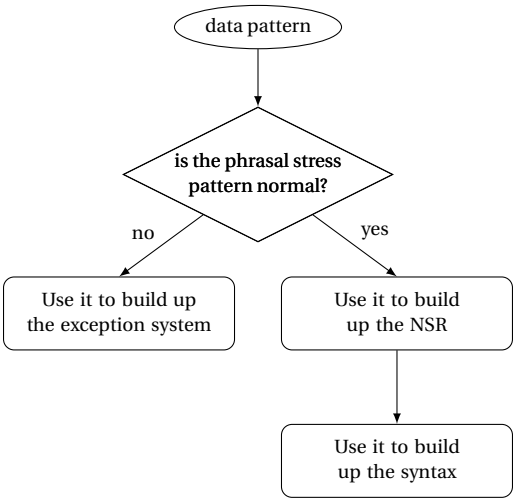



Figure 1: How a model of phrasal stress with exceptions must proceed

(7) Gerp blick *snárf* zoop.

If one child interprets this pattern as normal and another as aberrant, this may lead to different NSRs or different underlying representations for the string *gerp blick snarf zoop* in their respective adult grammars. We should find multiple populations of adult speakers, differing in grammatical properties when the prosodic pattern could either be perceived by the learner as normal or aberrant. It is not impossible for heterogeneity in adult grammars to characterize the actual state of affairs in the world; however, in the "exceptional" patterns investigated in depth here, the grammatical patterns/judgments are quite stable, across speakers.[5] This strongly suggests that learners are biased in such a way that results in the emergence of only one set of patterns/judgments across all speakers.

Due to the lack of variation in judgments on these phrasal stress patterns, perhaps we do not have motivation for there to be such thing as truly aberrant phrasal stress. The only sense in which they are "aberrant" is that they are unexpected under a certain set of linguistic hypotheses. Perhaps instead the Grammar contains only a "normal" learning path — all phrasal stress data can be taken as evidence of how the NSR and syntax should be formulated, and there is no reason to posit an exception system.

To stress the point, the label "exception" is defined theory-internally. A putative exception is labeled as such only in the context of a model. Specifically, there are two critical aspects of the model that a definition of exceptional must refer to:

(8) Definition: *Exceptional Phrasal Stress*
A phrasal stress pattern P is exceptional just in case P is not predicted as the output of **(i)** the phrasal stress rule applying to **(ii)** its input.

[5]It is worth noting that the prediction is the same for all other "exceptional" patterns in human language. If the putative exceptions are truly so, there ought to be variability across speakers and syntactic variables ought not reliably influence the exceptional pattern. This appears to be the case with, for example, irregular verb paradigms. There is variability across (and within) speakers on these irregulars (e.g., variation in *I have drank/drunk*), and that syntactic variables such as occurring in an island does not affect the "exceptionality" of these paradigms. As we will see, putative exceptions for the phrasal stress rule do not behave like irregular morphology.

Changing the NSR and/or the shape of the syntactic derivation will change what will count as an exception. This is a point made clear by Wagner in recent work:

> "The strength of any claim about a mismatch between syntax and prosody depends on the strength of the arguments supporting the syntactic analysis it is premised on." (Wagner 2015)

Thus in the rest of this paper, we will typically refer to "putative exceptions" – that is, patterns that are deemed exceptional under certain assumptions. It will be shown that using more recent (and more principled) approaches to the NSR and syntactic structures renders the notion of "exception" unnecessary in the derivation of phrasal stress patterns.

The paper proceeds as follows. In section 2, the basic grammatical architecture and approach to phrasal stress assignment are sketched out. Following that, in section 3, each of the putative exceptions to the NSR is more closely investigated, and it is shown how the derivation proceeds to derive the loci of phrasal stress. Finally, the paper concludes in section 4, where the theoretical consequences of this investigation are laid out.

# 2 Modeling Phrasal Stress Assignment

Before attempting to resolve the issue of putative exceptions for phrasal stress assignment, we must establish the basics of phrasal stress assignment. First, since syntactic computations are done separately from, but interact with, phonological ones like the NSR, we first need an understanding of how syntax and phonology interface. From there, we will provide a clear model of how phrasal stress is assigned.

## 2.1 Architecture of the Interfaces

This paper assumes a Minimalist architecture, which defines (narrow) syntax,[6] semantics (LF), and phonology (PF) as largely modular, in the sense that operations in each proceed without consideration of the primitives of the others (e.g. Chomsky 1995, Collins and Stabler To Appear). That is, phonological operations may proceed without considerations of syntactic objects like islands, or semantic objects like truth conditions.

Furthermore, the interfaces between the modules are only able to pass certain kinds of information in certain directions (e.g. Chomsky 1995). Namely, syntax can send information about a syntactic object $\alpha$ to phonology and semantics through a mechanism called Spell-Out, but phonology and semantics cannot send information back to the syntax, in order to influence the syntactic properties of $\alpha$. This is due to the nature of the operations triggered by Spell-Out. In particular, Spell-Out replaces the formal syntactic features of $\alpha$ with lexical material, and sends the hierarchical structure specified with lexical items to LF and PF. This replacement of syntactic features with semantic and phonological ones is what renders impossible the phonological/semantic features of a certain domain $\alpha$ to influence the syntactic features of that same

[6] Throughout this paper, "syntax" refers to the morphosyntax – the formal structure-building system that is neither phonological nor semantic in nature.

domain $\alpha$.

Moreover, Spell-Out applies multiple times within a single derivation, at fixed cyclic intervals, as defined by certain heads called phase heads (Uriagereka 1999, Chomsky 2001, *et seqq.*). In this cyclic Multiple Spell-Out model, a phase head (Phase$^0$) causes its complement, the Spell-Out Domain, to be populated by lexemes and transferred to semantics and phonology. The PhaseP and content merged higher than it will get Spelled-Out at a later point in the derivation. This model is roughly sketched out in Figure 2, where the directionality of arrows represents the sending of information from one component to another.[7]

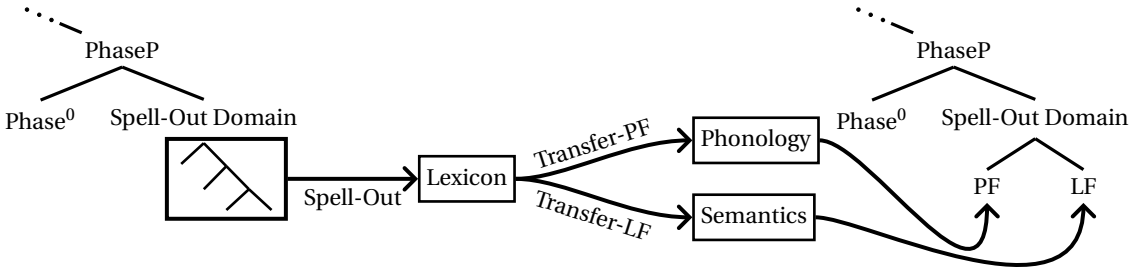



Figure 2: A Multiple Spell-Out Architecture of Grammar

Because syntax feeds PF and LF separately in this model, and because there is no interface between the two, there is no PF-LF interface – except for the narrow syntax (Chomsky 1995:169). This implicates the following interface condition:

(9) Condition on LF and PF Operations
No operations at PF depend on LF operations/properties, and vice-versa.

As a consequence of this condition, any phenomenon that has both PF and LF effects must be rooted in a common syntactic representation.

Additionally, not all aspects of the syntactic representation get passed on to the interfaces. During the syntactic derivation that builds up the Spell-Out Domain in Figure 2, there is a non-trivial amount of information that doesn't get transferred to PF or LF – in particular, formal syntactic features (a.k.a. uninterpretable features) must not reach the interfaces. Instead, they must be deleted (or "checked") by the time LF or PF receive their input, as LF and PF cannot interpret them ("legibility conditions", Chomsky 2000:§3.2).[8] For this reason, it must not be the case that PF or LF depend on having access to formal syntactic features:

[7]Note that the syntactic structure of the Spell-Out Domain that was present before Spell-Out is entirely absent after Transfer-LF/Transfer-PF. What must remain, however, is the label so that the node that dominates all Spelled Out material can participate in later grammatical operations as a unit. In addition, perhaps all the formal features of the constituent node remain visible to the syntax as well – i.e. only the Spell Out Domain's *internal* syntactic properties disappear.) This derives the syntactic impenetrability of phases (PIC, Chomsky 2000) – the syntactic structure is gone, and what remains is a pairing of an LF and PF with a syntactic label but no internal structure – this is Uriagereka 1999's "conservative" proposal of multiple Spell-Out. See also McPherson 2014 and Ahn and McPherson *in prep.* for arguments that the PF produced by phonology is re-inserted into the syntactic structure in this way.

[8]If uninterpretable formal syntactic features reach LF or PF, the derivation crashes. These features may be deleted during Vocabulary Insertion (VI), which happens at or just after Spell-Out (Halle and Marantz 1993). As such,

(10) Condition on Features and PF Operations
No operations at PF depend on uninterpretable features.

Thus, any PF (or LF) effects that appear to be the result of uninterpretable features – such as syntactic label/grammatical category – must not be. They must be the result of something that PF does have access to (interpretable features, hierarchical constituency, prosodic structure, phonological features, etc.).

With the two conditions in (9) and (10), it is fair to say that properties like the semantic property of being discourse-given or indefinite, or the syntactic property of being a function word or subject-bound anaphor will never reach PF. We therefore require an additional, interface-interpretable difference between these putatively "exceptional" cases and the cases that the NSR handles more straightforwardly.

## 2.2 The Nuclear Stress Rule

Having established the framework in which we are situated, we now need to re-approach the Nuclear Stress Rule (NSR). Recall the word-order-based NSR of SPE:

(1) Linearization-Based Nuclear Stress Rule (SPE, English):
The rightmost primarily-stressed vowel in a domain receives the highest stress

In order to sufficiently account for the distribution of phrasal stress for cases like those in (3), this NSR needs to make reference to exceptions based on purely syntactic features (e.g. grammatical label) or semantic features (e.g. discourse-givenness or indefiniteness), as noted in e.g. Bresnan 1971, and more recently in Adger 2007. However, as we have just seen, a Minimalist architecture disallows these sorts of features from being visible for the NSR (at phonology) – specifically due to the conditions presented in (9) and (10). Thus, we need a different formulation of the NSR that can access the appropriate amount of the information Spell-Out provides it to correctly predict the locus of phrasal stress.

In the past twenty years, theories of phrasal stress have developed that generally agree that what the NSR pays attention to is syntactic depth, and not linear order (Cinque 1993, Zubizarreta 1998, Kahnemuyipour 2004, Kratzer and Selkirk 2007, Ahn 2015, among others). In fact, Ahn 2015 argues that there is no strict ordering between the application of the NSR and linearization operations, and the two are entirely independent of one another.

This paper takes the specific stance that what receives phrasal stress is the most embedded constituent.[9] Being that embeddedness is what matters, it is critical that we have a formal

lexical items, interpretable features (and not deleted uninterpretable features), and syntactic hierarchy are transferred to PF. (Traditionally, VI does not feed semantics, and happens on the path from syntax to phonology. It seems to be that lexical items feed semantics, on the basis of implicatures triggered by particular lexical items and on the basis of idiomatic interpretation of certain collections of lexical items. However, nothing crucially relies on this: it could be that VI only occurs on the path from syntax to phonology, and uninterpretable features could be deleted slightly earlier than VI.)

[9] Kahnemuyipour and Kratzer and Selkirk argue, differently from the others, that what receives phrasal stress is the *least* embedded constituent in the Spell-Out Domain. This difference is due to their theoretical attachments, including the syntactic position of the verb. This is returned to in section 3.2, where it is demonstrated that it must be that phrasal stress is assigned to the most deeply embedded constituent.

definition of depth of embedding. This is provided in (11).[10]

(11) Depth of Embedding:
A syntactic object, X, is most deeply embedded in a domain iff there is no other syntactic object, Y, such that (some copy of) X c-commands all copies of Y

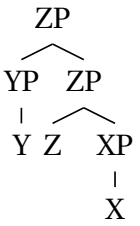
In informal terms, a constituent is most embedded if it doesn't c-command (all the copies of) any other constituent.[11]

Under this model of grammar, the NSR, like any PF operation, blindly applies every time Phonology receives hierarchically organized lexical items – i.e. after each application of Transfer-PF. Taking this alongside the idea that being most embedded is what matters for assigning phrasal stress, we can arrive at the following definition for the NSR for English:[12]

(12) Depth-Based Nuclear Stress Rule:
The most deeply embedded constituent in a Spell-Out Domain gets phrasal stress.

