A CVG APPROACH TO VERB-PARTICLE CONSTRUCTIONS IN ENGLISH

THESIS

Presented in Partial Fulfillment of the Requirements for the Degree Master of Arts in the Graduate School of the Ohio State University

By
Lia Vittoria DeMarco Mansfield, B.A. and B.S.
Graduate Program in Linguistics

The Ohio State University
2010

Thesis Committee:
Carl J. Pollard, Advisor
Robert D. Levine
Verb-particle constructions in English have been the subject of considerable syntactic interest for many years. These constructions, hereafter VPCs, are unusual for English because they display a word alternation without any corresponding semantic difference. They should not, however, be taken as a uniform and undivided phenomenon. Rather, verb-particle constructions comprise at least three distinct groups, distinguished syntactically and semantically. Not only do compositional and non-compositional VPCs require different analyses, but the compositional cases may be further divided into Transparent and Aspectual VPCs, which differ in both meaning and internal structure. I demonstrate that Aspectual and Transparent VPCs each have a “natural” word order based on their valence patterns, but that each can take on the syntactic properties of the other via operations within the lexicon itself. The variable word order that characterized all classes of VPC is accounted for by recognizing the different combinatorial systems of word-grammar vs. phrase-grammar. I model all of these alternations in the Convergent Grammar framework of natural deduction style categorial grammar, and introduce a rudimentary morphological component for that framework to capture the necessary interactions below the lexical level.
ACKNOWLEDGMENTS

I would like to give special thanks to my husband, my colleagues, in particular Stephen Boxwell, Vedrana Mihailicek, Christin Wilson, and Chris Worth, and to my advisor Dr. Carl Pollard for all their help, feedback, and support in the completion of this thesis.
VITA

1983 ..........................  Born in Pacific Grove, California

2001 ..........................  John Wesley North Highschool

2006 ..........................  B.A. in Linguistics, University of California, Santa Cruz

2006 ..........................  B.S. in Physics, University of California, Santa Cruz

2006-Present .....................  Graduate Teaching Associate,
                                  The Ohio State University

FIELDS OF STUDY

Major Field: Linguistics

Specialization: Syntax

Specialization: Morphology
# TABLE OF CONTENTS

Abstract ................................................................. ii  
Acknowledgments ......................................................... iii  
Vita ........................................................................ iv  
0 Introduction ............................................................... 1  
1 Background to the Problem ........................................... 1  
2 Previous Analyses ....................................................... 4  
3 Grammatical Status of Particles ..................................... 9  
4 Semantic Distinctions in VPCs ....................................... 17  
5 Syntactic Asymmetries in VPCs .................................... 27  
6 Introduction to the Convergent Grammar Framework ........ 32  
7 A Toy Morphology for CVG .......................................... 39  
8 A CVG Analysis of Compositional VPCs .......................... 42  
9 Idiomatic VPCs .......................................................... 53  
10 Conclusions ............................................................. 56  
References ................................................................. 57
0 Introduction

English is well known for having a comparatively rigid word order. One apparent exception is the case of verb-particle constructions. Verb-particle constructions display a word alternation without any corresponding semantic difference. I argue that the two word orders are the effect of different combinatoric systems in the word-grammar and the phrase-grammar, and that they are therefore structurally distinct. I further argue that although they share this unusual word order alternation, verb-particle constructions comprise at least three distinct groups, distinguished syntactically and semantically.

1 Background to the Problem

I take verb-particle constructions (hereafter VPCs) to be those constructions which involve a verb, a preposition-like particle, and a word order alternation\(^1\) whereby the particle can appear on either side of the direct object (when there is a direct object present).

(1) a. Harvey hung \textbf{up} the picture \\
b. Harvey hung \textit{the picture} up

\(^1\)There are several well-known cases of apparent VPCs which do not display this alternation, such as \textit{count} \textit{X in} and \textit{give off} \textit{X}. These are accounted for in my analysis, and I will discuss them in a later section.
It is important to note that the particle and direct object do not constitute a prepositional phrase under standard notions of constituency and associated tests:

(4)  a. Harvey climbed [up the tree]
    b. [Up the tree] Harvey climbed

(5)  * [Up the picture] Harvey hung

(6)  * Harvey climbed the tree up

Whereas the prepositional phrase *up the tree* acts as a unit, allowing fronting in (4) and disallowing alternative word orders in (6), the verb-particle combination *up the picture* is precisely the opposite. VPCs and PPs are therefore syntactically distinct constructions.

While it is uncontroversial that particle - NP strings in VPCs do not constitute prepositional phrases, very little else about them is free from dispute, including the precise boundaries of the phenomenon. While I do not include resultative constructions in the set of VPCs, even those that display the word order alternation (for instance *push the door open / push open the door*), I do include cases that some analyze as adverbial (e.g. Fraser’s *The dissatisfied customer threw down the dirty dishes* (Fraser 1976)). In general, I am considering exactly those combinations involving a verb and a preposition-shaped particle, regardless of valency, semantics, or word order possibilities. These properties and distinctions will be relevant to my analysis, but not in terms of deciding what is or is not a VPC.
I refer to these combinations via the neutral term verb-particle constructions, or VPCs. I do not use the term “phrasal verb” since that term is often used to refer additionally to verbs which select PPs headed by specific case-marking prepositions - that is, combinations such as rely on. I similarly reject the term “particle verbs” for these constructions because I do not analyze them as a type of verb per se as the particle contributes as much if not more to the combination as the verb does. There has also been much discussion of what category the particle should be assigned. This issue will be thoroughly addressed in the appropriate section, but I will generally refer to them simply as particles. It is a convenient label for a set of well known alternations, but that name should be taken as descriptively convenient, rather than theoretically significant in any way.

The purpose of this thesis is to firstly show that different VPCs require different syntactic analyses, and secondly to show how VPCs generally might be modeled mathematically in a logical deductive framework. Its purpose is not to account for an individual speaker’s choice of word in a give situation, which is best left to information structural accounts such as Dehé (2002). Nor is it to tease apart the precise lexical semantics of specific particles and the differences between them. Rather, I divide VPCs into broad syntactic and semantic classes, and show how such classes facilitate a consistent formal account.

The paper will proceed as follows: section 2 reviews previous syntactic analyses and comments on the ways in which they are inadequate to fully account for the phenomenon. In section 3 I address the question of whether VPCs are morphological or syntactic constructions, concluding that different particles pattern very differently with respect to relevant criteria. In section 4 I lay out and defend three distinct semantic classes of VPC in greater detail, and argue that they warrant different syntactic analyses. In section 5, I point out syntactic asymmetries between the two
available word orders that crosscut the semantic distinctions in section 4. In order
to account for the observations in both sections 4 and 5 it is necessary to draw a dis-
connect between syntactic and semantic combinatorics. Few frameworks allow such a
disconnect, much less contain well-formulated tools for modeling it. section 6 lays out
one framework which contains just such tools: Convergent Grammar (hereafter CVG)
and section 7 introduces a toy morphology for CVG to account for the sub-lexical
behavior of certain particles. section 8 comprises a CVG analysis of compositional
VPCs that takes into account all of the observations of sections 4 and 5. In section
9, I expand my analysis to also address non-compositional VPCs. I end with a few
concluding remarks on the phenomenon and analysis in section 10.

2 Previous Analyses

The standard approach to analyzing these constructions has been to take one word
order as ‘basic’ and the other as ‘derived.’ There are two main threads of theoretical
analysis in the literature, corresponding to the choice of which of the two word orders
to take as ‘basic.’ The first type analyzes the particle as forming a syntactic and
semantic unit with the verb. Ramchand & Svenonius call this the “complex predicate
approach,” adopted by Bolinger (1971), Fraser (1976), Dehé (2002), (more or less)
Farrell (2005) and others. That is to say that in

(7) Harvey [looked up] the number

the number is the direct object of the complex verb look up. Alternatively, one
could say that the particle forms a syntactic and semantic unit with the complement
noun phrase, and that the basic or underlying word order is the one in which the
particle is separated from the verb. Ramchand & Svenonius call this the “small clause approach,” which is in turn favored by Jackendoff (1973), Emonds (1976), den Dikken (1995), Ramchand & Svenonius (2002), and (implicitly) Capelle (2005). This is something of a misnomer, since not all authors who take the separated order as the basic one believe that the NP and following particle constitute a small clause or other type of constituent. In this case, an example like

(8) Harvey looked [the number up]

is analyzed as consisting of the verb looked and its complement(s) the number up.