This NSR often yields the same output as the often-descriptively-true NSR in (1), because in English, most-deeply-embedded often coincides with the rightmost – but not always. Importantly, in addition to the problems with exceptions that this linear NSR has, it makes the wrong prediction in a number of other ways; see Cinque (1993) and Ahn (2015) for a more in-depth discussion of the failures of the idea that the NSR is based on word order.

There are two aspects of this structural, Multiple Spell-Out based approach to the NSR that ought to be noted before continuing. First, an important component of the definition in (11) is that it is relativized to Spell-Out Domains. If depth were not calculated based on Spell-Out Domains in a Multiple Spell-Out model, a structure like (13) would require further explanation:

(13)



If this entire structure were evaluated for the most-deeply embedded constituent using the definition in (11), then both Y and X would be considered as most embedded: Y c-commands nothing and X c-commands nothing. Cinque (1993) notes this issue, and resolves it with a more

[10] If this is the formal definition of depth used by the grammar, and if we assume Chain Reduction applies before Vocabulary Insertion (as in a DM model), this means that phrasal stress is assigned before lexical items are inserted. As such, phrasal stress would be some kind of abstract feature assigned before segmental phonology is even present. This suggests phonological processes starts earlier in the derivation than PF proper, as suggested in recent works such as Richards 2010. Thanks to Neil Myler for pointing this out.

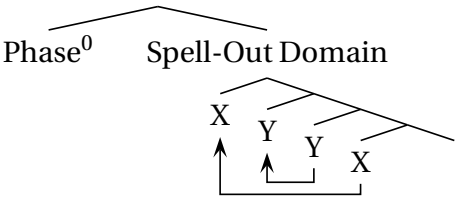
[11] Importantly, NSR will not assign phrasal stress to syntactic material that has no phonological content (of course, being a PF operation, the NSR has access to phonological information like that) – or, if it does, the stress will be moved via an operation; this may be understood as last-resort phenomenon. For two different formulations of this kind of operation, see Ahn 2015:§4.4 and Sailor 2014:§3.2.

[12] It is not necessary that this NSR be universal, though it does have cross-linguistic support; see Cinque 1993. Instead, perhaps it is parameterized, with some languages marking phrasal stress on most embedded elements, and others marking phrasal stress on least embedded elements (Kandybowicz, p.c.).

complex definition of the NSR, which refers directly to paths of complementation. The solution provided here derives Cinque's stipulation on complementation using an independently motivated architecture. Specifically, this apparent problem is never one that arises in a grammatical derivation in a Multiple Spell-Out model like Uriagereka 1999, which we adopt here. In this model, non-complements are always Spelled Out before merging with the spine. (Otherwise, structures like (13) are unlinearizable.) This means that YP will have no inner structure at the point that it is merged as an adjunct to ZP (while XP maintains its inner structure as a complement), and the only syntactic object that is defined as most-embedded for the domain ZP is X.

Secondly, the depth-based NSR operates on each Spelled-Out constituent, blind to any material outside of the Spell-Out Domain (e.g. Zubizarreta 1998, Adger 2007). In this way, copies in the Phase edge are ignored, predicting that some movements should affect what NSR applies to, and others should not; this has been pointed out by Legate 2003 (among others). Consider first a situation in which X moves within a Spell-Out Domain:

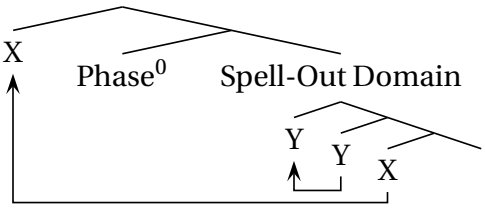
(14)




In a structure like (14), the Spell-Out Domain contains both copies of X alongside both copies of Y. As such, all copies of X and Y are visible to the NSR. Our definition of depth, in (11), determines that Y is most embedded. Even though there is one copy of X lower than a copy of Y in the Spell-Out Domain, X is not most embedded in that domain because a different copy of X c-commands all copies of Y. Of course, some movements within the Spell-Out Domain allow the moving constituent to remain most embedded (as in the case of Y's movement in (14)).

However, if movement targets a position outside of a Spell-Out Domain, the moving item will stop in Spec,PhaseP (Chomsky 2001).[13] In this way, when movement targets a position outside of the Spell-Out Domain that contains the lower copy, the NSR will not see the copy of the moving object in the phase edge, when it receives the Spell-Out Domain as its input. In other words, to the NSR, it will appear as though this movement out of the Spell-Out Domain has not occurred. Such a movement takes place with X in (15):

(15)




The Spell-Out Domain contains only one copy of X alongside both copies of Y, and that sole copy of X does not c-command all copies of Y. As such, X will be deemed most embedded in the Spell-Out Domain, following our definition of depth in (11). Even though there is some copy

[13] Certain theoretical assumptions about how movement, phases and Spell Out work will demand stopping in PhaseP. However, under different assumptions, this might not be necessary.

of X that c-commands (every copy of) Y, this is not visible at Spell-Out.[14] As such, if the moved item was most embedded before moving out of the Spell-Out Domain, the NSR will still treat it as most embedded.

To summarize, movements that take place within a Spell-Out Domain may affect the input to NSR, but movements that take place out of a Spell-Out Domain will "preserve" the input to NSR. Largely the same conclusions are reached in Bresnan 1971, in different formal terms[15], as well as in Legate 2003 and Adger 2007.

At this point, the model of assigning phrasal stress refers only to: (i) syntactic hierarchy, (ii) a definition of syntactic depth like (11), and (iii) a depth-sensitive NSR as in (12). Taken with Minimalist conditions on which features are accessible at PF (as in (9) and (10)), we are prepared to more thoroughly examine the cases of putative NSR exceptionality, in (3), and their minimal pairs in (4).

# 3 Deriving Classes of Putative Exceptions

According to the structure-based model of NSR described in the previous section, syntactic depth is the primary factor in determining phrasal stress placement. As such, the null hypothesis should be that, when phrasal stress does not fall on a constituent, it is because the constituent in question is not most embedded.[16] No exceptional mismatch between the syntax and prosody need be posited, if we posit a different syntactic input to the phrasal stress rule. With this in mind, we should be open to revising the syntactic structures of the putative exceptions in (3). (See also recent works by Steedman (2000) and Wagner (2015).)

Of course, it is in principle possible that a list of exceptions (and exceptions to exceptions) could operate on top of the NSR, at PF. This raises the question of how to define the apparent exceptions, in terms of properties that are accessible to the NSR at PF. Alternatively, the NSR's syntactic input is the source for variation in stress placement.

In the remainder of this section, the latter will be shown to be supported for each of the putative exceptions laid out in (3), in which phrasal stress is not phrase-final. Particularly, syntactic structure constrains the apparently exceptional patterns. In light of this, phrasal stress distribution is not a stumbling block for acquisition (cf. (5)), but instead provides a cue to the learner for abstract syntactic representations, including ones that are not obvious from word order alone. In a similar way way, phrasal stress patterns provide evidence to us, the theoreticians, about the syntactic derivation; we will exploit this to explore derivations of a range of structures.

[14] And even though X may surface in the position of the higher copy. If the higher copy surfaces, the lower copy will be deleted at a higher occurrence of Spell-Out – this is how a copy theory of movement defines movement through the phase edge. Additionally, the fact that the copy of X that gets declared most embedded may be later deleted at PF is irrelevant: if one member of the chain receives an abstract PF feature like phrasal stress marking or focus marking, all members of the chain do (such a position is defended in Selkirk 1996, Ahn 2012, Ahn 2015, and McPherson 2014).

[15] Namely, Bresnan 1971 concludes that transformations applied after the cycle will preserve any phrasal stress assigned within that cycle; transformations applied within the cycle can influence it.

[16] However, see footnote 4.

## 3.1 Given Material

Discourse-given material is typically unable to bear phrasal stress. Following Prince 1981, a constituent is discourse-given if it (i) has been explicitly mentioned in previous discourse, or (ii) is salient in the immediate context ("discourse participants and salient features of the extratextual context", *ibid.* p.236). For the sake of exposition, we will represent the G status of a constituent with a subscript G. A sentence like (16) would have the G-marking below:

(16) After Floyd came back from the football game, [he]$_G$ told [me]$_G$ [the game]$_G$'s final score.

In this sentence, *he* and *the game* are both G-marked because their referents (*Floyd* and *the football game*) have been previously mentioned in the discourse; and *me* is G-marked because discourse participants are salient.

In fact some theories, e.g. Féry and Samek-Lodovici 2006 and Selkirk 2007, argue that all discourse-given elements are formally G-marked.[17] If one assumes G-features are formally represented in the derivation, one ought to ask when they enter the derivation.

One especially logical possibility is that they are purely interpretive, and are only a part of the semantic derivation (absent in the syntax). If syntax is blind to discourse status (as is assumed in some models), this would be the most natural assumption. However, if G-features were only present in the semantic component (LF), they would be the type of semantic features that are not visible to PF operations, bearing in mind the Condition on LF and PF Operations in (9). As such, it would not be able to inform the NSR to derive the phrasal stress placement in examples like (17a).

On the other hand, if a G-feature informs the prosody, it must be present in the syntax as an interpretable feature that does not get deleted by Spell Out, and reaches LF and PF.[18] In more general terms, it must be that discourse status must be represented in the syntax and reach both semantics and phonology, as explicitly discussed by Selkirk (2007:132).

The data in (3a) and (4a) have been repeated below as (17), exemplifying how discourse-givenness (marked with subscript Gs) interacts with phrasal stress:

(17) a. (Chicken was cheap today. So...) Frank *áte* [chicken]$_G$. [given material]

b. # (Chicken was cheap today. So...) Frank ate [*chícken*]$_G$.

[17] Others, e.g. Schwarzschild 1999, believe that discourse-givenness arises when a constituent is not F-marked, and that F-marked constituents include those that are discourse-new and contrastively focused. See Selkirk 2007, Katz and Selkirk 2011 for arguments that contrastive focus, discourse Newness, and discourse-givenness each require different treatments in the syntax, and see also Büring 2013 for a more cautious assessment of the grammatical status of focused, discourse-given and discourse-new which "err[s] on the side of caution [...] and assume[s] that they are distinct".

[18] It ought to be questioned, however, where this G feature comes from. It can in principle be associated with any lexical item or complex constituent (i.e. there is no restriction on what kind of syntactic object can be G-marked) – see the informal definition of Givenness in Schwarzschild 1999. As such, it does not seem to be a property of the actual Given constituent – if structurally complex, the Given constituent only exists as a formal object as a result of syntactic structure building. As such, G-marking such a syntactically derived object must be the result of the derivation. In this way, perhaps it is best thought of as analogous to Case features; licensed by a head external to the phrase (as in Stevens 2014). I will argue in this section that this G-feature comes from a syntactic head, on the clausal spine (what I call GivenP), and that it is not the G-feature itself that affects phrasal stress placement.

Since *chicken* has been previously mentioned in the preceding discourse context (notated in parentheses in these examples), it is G-marked. On the other hand, contrast this case in (17) with (18), in which the linguistic context mentions a fried chicken fast-food restaurant, Popeye's, but it does not explicitly mention *chicken*. In such a context, *chicken* is not discourse-given (and thus not G-marked):

(18) a. (Popeye's was open. So...) Frank ate *chícken*. [new material]
b. # (Popeye's was open. So...) Frank *áte* chicken.

Though one typically eats chicken at a fried-chicken restaurant like Popeye's, *chicken* has not entered the discourse, and thus it is discourse-new.[19] Thus, it seems that G-marking, and discourse status more generally, has an important effect on the location of phrasal stress.

Because this descriptive generalization holds in a large majority of the cases, the common theoretical analysis has been that the NSR will not assign phrasal stress to G-marked constituents. This has been formalized to different degrees and in different ways, a few of which are provided below:[20]

(19) a. Generalization on Given Material (Bresnan 1971)
...by some means or other, [discourse-]anaphoric [...] elements are not assigned primary stress...
b. Metrically Invisible Given Material (Zubizarreta 1998)
[Discourse-]Anaphoric constituents are metrically invisible for the NSR in English and German.
c. Destress Given (Féry and Samek-Lodovici 2006)
A given [G-marked] phrase is prosodically nonprominent.

More broadly construed, these generalizations/analyses assert that information structural properties such as being G-marked may directly affect phrasal stress placement, and generally assume that G-marked constituents occur in the same structural position as any non-G-marked constituent (e.g. the direct object is the complement of V, regardless of whether the object is G-marked or not).