Under either type of approach, the alternate word order must be derived via some kind of operation. The arguments for and against each of these positions are numerous, and many will be touched on below as they become relevant. One potential compromise is adopted by Svenonius (1996) who puts forth that both word orders are derived from a common, (abstract) third structure. This avoids privileging one word order over the other, but requires two transformations (rather than one) and an additional structure that is never realized.

Each of these approaches tacitly assumes that VPCs can all be treated as a single unified phenomenon. However, a third possible approach is to recognize that VPCs can be divided along both syntactic and semantic lines. For example, Wurmbrand (2000) distinguishes two different types of VPC: Transparent, as in (42)-(44), and Idiomatic, as in (32)-(39). She argues that this semantic distinction corresponds to a syntactic distinction, and that the two classes should be analyzed differently. In her analysis, “transparent particles are licensed in a predicate/argument relation, which is prototypically represented by a small clause structure...Idiomatic particles, on the other hand, are not licensed as small clause predicates but in a local relation...with the verb.” (Wurmbrand 2000). That is to say, she adopts something like a complex
predicate analysis for idiomatic VPCs and a small clause analysis for transparent VPCs.

Wurmbrand justifies this syntactic split along semantic lines by appealing to a series of tests to distinguish her two classes of VPCs syntactically as well. In particular, she points out several uses of transparent VPCs which, she claims, are impossible for idiomatic VPCs. In the following examples, the (a) case is a transparent VPC and the (b) case is an idiomatic one, under Wurmbrand’s characterization.

**Predication:**

(9)  a. Harvey put the cat out
     → The cat is out
  b. Harvey wiped the milk up
     → * The milk is up

Transparent particles can be predicated of the object of the VPC, whereas idiomatic particles cannot be.

**Contrastive particles**

(10)  a. Take the garbage **in** and **out**
  b. * Take the opposition **over** not **out**

(11)  a. Where he should take the garbage is **in** not **out**
  b. * What/how...he should take the opposition is **over** not **out**

---

2Wurmbrand actually makes these claims primarily for German, but she intends them to apply across Germanic. Thus, examples (10) and (11) are hers, and the others are my adaptations of her examples into English. Another of her tests, the ability of the particle to scramble, I have omitted because English does not have scrambling.
Transparent particles can be coordinated and pseudoclefted, whereas idiomatic particles cannot be.

**Topicalization:**

(12) a. I told Harvey to put the cat out, and out he put it
   b. *I told Harvey to eat up his vegetables, and up he ate them

Transparent particles can be fronted or topicalized, whereas idiomatic particles cannot be.

McIntyre (2002) points out two potential problems with this approach. The first is that Wurmbrand classes as idiomatic all VPCs where the particle does not have a transparent (literal spatio-temporal) interpretation. However, there are certain VPCs which are compositionally - but not transparently - formed. Consider:

(13) Harvey ate up his vegetables

In this case the meaning of *eat up* is the meaning of *eat* plus some additional meaning provided by *up*. Because its meaning is made up of the meanings of its parts, *eat up* is compositional. However, the contribution of *up* is aspectual, rather than spatio-temporal. Therefore, by Wurmbrand’s characterization, *eat up* is neither transparent nor idiomatic. Jackendoff (2002) introduces a third class of VPCs, often called aspectual VPCs because the particle seems to contribute a consistent aspectual meaning, rather than a spatial one.