If G-marking a constituent is the reflex of having been mentioned in the discourse, G-marking would seem to be insensitive to where in a sentence that discourse-given constituent occurs. Thus the null hypothesis for this type of approach is that all discourse discourse-given material will be G-marked. If true, cases like (20), repeated from (4a), cause problems for the generalizations in (19):

[19] There may be some variability in whether *chicken* could be treated as discourse-given in (18), depending on how generous a particular speaker is with regard to whether *chicken* is salient in a context where *Popeye's* is mentioned (see the second part of the definition of discourse-givenness, provided at the beginning of this section).

[20] Zubizarreta provided evidence that languages vary on the point of whether discourse status has an effect on phrasal stress. Thus, her analysis is that G-marked constituents are metrically invisible to the NSR in languages like English and German, but in Spanish and Italian they are visible to the NSR and bear phrasal stress regardless of discourse status. The position this paper would adopt is that *structures* with discourse-given material differ across these types of languages in such a way that will affect where phrasal stress is placed. In this way, the NSR in all languages can be sensitive to discourse status inasmuch as it relates to syntactic structure, while remaining blind to the discourse status features themselves.

(20) (Chicken was cheap today. So...) Frank ate beans and [*chícken*]$_G$.

In (20), *chicken* is equally discourse-given as *chicken* in (17); the linguistic context is identical. Despite this, *chicken* doesn't bear phrasal stress in (17), but does in (20). Crucially, this means that, although the generalization that G-marked constituents do not bear phrasal stress holds in (17) and (18) —and indeed a wide range of data— the generalization does not hold for data like (20).[21]

This kind of pattern in the data, also discussed in Wagner (2006), sets up the analysis in the rest of this section. First, we are forced to conclude that G-marking must not directly influence the location of phrasal stress. If it did, the phrasal stress in (20) would not fall on *chicken*. At the same time, the generalization stands for a large portion of the data, and this must be accounted for.

Instead of having an NSR that is sensitive to features like discourse-givenness, which is empirically insufficient given data like (20), let us return to the NSR in (12), which (as formulated) is only sensitive to depth of embedding.

(12) Depth-Based Nuclear Stress Rule:
The most deeply embedded constituent in a Spell-Out Domain gets phrasal stress.

The null hypothesis for this NSR would be that discourse-given elements, when not the bearers of phrasal stress, occupy a position that is not most deeply embedded when the NSR applies. Thus, in simple SVO clauses where the direct object bears phrasal stress (such as (18) and (20)), the direct object occupies a position at Spell-Out that is lower than the verb – as expected under standard accounts of English syntax. In other simple SVO clauses where the direct object is discourse-given and the verb bears phrasal stress, the direct object must occupy a position at Spell-Out that is higher than the verb.

Such a syntactic representation of discourse-given material is motivated in Wagner (2006); discourse-given material occurs higher than new material, when grammatically possible.[22] On the other hand, the discourse-given *chicken* in (20) is not higher than new material – it bears phrasal stress. The critical difference between (17) and (20) is that *chicken* is in an island in the latter. This island prevents then discourse-given *chicken* from occurring higher in the structure, implicating that the motivation for occurring higher in the structure is movement from a base-position.

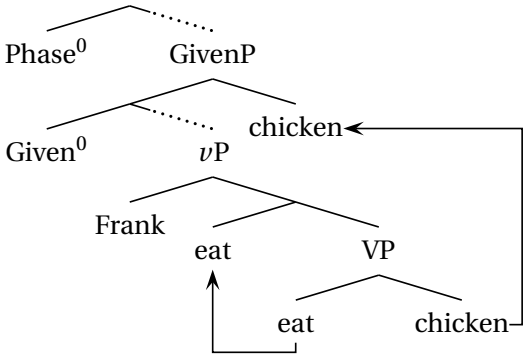
[21] One might conjecture that the reason *chicken* bears phrasal stress in '*beans and chicken*', in (20), is because it is interpreted as a single discourse-new entity. While it may be true that '*beans and chicken*' is a singular discourse-new entity, it is not an atomic entity without internal structure. This internal (syntactic and prosodic) structure provides multiple candidates for bearing phrasal stress. When it comes to placing phrasal stress within '*beans and chicken*', the approaches in (19) make an incorrect prediction; namely that phrasal stress ought not fall on '*chicken*' (as it is still discourse-given), predicting the infelicitous '*beans ánd chicken*' or '*béans and chicken*' – not on the G-marked '*chicken*'.

[22] This "as much as is grammatically possible" restriction is intriguing. When movement is impossible, the discourse-givenness seems to 'come for free'. This is reminiscent of Preminger (2011), who shows that there are grammatical operations which must be satisfied via syntactic feature-checking as much as possible, but need not (when syntactically impossible). It would seem that movement to GivenP has the same property: a phrase is G-marked by movement to GivenP, but when such movement is impossible, the G-marking may still obtain. For further discussion, see discussion in Appendix E of Ahn 2015.

Thus *chicken* in (17) moves, but it does not move in (20), because movement out of an island is impossible. This givenness movement is "covert" – it does not affect linear word order – but it must not be LF movement. When movement affects phrasal stress placement by the NSR (done at PF), givenness movement cannot take place at LF, considering our Condition on LF and PF Operations in (9).

This givenness movement that takes place in (17) can be represented as (21). In this structure (and in most structures in this paper), I simply represent movement with multiple copies, leaving open the question of how to properly linearize the structure such that only one copy is pronounced.

(21)




Before continuing, let us briefly discuss some possibilities of how to resolve the structure linearly such that the movement does not appear to affect the word order. This could be due to incidentally string vacuous movement (as Kayne 1998 describes covert movement), to the higher copy being pronounced followed by other movements occur which essentially "reconstruct" the previous word order (due to constraints on linearization as described in, e.g., Fox and Pesetsky 2005), or to the lower copy being pronounced (e.g., Fox and Nissenbaum 1999). We currently have no evidence to decide between these three hypotheses, nor do we have evidence that these are the only three relevant hypotheses.

The target of movement for discourse-given material in (21) is labeled "GivenP", for expositional purposes. There are two relevant aspects of this structure that must hold in order for our NSR in (12) to predict the phrasal stress patterns. First, the unmoved *chicken* is most embedded, but after givenness movement *ate* is most embedded. Second, the target of movement is located within the lowest Spell-Out Domain that contains the predicate. Considering these two properties of the derivation, a direct object like *chicken* is most embedded and bears phrasal stress when not moving to GivenP. At the same time, when *chicken* undergoes givenness movement (to a position within the Spell-Out Domain), *ate* becomes most deeply embedded (no copy of *eat* c-commands all copies of anything else), and is assigned phrasal stress by the NSR. This derives the data in (17).

On the other hand, island effects block movement of *chicken* to GivenP in (20):

(20′) $[_{\text{PhaseP}}\ [_{\text{GivenP}}\ [_{\text{vP}}$ Frank eat $[_{\text{island}}$ beans and chicken ] ] __ ] ]

Thus *chicken* stays in its most-embedded position for purely syntactic reasons, and receives phrasal stress, despite being discourse-given. This is especially strong evidence in favor of a syntactic-structure based NSR. The linear position of *chicken* is held constant, with the manipulation being whether *chicken* is in an island. Since syntactic phenomena like islandhood can affect phrasal stress placement, we need an NSR that is sensitive to structural position.

In sum, if an interpretable G feature which causes the associated constituent to be metrically invisible were assigned to all discourse-given words/phrases in the narrow syntax, the difference between (17) and (20) is not predicted.[23] Instead, a structural-depth based approach like (12) derives without stipulation the fact that discourse-given material sometimes behaves as extrametrical for the NSR, and sometimes it does not.

Perhaps the most surprising aspect of this analysis is that the target of givenness movement is within the Spell-Out Domain that contains the predicate. If givenness movement targeted a higher position outside of the Spell-Out Domain from which it originates (e.g., the (clausal) left periphery), then discourse-given constituents would have to pass through the phase edge, and would be visible to the NSR in their base position. (See discussion surrounding (15).) This implicates that the phase containing the predicate and its direct object has more structure than we may have previously imagined and certainly includes a position higher than $v$P (under standard assumptions that the V has moved to $v$). This analysis of phases and verb positions has independent support, as it is also necessary for treatments of so-called VP ellipsis, VP fronting, and transitive expletive constructions (e.g., Merchant 2007, 2013, Harwood 2013, Sailor 2014). In addition, this data has led us to conclude that there are syntactic heads associated with discourse and information structure, which are (or at least may be) within the same Spell-Out Domain as the verb; cross-linguistic support for this idea has been argued in works by Belletti (2001, 2004, 2005) and Jayaseelan (2001).

## 3.2 Reflexive Anaphors

We turn now to another domain for which exceptionality has been proposed: reflexive anaphors. Recall the minimal pair in (3b) and (4b), repeated below, with indices:

(22) Q: What happened on April Fools Day?
A1: Hazel$_1$ glued *Kén*$_2$ to herself$_1$.
A2: Hazel$_1$ glued Ken$_2$ to *himsélf*$_2$.

In this case, the subject-bound anaphor in (22A1) is extrametrical, but the object-bound anaphor in (22A2) is not. Assuming a linearization-based NSR, *herself*'s not bearing phrasal stress in (22A1) would constitute an exception to the rule, while *himself*'s bearing phrasal stress in (22A2) is predicted.

[23] This G feature may still be present in the syntax, and may still have prosodic effect. Specifically, it may interact with F-marking in the ways described in Selkirk 2007. All that is necessarily true is that this G feature does not affect assignment of phrasal stress (contra Selkirk 2007).

In addition, these data are particularly puzzling because, in order to define when a reflexive anaphor is extrametrical, it would seem that we need to make reference to the antecedent of the anaphor. A system where this kind of information is available to the NSR would be particularly surprising, and is entirely ruled out by our grammatical architecture. This renders any exception-based approach implausible.

To understand the prediction of a structure-based NSR, as defined in section 2.2, we must understand the structure of ditransitives like the ones in (22). A range of observations support a structure in which the direct object (like *Ken*) typically c-commands the indirect object (like *himself*). This includes NPI licensing, pronominal binding, and condition C effects, laid out below.

(23) a. Hazel glued no one to anything. [NPI licensing]
b. ★Hazel glued anyone to nothing.

(24) a. Hazel glued no man$_1$ to his$_1$ chair. [Pronominal Binding]
b. ★Hazel glued his$_1$ chair to no man$_1$.

(25) a. Hazel glued Frank$_1$ to his$_1$ chair. [Condition C]
b. ★Hazel glued him$_1$ to Frank$_1$'s chair

By assuming any of these are sensitive to c-command relations, one must draw the conclusion that the direct object c-commands the indirect object, and not vice-versa. It is for this reason that both reflexive anaphors in (22) are assumed to be in the same, most-deeply embedded position. In this way, a structure-based NSR does not seem to make a different prediction than the linearization-based NSR.

As with the discourse-given material, a plausible analysis is that, though the linear positions of the two anaphors in (22A2) are the same, they are each in different syntactic positions. In particular, the subject-bound anaphor in (22A1) must be higher than the verb, but the object-bound one in (22A2) must be lower. It has been shown that certain reflexive anaphors, like the one in (22A1), undergo movement to a position outside of $v$P and within the Spell-Out Domain, with cross-linguistic evidence from syntax, semantics, and/or prosody, and results in a structure in which the only possible antecedent is the local subject (Sportiche 2010, Ahn 2012, 2015, *forthcoming*).

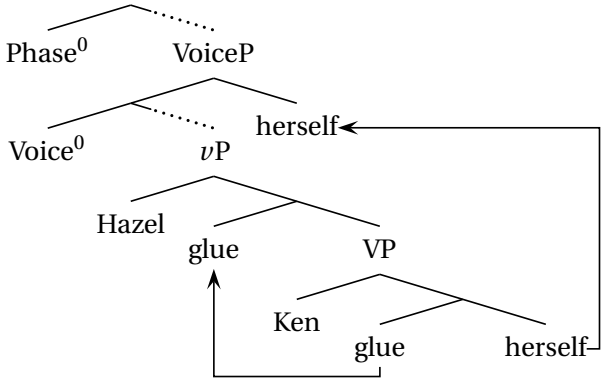
In essence, this movement is necessary to explain locality and binding constraints on the position of anaphors. This has been claimed for subject-bound anaphors many times in the literature, as exemplified by Chomsky 1995 (Ch.1):

> "...the reflexive must move to a position sufficiently near its antecedent. This might happen in the syntax, as in the cliticization processes of the Romance languages. If not, then it must happen in the LF component."

Moreover, in English and cross-linguistically, there are distinct morphological, semantic, and phonological properties which only align together for reflexive anaphors when this kind of movement is syntactically possible. (See Sportiche 2010 for a discussion of this movement and its effects in French. For a discussion of English, see Ahn 2015.) This movement is shown be-

low.[24]

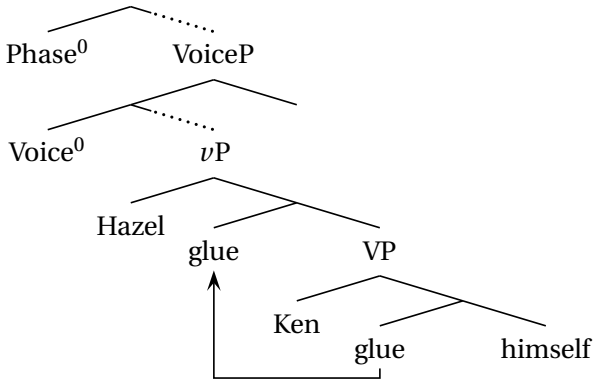
(26)




Since this anaphor-movement results in the subject being the antecedent of binding, it cannot take place when the anaphor is bound by some other constituent, such as the direct object. Additionally, because this movement is internal to the Spell-Out Domain, it bleeds NSR applying to the reflexive object, since the most deeply embedded constituent in (26) is *Ken*.[25] Thus *Ken* is correctly predicted to bear phrasal stress in (22A1).

On the other hand, when bound by a non-subject, reflexive anaphors do not undergo this movement. They stay in their base-position, as below.

(27)




If the anaphor moved to VoiceP, it would not be in a position to be bound by its antecedent (and may in fact induce a condition C violation[26]). In contrast to (26), *himself* is most-embedded and is correctly predicted to bear phrasal stress by our formulation of the NSR.

[24] Again, the specific choices in this structure, such as the spec-final VoiceP, are irrelevant. See Ahn 2015 for several possible structures that are compatible with the data being described here.

[25] Important questions ought to arise about the preposition *to*, and why it is absent from the derivations above. There is strong evidence from a range of data that prepositions enter the derivation higher in the structure (e.g., Kayne 2002, 2005). In this way, it is not the case that Ps 'avoid' stress, but rather they are typically not candidates for stress in a case like (26), because they are introduced too high in the structure. Thus Ps are like Ds (in that their surface-complement is not a deep-complement) and like particles (in their merge position) – see sections 3.3, 3.4, and the appendix.

[26] The anaphor in (26) does not induce a condition C violation, because *Hazel* moves to be higher than *herself*, and condition C need not be checked until all A-movement is complete (Sportiche 2011).

Additional evidence for this analysis is the fact that object-bound anaphors patterns with anaphors that are contained within islands that block the anaphor-movement in (26).

(28) a. Hazel glued Ken [to the wall and to *hersélf*]. [Coordinate Structure]
b. Hazel glued Ken [to the wall and to *himsélf*].

(29) a. Hazel glued Ken to [someone like *hersélf*]. [NP Adjunct]
b. Hazel glued Ken to [someone like *himsélf*].

In both cases, the anaphor remains most embedded, causing it to bear phrasal stress by our formulation of the phrasal stress rule.

There are some important theoretical conclusions that can be drawn on the basis of the uniform prosodic behaviors for object-bound anaphors, as in (22A2), and anaphors in islands, as in (28) and (29). First, this very strongly implicates that it is movement of the anaphor which is what derives the extrametricality of subject-bound reflexive anaphors. Object-bound anaphors and anaphors in islands do not undergo this movement. In the case of islands, the anaphor cannot move due to obvious restrictions on movement imposed by island boundaries. In the case of being object-bound, the anaphor cannot move because it would create an unintended interpretation.

In addition, these facts cast doubt on semantics-only analyses of binding. If syntactic position did not play a role in determining binding by the subject or object in (22), we would not predict that anaphors in islands and object-bound anaphors form a natural class, prosodically. (In fact, coargument approaches like Reinhart and Reuland 1993 make the opposite prediction: subject-bound anaphors and object-bound anaphors should form a natural class to the exclusion of the ones in islands.) Instead, this is predicted if what determines the binding is sensitive to syntactic locality and c-command relations. (See Charnavel and Sportiche 2014 and Ahn 2015 for detailed analyses in this vein.)

Finally, we are led to an important conclusion for the analysis of phrasal stress in English. Since anaphors like those in (22A2), (28), and (29) are more embedded than the binder, this constitutes strong evidence against any formulation of the phrasal stress rule which assigns phrasal stress to the highest XP in a Spell-Out Domain, such as Kahnemuyipour 2004 and Kratzer and Selkirk 2007. Under these analyses, phrasal stress in (22A2) would be predicted to fall on the direct object *Ken* in neutral contexts. (Recall from (23)–(25) that direct objects are higher than indirect ones in sentences like these.) However, this is infelicitous in a all-new information context:

(30) Unattested Prediction Made by a "Highest XP" Phrasal Stress Rule
Q: What happened on April Fools Day?
A: #Hazel glued *Kén* to himself.

The correctly-formulated phrasal stress rule for English does not place stress on the highest constituent in the Spell-Out Domain, but the most deeply embedded one.[27]

[27] Additional evidence against a highest-phrase analysis can be found, assuming a cartographic approach to adverbs (e.g. Cinque 1999). The only adverbs that bear nuclear phrasal stress for a clause are those that (i) occur

At this point, we ought to explore how givenness and anaphoricity interact. Since there is a GivenP to which discourse-given material moves, as well as a VoiceP to which reflexive anaphors move, two questions arise. First, do these movements interact (and if so how)? And second, what are the relative positions of GivenP and VoiceP.

First, consider what happens when an entire Spell-Out Domain, which does not contain a reflexive anaphor, is discourse-given. The stress pattern that emerges is the same as though everything were new information, as noted by Schwarzschild (1999) and Wagner (2006). This is shown in (32), which forms a minimal pair with (31):

(31) Q: So, what happened with Dennis?
A1: #Leo thanked [*Dénnis*]$_{\text{given}}$.
A2: Leo *thánked* [Dennis]$_{\text{given}}$. *Extrametrical*

(32) Q: So, is it true that in his speech Leo thanked Dennis?
A1: Yes. [Leo thanked *Dénnis*]$_{\text{given}}$. *Final Stress*
A2: #Yes. [Leo *thánked* Dennis]$_{\text{given}}$.

In (31), where only the direct object is discourse-given, the direct object does not bear phrasal stress. (It has moved within the Spell-Out Domain.) In (32), the direct object bears phrasal stress, even though it is discourse-given, because everything in the Spell-Out Domain is discourse-given.

When a reflexive object occurs in a sentence where everything is discourse-given, the reflexive still does not bear phrasal stress.

(33) Q: So, what happened?
A1: #Leo thanked *himsélf*
A2: Leo *thánked* himself. *Extrametrical*

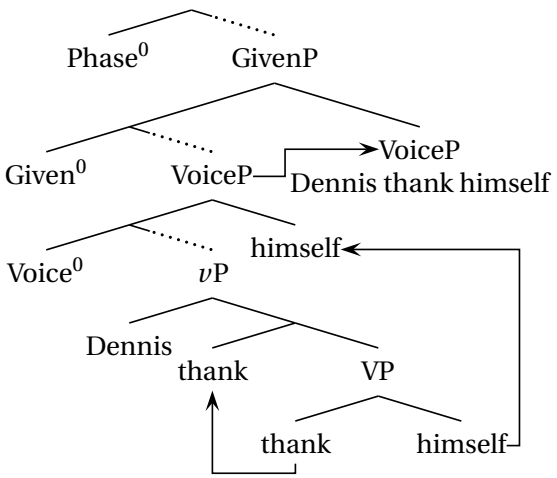
(34) Q: So, is it true that in his speech Leo thanked himself?
A1: #Yes. [Leo thanked *himsélf*]$_{\text{given}}$.
A2: Yes. [Leo *thánked* himself]$_{\text{given}}$. *Non-final Stress*

There are two conclusions to draw from this data. First, reflexive anaphors that are extrametrical are not so because they are discourse-given. If they were, making the whole sentence discourse-given should make the anaphor the optimal candidate for bearing phrasal stress (as with *Dennis* in (32)).

Second, we can cautiously conclude that the target of givenness movement (GivenP) is higher than the target of reflexive movement (VoiceP). The pattern in (34) is predicted if reflexives move to VoiceP, and then VoiceP (or a constituent containing it) is what moves to Spec,GivenP. This option is sketched out below:

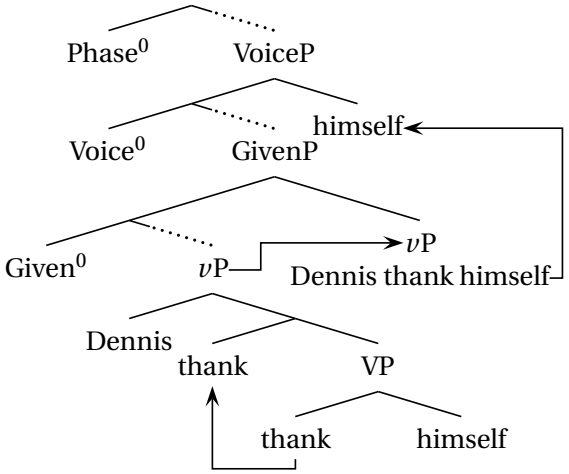
within the same Spell-Out Domain as the verb, and that (ii) are post-verbal. If phrasal stress is assigned to the highest XP in a Spell-Out Domain, this pattern is not predicted. (But see footnote 12; the highest/lowest distinction may be parameterized.)

(35)




In this case, the most deeply embedded constituent will be *thank* – *thank* does not c-command all copies of anything.[28] On the other hand, let us consider the phrasal stress facts if VoiceP were higher than GivenP and reflexives could move out of the specifier of GivenP to the specifier of VoiceP.

(36)




In this case, *thank* is still the only constituent such that no other constituent has all its copies c-commanded by *thank*. These two options are not distinguishable by phrasal stress predictions. However, this second option would seem to necessitate a CED violation, by moving *himself* out of the specifier of GivenP. Even if CED violations are deemed possible, the type of movement in (36) is ruled out on the grounds that specifiers must be Spelled-Out before merging in the specifier position (Uriagereka 1999). This means there is no internal structure to Spec,GivenP and *himself* cannot be extracted. In order for this argumentation to be complete, many controversial assumptions would need to be made, so we shall cautiously conclude that GivenP is hierarchically superior to VoiceP.

Let us summarize our findings from reflexives. First, if the lexical property of being an

[28] Moving VoiceP to GivenP does not add a second element that does not c-command anything. Recall the fact that non-complements must be Spelled Out before merging in this approach.

anaphor made anaphors invisible to the phrasal stress operation, the difference between (22A1) and (22A2) is not predicted. The minimal difference between the two, beyond the stress location, is that only the former is bound by a subject. Following others in the analysis that subject-orientation is a property derived from structural position, the prosodic difference between the two must be modulated by that syntactic difference. With syntactic structures as the input to our model of phrasal stress, as in (12), we correctly predict that only subject-oriented reflexives avoid bearing phrasal stress, and only when not occurring in an island. The phenomenon of extrametrical reflexives, as with extrametrical discourse-given material, is syntactically constrained. This provides further support for a non-linear-based NSR, and also exemplifies how prosodic structure can be used to make inferences about syntactic structure.

## 3.3 Indefinites and N→D

Indefinites have also been claimed to be exceptional for the phrasal stress rule. Bresnan (1971) states "by some means or other, [...] indefinite elements are not assigned primary stress". Compare this statement to (3c) and (4c), repeated below:

(37) a. We will *cóok* something.
b. We will cook some *fóod*.

Bresnan's statement is too broad, and seems only to apply to certain indefinites; namely, those indefinites which are sometimes called indefinite pronouns: e.g., *someone*, *something*, *somebody*, etc. There are two hallmarks of this kind of indefinite pronoun. First, the word-level stress falls on *some* in all of these cases, allowing the vowel quality of *one*, *thing* and *body* to be reduced. Giving lexical stress and full vowel quality to the noun yields a distinct, more compositional interpretation.

(38) a. Sómeb[ə]dy just arrived.
b. Some b[á]dy just arrived.