McIntyre’s second objection is that Wurmbrand’s tests are all based on the ability of particles to be topicalized in one way or another. But topicalization depends on the presence of a semantic contrast with the topicalized element. So, for instance,

---

3or, according to some authors, Aktionsart (Brinton 1985).
(14) Bagels, Sandy likes

is only felicitous if there is something else (such as muffins) that Sandy doesn’t like. The ungrammaticality of Wurmbrand’s examples, according to McIntyre, is therefore not a syntactic pattern based on degree of idiomaticity. Rather, the success or failure of Wurmbrand’s tests depends on the availability of contrasting particles in the language’s lexicon. It just so happens that English is rich in contrasting pairs of spatio-temporal particles, but lacks contrasting pairs of aspectual particles. If we were to find a particle meaning something like ‘partially’ to contrast with completive up, McIntyre predicts, sentences like

(15) * It was up that Harvey ate the vegetables

would be perfectly grammatical. As it so happens, German has just such a pair of aspectual particles, ab and an, and they bear out this prediction (McIntyre 2002).

(16) Er hat den Fisch nicht AB, sondern ANgefressen
     He has the fish not AB, rather AN-eaten
     He ate the fish not (completely) up, but rather (partially) up

This German example is only relevant to showcase McIntyre’s criticism that Wurmbrand’s tests are insufficient to motivate dividing transparent and idiomatic VPCs along syntactic lines. Jackendoff (2002) adds the observation that transparent and aspectual particles have categorically different effects on the argument structure of the host verb. With this extra criterion, and a few more that will be addressed in the following section, the three-way split between transparent, aspectual, and idiomatic VPCs can be effectively motivated despite McIntyre’s objections.
Another analysis that proposes multiple syntactic structures for VPCs is that given by Farrell (2005). Unlike Wurmbrand and Jackendoff, however, he does not divide VPCs along semantic lines, saying “it is unclear that very much hinges on degree of idiomaticity” (Farrell 2005). Rather, he takes the two word orders to be syntactically distinct, but takes each one to be uniform across all VPCs. Farrell distinguishes adjacent and separated VPCs — those in which the particle is adjacent to the verb (thus preceding the direct object) versus those in which the particle is separated from the verb (thus following the direct object). He analyses adjacent VPCs as compound verbs, equivalent to compounds like *overlook*, just in the opposite order. Separated VPCs he calls discontinuous verbs, or “lexemes whose pieces are distributed across ordinary syntactic structures” (Farrell 2005). This means that, regardless of the lexical status of the combination, the particle is a complement of the verb in the separated case.

In the following sections I propose a dual (or treble) structure analysis that incorporates the insights of both Wurmbrand’s and Farrell’s approaches. I argue that there are genuine syntactic asymmetries both along three semantic classes of VPCs and across the two word-orders. Firstly, though, it is necessary to determine what the precise lexical and grammatical status of each of these possible combinations actually is.

## 3 Grammatical Status of Particles

The first step in an analysis of verb-particle constructions is to determine whether such constructions are best analyzed word-grammatically or phrase-grammatically. That is to say, VPCs are either morphological constructions or syntactic constructions, and can either be analyzed as constructed in the lexicon or in the grammar. Zwicky
(1985) argues that particles generally (of which those discussed here are a subset) should be analyzed as independent words, operating syntactically at the phrase-level. He identifies several tests for distinguishing full words from affixes, which interact at the sub-word level, and clitics, which are somewhere in between. If taken as an undifferentiated class, particles tend to be classified as independent words by these tests. However, if we take seriously the distinctions put forth by Jackendoff on the one hand and Farrell on the other, Zwicky’s tests start yielding different results for different particles.

**Stress:** Words can carry stress, but affixes and most clitics must be unstressed.

Bolinger (1971) devotes an entire section to the prosodic properties of VPCs, among them, the ability of the involved particles to bear lexical stress. Also of interest is the pattern:

(17)  
\begin{align}  
a. & \quad \text{Harvey looked it up} \\
& \quad \text{b.} \quad * \text{Harvey looked up it} 
\end{align}

Pullum & Zwicky (1983) account for this pattern with the fact that the final constituent in a sentence (or other prosodic phrase) must bear stress. (17b) is unacceptable because *it* cannot bear lexical stress; by contrast (17a) is fine because the particle *up* can. In terms of stress, therefore, postverbal particles behave like full words, not like affixes or clitics.