In the former, it means that some person just arrived, but the latter means that some corpse just arrived. Second, nominal adjuncts are all obligatorily post-nominal in this cases:

(39) a. someone tall
b. something red
c. somebody intelligent

Such indefinite pronouns are said to be formed by N to D (N→D) head movement of certain Ns (Abney 1987), which allows the N to precede all of these adjuncts.[29] This N→D movement targets a position higher than all nominal adjuncts.

(40) a. [$_{DP}$ some body [$_{NP}$ intelligent ~~body~~ ] ] [N→D ]
b. # [$_{DP}$ some [$_{NP}$ intelligent body ] ] [no N→D ]

[29] Head movement of N has been proposed (e.g., Abney 1987, Kishimoto 2000), as the N moves without any complements, adjuncts or number features. Alternatively, see Leu 2005 for arguments that the N is external merged in the higher position, above the relevant adjuncts.

Again, only in the case of the movement is it possible to have an adjective like *intelligent* with the nominal head *body*; without the movement, a strange meaning arises, as bodies cannot be intelligent.

In cases of N→D movement, the resulting constituent does not bear phrasal stress, as exemplified in (37a). It has been claimed that the reason for this is that indefinite pronouns have a certain interpretation, whereby they do not contribute anything newsworthy (as in Bolinger 1972). That is, *something* is not newsworthy because *we will cook* entails *we will cook something*. Wagner 2006 points out flaws in this logic, using examples like the ones below:

(41) a. They will *drínk* something.
b. They will drink some *líquid*.

(42) a. I *dréamt* something tonight.
b. I dreamt a *dréam* tonight.

It is not clear that *a liquid* is more newsworthy than *something* in (41), nor is it clear that *a dream* is more informative than *something* in (42). Drinking something entails drinking liquids, and dreaming something entails dreaming a dream.

In addition, the linear order is the same between (37a) and (37b), so we turn to the structure, which we have already twice shown to be the only relevant source for considering phrasal stress placement. It would be standard, under an N→D movement account of pronouns like *something*, to assume that *cook something* and *cook some food* have the direct object in the same position, in relation to the verb.

(43) [$_{vP}$ we cook [$_{VP}$ ~~cook~~ [$_{DP}$ some thing [$_{NP}$ ~~thing~~ ] ] ] ]

(44) [$_{vP}$ we cook [$_{VP}$ ~~cook~~ [$_{DP}$ some [$_{NP}$ food ] ] ] ]

These structures do not provide any obvious reason that *cook* should bear the phrasal stress in (43) but *food* should bear it in (44).[30]

Instead, it would seem that we need an alternate structure for cases of N→D. Sportiche 2005 proposes an alternate structure of DPs, in which the deep structure of *cook some food* is as (45).[31]

(45) [$_{DP}$ some [$_{VP}$ cook [$_{NP}$ food ] ] ]

One of Sportiche's basic arguments in favor of (45) is that predicates often place selectional restrictions on the type of N with which they can merge, while not restricting the type of D

[30] In fact, it is not clear what our NSR would predict when there is symmetrical c-command, as there is between the D and the N in (43). One possibility is that it looks for other copies for which there is no symmetrical c-command – however, this would falsely predict that *thing* should bear phrasal stress in (43). Alternatively, it could be that such structures should never reach the interfaces, and some additional symmetry breaking operation must take place – see Moro 2000 and Chomsky 2013, among others.

[31] This approach opens up an interesting line of work, in which Quantifier Raising is not necessary for reasons of type-mismatch with the predicate. Predicates compose with NP arguments, not DP arguments. Additionally, Ds/Qs will compose directly with the predicate (as well as the NP), straightforwardly accounting for their semantics, relating the sets denoted by the NP and the predicate. I do not pursue this idea here, but this is a beneficial consequence of this analysis.

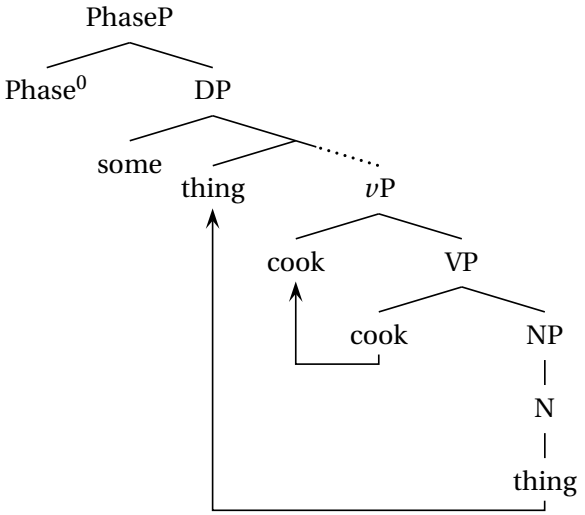
with which they can merge.[32] Assuming a definition of locality whereby a head X can only select something within its XP, and assuming the DP hypothesis, this asymmetry is unexpected. In light of the general robustness of this constraint on the locality of selection, as well as the general finding that nominal constituents are headed by D in the surface structure, we should re-evaluate the structure at deeper levels of structure.

Sportiche proposes that NPs (and not DPs) are merged as arguments of the predicate, as it was before the DP-hypothesis became standard. To reconcile this with the finding that Ds head the nominal material at the surface, later in the derivation the NP forms a derived constituent with the D, via movement of nominal material up to near D.[33]

In this case, in both *something* and *some food*, there is movement of a nominal constituent up to D, which is higher than the predicate. However, the two *some*s in *something* and *some food* are not the same D – they have different selectional restrictions. The N→D *some* can only attract (certain) bare Ns in the singular, and the other *some* can form a constituent with either plural or singular Ns that have complements or adjuncts. This opens the door to the possibility that the two *some*s occur in different positions. (For additional discussion of different types of Ds being associated with different loci on the clausal spine, see Hallman 2004.)

Returning now to the phrasal stress data, N→D Ds must be within the Spell-Out Domain. Movement of the N(P) to D in *something* bleeds *thing* receiving phrasal stress, by manipulating the input to the NSR.

(46)




What the NSR sees after Spell Out is that *cook* is the most deeply embedded constituent. (There is a copy of *thing* that c-commands all copies of *cook*, ruling out *thing* as most embedded.)

On the other hand, the non-N→D-inducing D seems to be outside of predicate's Spell-Out

[32] The only possible counterexample is the definiteness restriction of existential constructions. Though, existential constructions do not constrain the distribution of morphosyntactically definite Ds, per se. For example, list and kind interpretations are permissible with definite determiners in existential constructions. Instead, the interpretation of Ds is what is constrained.

[33] Sportiche does not rely on any specific movement analysis, though a sidewards movement approach would be most obviously harmonious with this idea (whereby the NP sidewards-moves into the complement position of DP). Alternatively, there could be some series of upwards-movements that will also yield the same surface constituency.

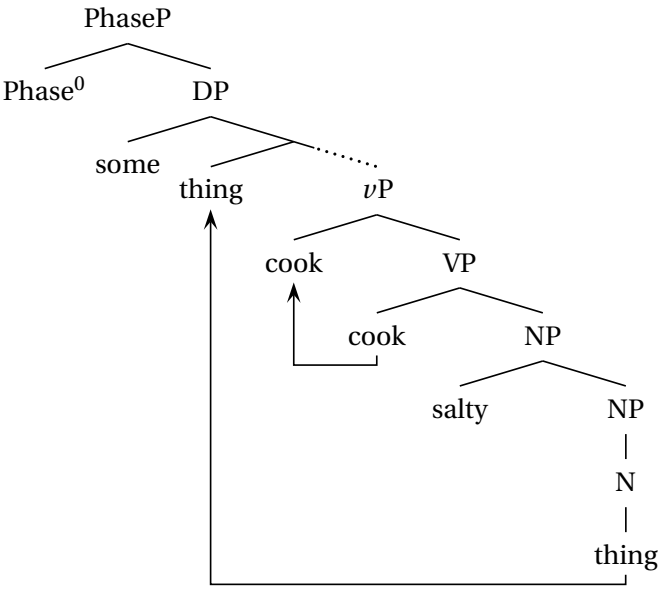
Domain; movement of the NP does not affect the NSR.

(47) $[_{DP}$ some $[_{PhaseP}$ $[_{vP}$ cook $[_{NP}$ food ] ] ] ]

What the NSR sees after Spell Out in this case is that *food* is the most deeply embedded constituent. Though there is a copy of *thing* that c-commands *cook*, it does so from outside of the Spell-Out Domain that is provided to the NSR as its input.

By having Ds outside of the VP, with different Ds in different positions (as independently argued), we now understand which indefinites bear phrasal stress and which do not.[34] This approach also makes the following correct prediction: because N→D strands any nominal adjuncts (allowing them to become post-nominal), those adjuncts will be low enough to bear phrasal stress.

(48) We will cook something *sálty*.




After this movement, the (lowest) stranded adjunct is most embedded – *salty* does not c-command all copies of any other constituent, but *cook* c-commands all copies of *salty*. This structure correctly predicts that *salty* bears phrasal stress. Additional movements that do not feed phrasal stress will be necessary to produce a word order such that the verb precedes *something* and such that *salty* and *something* are adjacent.[35]

[34] Also, by this logic, it might be appropriate for other 'weak' Ns such as *stuff* or *shit* (as in, *She did stuff/shit* to also undergo N→D movement, albeit to a silent D – one that occurs with bare mass Ns. This is supported by the fact that *stuff* and *shit* in these types of cases are near synonyms for *something*. (Beware: there is a *shit* that doesn't undergo N→D movement, which is a near synonym of *nothing* – *About physics, I know shít* means "I know nothing" but *About physics, I knów shit* means "I know stuff". Note that *nothing* bears phrasal stress in places where *every/some/anything* do not, indicating that *nothing* has a different syntax – one with may involve movement out of the Spell-Out Domain to near $Neg^0$; see Kayne 1998.)

[35] To understand the latter more fully, a more complete understanding of the properties of the adjectives that can occur post-nominally with N→D structures is required. For example, Larson and Marušič 2004 provide a range of evidence and argue that these adjectives are introduced outside of the NP, in the DP. If Ds are merged above *v*P, it is unclear what Larson and Marušič's findings mean for the exact structural position of these post-nominal adjectives, though the phrasal stress is telling us they are more embedded than the verb and the indefinite pro-

Additionally, this approach derives that the phrasal stress behavior of indefinites like *something* is not the result of its descriptive lack of newsworthiness. This phrasal avoidance also happens in other places where N→D happens, outside of indefinites and in the case of much more informative contexts.[36] This includes N→D derivations, such as (49) which contains a direct object *everyone*.

(49) What's Kathy's job?
  a. She *gréets* everyone.
  b. She greets every *guést*.
  c. #She greets *éveryone*.

It is not the case that *everyone* is discourse-given, indefinite, or non-newsworthy. Despite this, it is extrametrical for the NSR, as *one* has moved to a position in which it is not most embedded.

In summary, if an indefinite pronoun's interpretive property of being indefinite or "not newsworthy" makes it invisible to the NSR, the difference between (37a) and (37b) is not predicted, nor is the behavior of *everyone* in (49). Instead, what does predict this behavior is that N→D-movement-inducing Ds are outside of VP, placing a copy of the N in a high position within the Spell-Out Domain, resulting in the verb being most embedded in cases like (37a).

## 3.4 Verb Particles

This approach to phrasal stress allows us to draw conclusions on the syntax of particle verbs, whose syntax has been heavily debated (e.g., Guéron 1987, Hoekstra 1988, Johnson 1991, Neeleman 1994, den Dikken 1995, Kayne 2000, Ramchand and Svenonius 2002, among many others). By investigating their prosodic properties, we can perhaps settle some of the debate, though we will not come to a firm conclusion about the exact shape of the derivation. Recall the minimal pair from (3d) and (4d), repeated below, in which givenness of the direct object interacts with whether or not the particle bears phrasal stress:

noun in the Spell-Out Domain. One possibility is that these post-nominal adjectives are introduced above $v$, with another copy of the verb occurring between the adjective and the N that is in D.

[36] However, it might be that not all N→D movement is the same. Consider the data below, in (1):

i. What will happen if the contract is broken?
  a. [ I'd *gét* something ]$_{\text{new}}$
  b. #[ I'd get *sómething* ]$_{\text{new}}$
  c. #[ I'd *gét* nothing ]$_{\text{new}}$
  d. [ I'd get *nóthing* ]$_{\text{new}}$
  e. ?[ I'd *gét* everything ]$_{\text{new}}$
  f. [ I'd get *éverything* ]$_{\text{new}}$

This could be because of differences between types of 'determiners', with different types of 'determiners' merged in different locations (see Hallman 2004, as well as Kayne 1998 and Alrenga and Kennedy 2014, suggesting that *no* is in a position that is likely higher than *some* in (46)). More investigation is needed, especially with regard to interpretation. Alternatively, maybe the differences in phrasal stress above have to do with what is naturally focused by the context. That is, perhaps what is indicated as discourse new with the brackets above is insufficient; there may be non-neutral focus being placed on the stress-bearing words, and such focus would change the stress placement.

(50) 3d. Walter turned my *rádio* on.
4d. After Sue bought me a radio, Walter turned [my radio]$_{\text{given}}$ *ón*.

We will see that this allows us to rule out some of the derivational possibilities for particle verbs.

By definition, verb particles in English can occur between the V and a direct object, or after the direct object. In order to truly investigate their syntax with phrasal stress as a diagnostic, we should compare the locus of phrasal stress in both of these two orders. We will first consider scenarios in which nothing is discourse-given.

(51) Q: What's that noise? [V Obj Prt]
A1: Walter turned my *rádio* on.
A2: #Walter my radio *ón*.

(52) Q: What's that noise? [V Prt Obj]
A1: Walter turned on my *rádio*.
A2: #Walter turned *ón* my radio.

In both of these contexts, no matter where the direct object *the radio* surfaces, it bears the phrasal stress. This means that, at Spell-Out, the direct object is more embedded than the particle, in both word orders.

In comparison, let us consider scenarios in which the direct object is discourse-given. Again, in both word orders, the phrasal stress falls on the same constituent. The particle – and not the verb or direct object – bears phrasal stress.

(53) Q: What happened to my radio? [V Obj Prt, Discourse Given Obj]
A1: Walter turned [my radio]$_{\text{given}}$ *ón*.
A2: #Walter turned [my *rádio*]$_{\text{given}}$ on.
A3: #Walter *túrned* [my radio]$_{\text{given}}$ on.

(54) Q: What happened to my radio? [V Prt Obj, Discourse Given Obj]
A1: Walter turned *ón* [my radio]$_{\text{given}}$.
A2: #Walter turned on [my *rádio*]$_{\text{given}}$.
A3: #Walter *túrned* on [my radio]$_{\text{given}}$.

This suggests that, at Spell-Out, the particle is more embedded than the verb and discourse-given material, in both word orders.

To be clear, the phrasal stress properties are not specific to the particle verb *turn on* (in which the particle clearly contrasts with *off*). The same patterns arise with *zip up* (cf. **zip down*) and *throw away* (cf. **throw towards*):[37]

(55) Q: Why are they staring at me? [V Obj Prt]
A: Zip your *pánts* up.

[37] Thanks to David Pesetsky for this suggestion.

(56) Q: Why are you mad at yourself? [V Obj Prt]
A1: I threw my *móney* away.

(57) Q: Why are they staring at me? [V Prt Obj]
A: Zip up your *pánts*.

(58) Q: Why are you mad at yourself? [V Prt Obj]
A1: I threw away my *móney*.

(59) Q: Why are they staring at my pants? [V Obj Prt, Discourse Given Obj]
A: Zip [your pants]$_{\text{given}}$ *úp*.

(60) Q: Where's your money? [V Obj Prt, Discourse Given Obj]
A1: I threw [my money]$_{\text{given}}$ *awáy*.

(61) Q: Why are they staring at my pants? [V Prt Obj, Discourse Given Obj]
A: Zip *úp* [your pants]$_{\text{given}}$.

(62) Q: Where's your money? [V Prt Obj, Discourse Given Obj]
A1: $^{\checkmark ?}$I threw *awáy* [my money]$_{\text{given}}$.

The particle bearing stress in (59)–(62) is due to the givenness of the object, and not due to the particle being contrasted with alternate particles (since there aren't any).

What is perhaps striking is that the phrasal stress facts are constant across both word orders. This indicates that the hierarchical relations are the same at Spell-Out, and some additional movements after Spell Out cause the difference in word order. In particular, the implicated hierarchy is as in (63), which enriches our understanding of the structure within the phase for the verbal domain:

(63) Phase > Given Material > Verb > Particle > Direct Object

The hierarchy in (63) are meant to represent the placement (at Spell Out) of the highest copies of the direct object, the particle, the verb, and any given material. They do not indicate, for example, the external merge positions of each of these constituents, nor do they represent the final position at the completion of the derivation. Moreover, these general findings make correct predictions, beyond the data observed – in particular, in the absence of an object, the particle bears the phrasal stress:

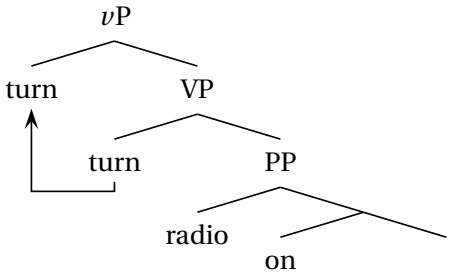
(64) (Context: the radio is on the fritz, and the speaker is addressing the radio while banging the side of it)
a. Turn *ón*!
b. $^{\#}$*Túrn* on!

This reinforces our structural findings in (63), as well as our previous finding that function word status (the particle is arguably a function word) does not influence phrasal stress location.

Given the vagueness of (63), our findings are compatible with many derivational possibili-

ties of particle verbs, and the theoretician and learner need further evidence before being able to make more definitive conclusions about the exact nature of the derivation. At the same time, a commonly held analysis of particle verbs can now be shown to be insufficient. Consider the predictions of the small clause analysis of particle verbs (e.g., Hoekstra 1988, Kayne 2000, Ramchand and Svenonius 2002, etc.), which is sketched out below.

(65) Small-Clause Analysis of Particle Verbs: [Obj Prt] Order




This analysis succeeds in a variety of ways, including the way in which there seems to be a predication relationship between the apparent object *radio* and the particle *on*. Consider that (66a) entails (66b).

(66) a. Walter turned my radio on.
b. My radio is on.

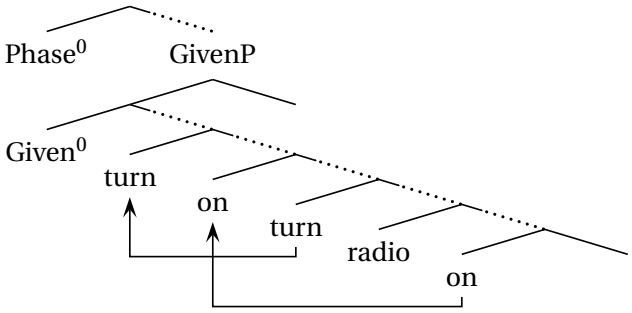
However, as it stands, (65) is insufficient in its predictions about the prosody. In such a structure, with a [Verb Obj Prt] order, *on* is predicted to be the most embedded, regardless of whether *radio* is new information or discourse-given. This prediction is not supported – (51) shows that *radio* bears the phrasal stress when new information, meaning it must be most embedded.

In addition, in order to derive the [Verb Prt Obj] order, this type of analysis typically assumes that *radio* undergoes rightward movement, and that the particle remains in situ. Regardless of where *radio* is moved to, it will move up the tree, and *on* will remain most embedded in the Spell-Out Domain. The makes incorrect prosodic predictions, as we saw that in [Verb Prt Obj] orders, the object bears phrasal stress when everything is new information, as in (52).

Thus, the (limited) conclusions we have drawn about the structures for particle verbs, in light of phrasal stress patterns, are enough to indicate that the traditional small clause analysis of particle verbs is insufficient. We will not attempt to resolve the issue of particle verbs here, but instead will provide an underspecified, alternative hypothesis that is consistent with the general empirical robustness of the small clause analysis, as well as the prosodic facts observed in (51)–(54).

In this alternative hypothesis, we take the predication relationship of the small clause analysis, and argue that there is some kind of predicate-fronting (i.e. the particle raises).

(67) Particle-Fronting Analysis of Particle Verbs (Preliminary)




Additional support for this type of particle movement comes from languages like Hungarian and Dutch, where the particle in particle verbs more obviously moves to a position higher in the structure than (certain copies of) the verb. See Koopman and Szabolcsi 2000 for further details.

The structure in (67) predicts (under standard analyses) a [Verb Prt Obj] order, with phrasal stress falling on the object. There are a number of ways in which this could result in a [Verb Obj Prt] order. First, it could be that (some number of) additional movements (out of the Spell-Out Domain) will yield this order. Being movements out of the phase, it would result in no change to the phrasal stress falling on the object; however, we would need independent motivation for these additional movements.

Alternatively, it could be that the movement of the particle results in linearization of either the higher copy (yielding [V Prt Obj] order), or the lower copy (yielding [V Obj Prt] order). This is appealing, because it would freely predict that where particle is linearized would have no effect on phrasal stress. While this helps us capture the data in (51)–(54), it is insufficient to predict that certain structures *require* the particle to obligatorily linearize in a certain order. Consider (68).

(68) Obligatory [V Obj Prt] Orders

a. Using Wikipedia, the politician looked himself *úp*.

b. ★ Using Wikipedia, the politician looked *úp* himself.

This analysis with variable linearization of the particle seems to predict (68b) to be equally acceptable as (68a). To be more explicit, if *up* is most embedded in (68a), and the only difference it has with (68b) is which copy of *up* is linearized, (68b) should be acceptable.

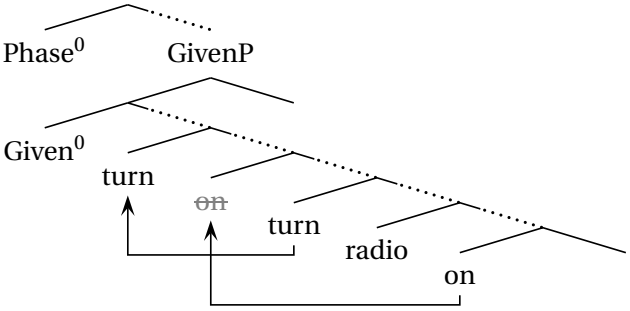
It has been stipulated that this is due to weak elements needing to occur between the verb and the particle. This faces a problem, as it is not clear how phrasal stress ought to be able to influence which copy of the particle is linearized.[38] However, since we already know anaphors to be moving higher in the structure, perhaps we want to derive this from something else.

Let us walk through one derivational possibility. First, let us hypothesize that the [V Obj

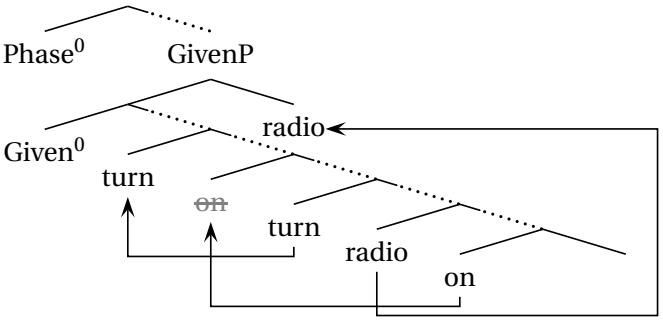
[38] It could be that both orders are generated for (68a-b), but phonology rules it out (68b), based on a well-formedness condition on prosodic phrasing. This possibility is discussed and argued against in Ahn 2015:Ch.4, on the basis of the distribution of focus accents. In short, phonologically focused anaphors with a specific interpretation cannot occur in the [Prt Obj] order – since this would be a phonologically heavy object, a phonological condition would allow this, but it is still ruled out. It is shown that the same conditions that govern extrametrical anaphors as in section 3.2 also govern the distribution of focused anaphors with this special interpretation.

Prt] order is generated if the particle fronting never affects word order (i.e. the lower copy of the particle is always the one linearized). This predicts that the object will bear phrasal stress unless it moves higher than the particle does (as with givenness movement in (53) and reflexive movement in (68a)). The [V Obj Prt] structures with an all-new context and a context with a discourse given object are presented below.

(69) Particle Fronting Analysis of Particle Verbs: [V Obj Prt]

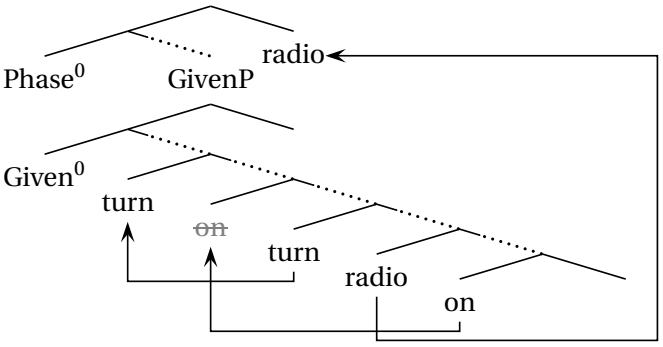



(70) Particle Fronting Analysis of Particle Verbs: [V Obj Prt], Discourse Given Obj



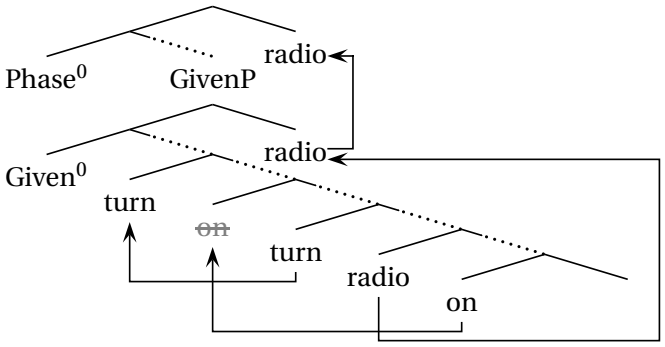

If the particle fronting always results in the lower copy being linearized, more must be said to generate the [V Prt Obj] order. A logical possibility is that, in such cases, the object must move to a position to the right of the particle – not unlike existing analysis of [V Prt Obj] orders, based on a structure like the small clause analysis in (65). Since phrasal stress is not affected by this movement of the object, this position must be outside of the Spell-Out Domain.

(71) Particle Fronting Analysis of Particle Verbs: [V Prt Obj]




In addition, this rightward movement out of the Spell-Out Domain can be fed by givenness movement, in light of data like (54). A derivation for such an example with a discourse given object would proceed as below:

(72) Particle Fronting Analysis of Particle Verbs: [V Prt Obj], Discourse Given Obj




However, reflexive movement should not be able to feed this secondary movement, as (68b) indicates. It is not clear exactly why this should be, though a possible answer lies in the fact that reflexive anaphors are subject to a number of locality and/or c-command restrictions that discourse anaphors are not.

We have now derived the prosodic facts of particle verbs in (51)–(54), as well as (68). At the same time, additional work lies ahead for this kind of approach. While there are many open questions yet unaddressed for particle verbs, this investigation has made several things clear. First, an appropriate derivation that considers phrasal stress indicates that particle verb structures are more complex than posited by simple small clause analyses like the one in (65). Such complexity has already been found on the basis of non-prosodic evidence in other languages, such as Dutch and Hungarian (e.g., Koopman and Szabolcsi 2000). In particular, we know that for both [Prt Obj] and [Obj Prt] orders, the following structural hierarchy is established:

(63) Phase > Given Material > Verb > Particle > Direct Object

One of the major problems for achieving a complete analysis of particle verbs is that there are several independent issues that will play an important role in establishing a more accurate derivation. First and foremost, this paper does not stake any claims as to what operations are available to constrain and determine linear order. For example, do syntactic structures encode linearization with branching order, or is linearization resolved strictly on the basis of c-command? Are remnant movement or other operations such as Richards 2010's Rotate (an option we have not considered here) playing a key derivational role in linearization for particle verb structure? What determines which copy gets linearized?

To conclude our discussion of particle verbs, the prosodic information provided to us by the signal tells us that, at Spell-Out, particles occur between the verb and the direct object – and that this hierarchical ranking is stable across word orders. This is quite different from commonly assumed approaches to particle verbs, and these stress-based conclusions can guide a more complete approach to particle verb syntax.

# 4 Conclusions

We can make two important conclusions based on the phrasal stress data that we have investigated here. The first is that phrasal stress assignment —as governed by the Nuclear Stress Rule in (12), which is defined in exceptionless terms— is sensitive to syntactic phenomena such as islandhood; and so it must be that the NSR takes the syntactic hierarchy (not linearization) of a Spell-Out Domain as input. The second is that, as such, phrasal stress placement can be used as a tool to probe syntactic structure, revealing properties that have remained obscured if the only phonological reflex of narrow syntax that we attend to is word-order.

## 4.1 The Predicate Spell-Out Domain

Elaborating first on this second (and more narrow) conclusion, many previous works (Chomsky 2000 *et seqq.*) consider the phase head for the predicate's spell-out domain to be $v^0$, with little functional structure within its c-command domain. This investigation has revealed that this conceptualization of the structure is too coarse-grained to capture the observed data.

Assuming the verb moves to $v^0$, $v^0$ must not be the lowest Phase head, since it can bear phrasal stress if its complement moves higher within the same shared Spell-Out Domain.[39] More functional structure is needed lower in the clause, within the same phase that includes the predicate, to account for the phrasal stress data, such that discourse-given material, subject-bound reflexive anaphors, (certain) determiners, and verb particles are all hierarchically superior to the direct object position. The hierarchical findings of this paper are summarized in (73):

(73) $$\text{Phase} > \left\{ \begin{array}{c} \text{given material} \\ \text{subject-bound reflexives} \\ \text{N}\rightarrow\text{D Ds} \end{array} \right\} > \text{Verb} > \text{Particles} > \text{Complements}$$

Aspects of (73) have been argued for before, and the distribution of phrasal stress adds weight to these proposals, and provides a more fine-grained view on how they come together.

## 4.2 Syntax / Prosody Interface

Beyond the specific structural analysis of the data, the critical finding of this investigation into the putative exceptions in the syntax-prosody interface in (3a-d) is that each kind of "exception" is subject to syntactic constraints. This leads us to conclude that syntactic structure, and not linear order, is the input to the Nuclear Stress Rule.

This does not discount the importance of phonological principles that might affect the surface realization of phrasal stress, such as a Rhythm Rule (e.g., Kiparsky 1979) or other constraints/rules that are formulated on the basis of phonological primitives. Syntax determines the abstract (underlying) location of stress, and the formal operations in the PF component may manipulate the location of stress realization.

[39] It might be that $v^0$ is a phase head *provided that* there are different types of phase heads. What can be conclusively determined is that $v^0$ is not the type of phase head that triggers phrasal stress assignment (assuming there are multiple types of phase heads, each triggering possibly different operations).

The patterns that we investigated revealed that each of the cases of "exceptionality" in (3a-d) is subject to different constraints (e.g. only reflexive anaphors are sensitive to the grammatical role of an antecedent in determining extrametricality), which interact in a predictable manner. A system in which the syntactic hierarchy of Spell-Out Domains is the input to an exceptionless phrasal stress rule explains this straightforwardly.

This indicates that reducing these phrasal stress patterns to properties of specific words or word classes (e.g. grammatical/anaphoric/functional words versus lexical/referential/content words) is insufficient, despite the commonplace nature of this sort of analysis. This corroborates previous research, such as Shih 2014, in which Shih carefully evaluates computational modeling of corpus data shows that employing a "content"/"function" diacritic on individual words in the mental lexicon is a poor predictor for the degree to which phonetic reduction takes place. The apparent successes of a content-function division, as well as where it fails, can be understood as simply being a result of the syntactic structures, where it tends to be content words that are most embedded in the structure that is transferred to PF after Spell-Out. Thus it tends to be that phrasal stress is assigned to content words, and not function words (to the extent that the division as such even exists), and thus content words will tend to not undergo phonetic reduction.

In light of the attested phrasal stress patterns, we are led to a syntactic model that is more complicated (in the sense that there are more syntactic movements posited), but also to a grammatical system which is as a whole simpler. The principles are not subject to exception, and the interfaces directly reflect (as much as possible) their syntactic inputs. The only mismatches between prosodic structure and syntactic structure will result from principles of grammar, and not exceptions indexed to particular lexical items.[40] Thus, the problem of obfuscation in (6) is only an apparent one, and any putative examples of it instead reveal properties of the grammatical system.

The locus of phrasal stress is providing detectable cues about the structure, for the learner, hearer and theoretician. This resolves the apparent problem of acquiring exceptions in (5). We have taken the strong theoretical position that there are no 'exceptional' phrasal stress patterns (as defined in (8)) that must be learned. Instead, phrasal stress can be used to reliably bootstrap syntax, and we hypothesize that 'simpler' structures that necessitate a stipulated list of unprincipled exceptions at the syntax-prosody interface are less easily learned than these structures which are more complex but involve a principled and transparent syntax-prosody interface.

[40] A potential example of a mismatch arising from grammatical principles is the prosodic structure of a syntactic structure like English [ X [ *'s* Y ]]. In such cases, principle of morphophonology dictate that English genitive *'s* will form a prosodic constituent with X but not Y: (( X*'s* ) ( Y )). Another theoretically possible example of such a predictable mismatch might arise if a Spell-Out Domain contains more levels of syntactic embedding than the number of possible levels of prosodic embedding.

# References


Abney, Steven. 1987. The English noun phrase in its sentential aspect. Doctoral Dissertation, MIT.

Adger, David. 2007. Stress and phasal syntax. *Linguistic Analysis* 33.

Ahn, Byron. 2012. External argument focus and the syntax of reflexivity. *Coyote Papers: Working Papers in Linguistics, Linguistic Theory at the University of Arizona* 20.

Ahn, Byron. 2015. Giving reflexivity a voice: Twin reflexives in English. Doctoral Dissertation, UCLA.

Ahn, Byron. Forthcoming. Reflexes of reflexivity: Locality and the interfaces. *Proceedings from the 50th Annual Meeting of the Chicago Linguistic Society* .

Ahn, Byron, and Laura McPherson. In Prep. A formalization of phonological faithfulness of phrasal phases.

Alrenga, Peter, and Chris Kennedy. 2014. There need be no split scope. Presented at the 2014 Annual LSA Meeting.

Belletti, Adriana. 2001. "Inversion" as focalization. In *Subject inversion in Romance and the theory of universal grammar*, ed. Aafke Hulk and Jean-Yves Pollock. Oxford: Oxford University Press.

Belletti, Adriana. 2004. Aspects of the low IP area. In *The structure of CP and IP*, ed. Luigi Rizzi, volume 2 of *The Cartography of Syntactic Structures*, 16–51. Oxford: Oxford University Press.

Belletti, Adriana. 2005. Extended doubling and the VP periphery. *Probus* 17:1–35.

Bolinger, Dwight. 1972. Accent is predictable (if you're a mind-reader). *Language* 48:633–644.

Bresnan, Joan. 1971. Sentence stress and syntactic transformations. *Language* 47:257–281.

Büring, Daniel. 2013. Syntax and prosody, syntax and meaning. In *The cambridge handbook of generative syntax*, ed. Marcel den Dikken, 860–895. Cambridge: Cambridge University Press.

Cardinaletti, Anna, and Michal Starke. 1999. The typology of structural deficiency: A case study of the three classes of pronouns. In *Clitics in the languages of Europe*, ed. Henk Van Riemsdijk. Mouton de Gruyter.

Charnavel, Isabelle, and Dominique Sportiche. 2014. Anaphor binding domains. lingBuzz/001742.

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

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

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

Chomsky, Noam. 2013. Problems of projection. *Lingua* 130:33 – 49.

Chomsky, Noam, and Morris Halle. 1968. *The sound pattern of English*. New York, NY: Harper and Row.

Christophe, Anne, Marina Nespor, Maria Theresa Guasti, and Brit Van Ooyen. 2003. Prosodic structure and syntactic acquisition: The case of the head-direction parameter. *Developmental Science* 6:211–220.

Cinque, Guglielmo. 1993. A null theory of phrase and compound stress. *Linguistic Inquiry* 24:239–297.

Cinque, Guglielmo. 1999. *Adverbs and functional heads: A cross-linguistic perspective*. New

York, NY: Oxford University Press.
Collins, Chris, and Ed Stabler. To Appear. A formalization of minimalist syntax.
den Dikken, Marcel. 1995. *Particles: On the syntax of verb-particle, triadic, and causative constructions*. New York, NY: Oxford University Press.
Fox, Daniel, and David Pesetsky. 2005. Cyclic linearization of syntactic structure. *Theoretical Linguistics* 31.
Fox, Danny, and Jon Nissenbaum. 1999. Extraposition and scope: A case for overt QR. In *Proceedings of the 18th West Coast Conference on Formal Linguistics*, ed. Sonya Bird, Andrew Carnie, Jason D. Haugen, and Peter Norquest, 132–144.
Féry, Caroline, and Vieri Samek-Lodovici. 2006. Focus projection and prosodic prominence in nested foci. *Language* 82:131–150.
Guéron, Jacqueline. 1987. Clause union and the verb-particle construction in English. In *The Proceedings of the North Eastern Linguistics Society*.
Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from building 20*, ed. Kenneth Hale and Samuel Jay Keyser, 111–176. Cambridge, MA: MIT Press.
Hallman, Peter. 2004. NP-interpretation and the structure of predicates. *Language* 80:707–747.
Harizanov, Boris. 2014. The role of prosody in the linearization of clitics: Evidence from Bulgarian and Macedonian. In *Formal approaches to slavic linguistics 22: The mcmaster meeting 2013*, ed. Cassandra Chapman, Olena Kit, and Ivona Kučerová, 109–130. Ann Arbor, MI: Michigan Slavic Publications.
Harwood, Will. 2013. An existential crisis: understanding the aspectual restrictions on English existential constructions. lingBuzz/001829.
Hoekstra, Teun. 1988. Small clause results. *Lingua* 74:101–139.
Höhle, Barbara. 2009. Bootstrapping mechanisms in first language acquisition. *Linguistics* 47:359–382.
Jayaseelan, Karattuparambil A. 2001. Ip-internal topic and focus phrases. *Studia Linguistica* 55:39–75.
Johnson, Kyle. 1991. Object positions. *Natural Language & Linguistic Theory* 9:577–636.
Kahnemuyipour, Arsalan. 2004. The syntax of sentential stress. Doctoral Dissertation, University of Toronto.
Katz, Jonah, and Elisabeth Selkirk. 2011. Contrastive focus vs. discourse-new: Evidence from phonetic prominence in English. *Language* 87.
Kayne, Richard. 1998. Overt vs. covert movement. *Syntax* 1:128–191.
Kayne, Richard. 2000. *Parameters and universals*. Oxford: Oxford University Press.
Kayne, Richard. 2002. On some prepositions that look DP-internal: English of and French de. *Catalan Journal of Linguistics* 1:71–115.
Kayne, Richard. 2005. Prepositions as probes. In *Movement and silence*, 85–104. Oxford: Oxford University Press.
Kiparsky, Paul. 1979. Metrical structure assignment is cyclic. *Linguistic Inquiry* 10:421–441.
Kishimoto, Hideki. 2000. Indefinite pronouns and overt N-raising. *Linguistic Inquiry* 31:557–566.
Koopman, Hilda, and Anna Szabolcsi. 2000. *Verbal complexes*, volume 34 of *Current Studies in Linguistics*. Cambridge, MA: MIT Press.
Kratzer, Angelika, and Elisabeth Selkirk. 2007. Phase theory and prosodic spellout: The case of

verbs. *The Linguistic Review* 24:93–105.
Larson, Richard K., and Franc Marušič. 2004. On indefinite pronoun structures with APs: reply to Kishimoto. *Linguistic Inquiry* 35:268–287.
Legate, Julie Anne. 2003. Some interface properties of the phase. *Linguistic Inquiry* 34:506–515.
Leu, Thomas. 2005. Something invisible in English. *University of Pennsylvania Working Papers in Linguistics* 11.
McPherson, Laura. 2014. Replacive grammatical tone in the dogon languages. Doctoral Dissertation, UCLA.
Merchant, Jason. 2007. Voice and ellipsis. Ms., University of Chicago.
Merchant, Jason. 2013. Voice and ellipsis. *Linguistic Inquiry* 44:77–108.
Morgan, James, and Katherine Demuth, ed. 1996. *The prosodic structure of function words*. Mahwah, NJ: Lawrence Erlbaum Associates.
Moro, Andrea. 2000. *Dynamic antisymmetry*, volume 38 of *Linguistic Inquiry Monograph*. Cambridge, MA: MIT Press.
Neeleman, Ad. 1994. *Complex predicates*. Utrecht: Onderzoeksinstituut voor Taal en Spraak.
Pinker, Steven. 1984. *Language learnability and language development*. Cambridge, MA: Harvard University Press.
Preminger, Omer. 2011. Agreement as a fallible operation. Doctoral Dissertation, MIT.
Prince, Alan, and Paul Smolensky. 1993. Optimality theory: Constraint interaction in generative grammar. Rutgers University and University of Colorado, Boulder.
Prince, Ellen F. 1981. Toward a taxonomy of given-new information. In *Radical pragmatics*, ed. Peter Cole. New York: Academic Press.
Ramchand, Gillian, and Peter Svenonius. 2002. The lexical syntax and lexical semantics of the verb-particle construction. In *WCCFL 21 proceedings*, ed. Line Mikkelsen and Christopher Potts. Somerville, MA: Cascadilla Press.
Reinhart, Tanya, and Eric Reuland. 1993. Reflexivity. *Linguistic Inquiry* 24:657–720.
Richards, Norvin. 2010. *Uttering trees*, volume 56 of *Linguistic Inquiry Monograph*. Cambridge, MA: MIT Press.
Sailor, Craig. 2014. The variables of VP ellipsis. Doctoral Dissertation, UCLA.
Schwarzschild, Roger. 1999. Givenness, AvoidF and other constraints on the placement of accent. *Natural Language Semantics* 7:141–177.
Selkirk, Elisabeth. 1996. Sentence prosody: Intonation, stress, and phrasing. In *The handbook of phonological theory*, ed. John A. Goldsmith, 550–569.
Selkirk, Elisabeth. 2007. Contrastive focus, givenness and the unmarked status of "discourse-new". In *The notions of information structure*, ed. Caroline Féry, Gisbert Fanselow, and Manfred Krifka, volume 6 of *Interdisciplinary Studies on Information Structure*, 125–145. Universitätsverlag Potsdam.
Shih, Stephanie. 2014. Towards optimal rhythm. Doctoral Dissertation, Stanford University.
Sportiche, Dominique. 2005. Division of labor between merge and move: Strict locality of selection and apparent reconstruction paradoxes. lingBuzz/000163.
Sportiche, Dominique. 2010. French reflexive se: Binding and Merge locality. lingBuzz/001273.
Sportiche, Dominique. 2011. The van Riemsdijk-Williams puzzle: in de Fourier's footsteps. Presented at Parallel Domains: A workshop in honor of Jean-Roger Vergnaud. lingBuzz/001272.
Steedman, Mark. 2000. Information structure and syntax-phonology interface. *Linguistic Inquiry* 31:649–689.

Stevens, Jon Scott. 2014. Against a unified analysis of Givenness and Focus. In *Proceedings of the 31st West Coast Conference on Formal Linguistics*, ed. Robert E. Santana-LaBarge.

Uriagereka, Juan. 1999. Multiple spell-out. In *Working minimalism*, ed. Samuel Epstein and Norbert Hornstein, 251–282. Cambridge, MA: MIT Press.

Wagner, Michael. 2006. Givenness and locality. In *Proceedings of SALT XVI*, ed. Masayuki Gibson and Jonathan Howell, 295–312. CLC Publications.

Wagner, Michael. 2015. Phonological evidence in syntax? In *Syntax – theory and analysis: An international handbook*, ed. Tibor Kiss and Artemis Alexiadou, volume 42 of *Handbooks of Linguistics and Communication Science*. Mouton de Gruyter.

Williams, Edwin. 1997. Blocking and anaphora. *Linguistic Inquiry* 28:577–628.

Zubizarreta, María Luisa. 1998. *Prosody, focus, and word order*. Cambridge, MA: The MIT Press.

# Appendix: More Prosodic Evidence for Structure

## Additional Evidence for Hierarchy Already Seen

The data we saw throughout the paper, when taken together, yielded the hierarchy sketched in (73).

(73) $$\text{Phase} > \left\{ \begin{array}{c} \text{given material} \\ \text{subject-bound reflexives} \\ \text{N}\rightarrow\text{D Ds} \end{array} \right\} > \text{Verb} > \text{Particles} > \text{Complements}$$

Below, more data are provided that more completely argue for this hierarchy. In all examples, the subject is discourse-given, but all else is discourse-new, allowing NSR to apply to the predicate.

(74) Phase > Given > Verb

Q: What does Ron do at the commune? I saw they have a lot of farm animals.

A1: He slaughters *pígs*. *Phase > Verb > Complement*

A2: He *sláughters* farm animals. *Phase > Given > Verb*

A3: #He slaughters *fárm animals*.

(75) Phase > Reflexive > Verb

Q: What did Jenna do when she thought she was dreaming?

A1: She slapped *Líz*. *Phase > Verb > Complement*

A2: She *slápped* herself. *Phase > Reflexive > Verb*

A3: #She slapped *hersélf*.

(76) Phase > N→D > Verb

Q: What did James do at the party?

A1: He kicked *Jón*. *Phase > Verb > Complement*

A2: He *kícked* someone. *Phase > N→D > Verb*

A3: #He kicked *sómeone*.

(77) Verb > Particle > Complement

Q: What's that noise?

A1: My radio automatically turned *ón*. *Phase > Verb > Particle*

A2: Walter turned my *rádio* on. *Phase > Verb, Particle > Complement*

A3: #Walter turned my radio *ón*.

(78) Reflexive > Verb > Particle
Q: What did Lynn do after prison?
A1: She cleaned her *áct* up. *Phase > Verb, Particle > Complement*
A2: She cleaned herself *úp*. *Phase > Reflexive, Verb > Particle*
A3: #She *cléaned* herself up.

(79) Given > Verb > Particle
Q: What did Walter do after Sue bought me a radio?
A1: Walter turned my *prógram* on. *Phase > Verb, Particle > Complement*
A2: Walter turned my radio *ón*. *Phase > Given, Verb > Particle*
A3: #Walter turned my *rádio* on.

(80) N→D > Verb > Particle
Q: What's that noise?
A1: Walter turned my *rádio* on. *Phase > Verb, Particle > Complement*
A2: Walter turned something *ón*. *Phase > N→D, Verb > Particle*
A3: #Walter turned *sómething* on.

## More Hierarchy: Prepositions

Prepositions are merged higher than the position that the verb reaches in the Spell-Out Domain. This is why phrasal stress is not assigned to the Ps, even when they appear to the right of the V at the surface.

(81) Preposition > Verb > Complements
Q: What did James do at the party?
A1: He talked about *cóllege*. *Phase > Verb, P > Complement*
A2: He *tálked* about himself. *Phase > Reflexive, P > Verb*
A3: #He talked *ábout* himself.

It is likely that Ps are located outside of the phase (perhaps above the non-N→D Ds), as they do not interfere with phrasal stress assignment within the lower Spell-Out Domain. (See Kayne 2002 for arguments that Ps are merged outside the VP.)

## More Hierarchy: Pronouns

Pronouns (re-)merge higher than the V and within the Spell-Out Domain. For this reason, a weak pronoun will avoid phrasal stress:

(82) Phase > Weak Pronoun > Verb
Q: What did James do at the party?
A1: He hugged *Wárren*. *Phase > Verb > Complement*

A2: He *húgged* me. *Phase > Pronoun > Verb*

A3: #He hugged *mé*.

Wagner (2006) argues that weak pronouns behave as exceptional because they are discourse-given (when they avoid stress).[41] This seems right: when the referent of a pronoun is *not* discourse-given (as in the case of deictic pronouns), the pronoun *does bear* phrasal stress:

(83) Phase > Weak Pronoun > Verb > Deictic

Q: What did Jack do today?

A1: Jack went to the *Eiffel Tówer*. *Phase > Verb > Complement*

A2: Jack went *thére*. *(pointing at a picture of the Eiffel Tower)* *Phase > Verb > Deictic*

A3: #Jack *wént* there. *(pointing at a picture of the Eiffel Tower)*

A4: Speaking of the Eiffel Tower, Jack *wént* there. *Phase > Pronoun > Verb*

Alternatively, it could be that pronouns external merge in a position higher than the position that the verb reaches in the Spell-Out Domain. Thus they would avoid stress by never being in a direct object position (like some analyses of clitics). For this analysis, deictic pronouns as in (83) must merge in a different location, lower than the verb. Either way, at Spell Out, a non-deictic pronoun is in a position higher than the verb.

## Summary

The new data in this appendix leads us to a more complete hierarchy:

(84) $$\text{Prep.s(?)} > \text{Phase} > \left\{ \begin{array}{c} \text{given material} \\ \text{subject-bound reflexives} \\ \text{N}\rightarrow\text{D Ds} \\ \text{non-deictic pronouns} \end{array} \right\} > \text{Verb} > \text{Particles} > \text{Complements}$$

Further work must be done to confirm this hierarchy, and provide additional refinements to it.

[41] It is also possible that pronouns are exceptional is because they are Ds, which are merged in a position which is not deeply embedded enough (but cf. Cardinaletti and Starke 1999, arguing that English style pronouns are not Ds).