Note though that this test is only probative for separated particles. The defining characteristic of adjacent particles is precisely that they lie in the (unstressed) position closest to the verb. If we try to force the test via contrastive stress, we find that adjacent particles do not pattern like full words in this case.
(18) * Take IN the bags, not OUT!

(19) Take the bags IN, not OUT!

Bolinger does have examples where an adjacent particle can bear contrastive stress, but in that case the entire verb-particle combination is being contrasted.

(20) He threw OUT the trash and packed IN the bags

With respect to this test, then, separated particles seem to act like full words, while adjacent particles act more like clitics or affixes.

**Word Order:** Full words may display variable order. Clitics and affixes may not.

One of the characteristic properties of VPCs is that the particle may appear either preceding or following the direct object (see examples (1)-(3) above). Also, even when there is independent evidence (to be discussed in greater detail below) that the particle is separated from the verb, it can occur before the direct object via Heavy NP-shift, which would be unexpected for a sublexical unit.

(21) Harvey looked right up the number of the all-night sushi bar where he intended to propose to Sally this weekend.

The presence of *right* identifies this as a separated particle. Since adjacent particles are by necessity prosodically light, there is no way to reverse this test to see if a sufficiently heavy adjacent particle can be moved away from the verb. We therefore cannot draw any conclusions about adjacent particles, but separated particles once more pattern as full words rather than affixes or clitics.
SYNTACTIC INDEPENDENCE: Affixes and clitics never appear as independent words. (Full words, trivially, do.)

Affixes are very specific about the types of lexical items they can combine with. Likewise, the defining feature of clitics is that they cannot stand alone. Particles, however, can occur in a variety of verbless constructions, which we would not expect if they were cliticized or affixed to the verb.

(22) Off with you!
(23) Out!
(24) (With) The kettle on, Harvey was free to greet his guests

Certain particles can be syntactically independent, like full words but unlike clitics and affixes. It should be noted that all of the above are transparent particles. Aspectual and idiomatic particles do not occur in verbless constructions.

(25) a. Harvey ate up his vegetables
    b. * Up with those vegetables, Harvey, or you won’t get any dessert
    c. * (With) His vegetables up, Harvey commenced on the pudding

(26) a. Harvey looked up the number
    b. * Up with that number!
    c. * (With) The number up, Harvey didn’t have to dial 411

4There are a few well-known examples that defy this test, notably -ish, which is fully syntactically independent for many speakers, and the so-called ‘phrasal affix’ possessive -’s, which combines with multi-word phrases. These cases are problematic for any account of the morpho-syntactic interface.
Transparent particles show syntactic independence, after the manner of full words. Aspectual and idiomatic particles, like clitics and affixes, show no such capacity for independence.

These verbless constructions bear on another of Zwicky’s tests for word-hood: “if the distribution of an element is correctly stated in terms of its ability to combine with (potentially) multi-word phrases, it will be a full word” (Zwicky 1985). Within VPCs, I can think of no clear example where a particle combines with a multi-word phrase. These particles seem to combine exclusively with verbs, a category which (unlike the category ‘intransitive verb phrase’) is not syntactically well-defined, but is morphologically well-defined.

(27)  a. Harvey stood
     b. Harvey stood *around*

(28)  a. Harvey ate the vegetables
     b. Harvey *ate up* the vegetables

(29)  a. Harvey gave the book to John
     b. Harvey gave *back* the book to John

This behavior more closely resembles an affix or a clitic than it does a full word. In the verbless constructions above, transparent particles do clearly combine with multi-word phrases, such as combining with an NP to form an initial small clause. Since only transparent particles participate in these constructions, only transparent particles pass this test for word-hood.

**Semantic Idiosyncracy:** Full words contribute the same meaning to all structures in which they appear. Affixes and clitics may be semantically idiosyncratic.
VPCs can often show idiosyncratic and non-compositional meanings.

(30) Harvey stood **up**

(31) Harvey picked his sister **up**

(32) Harvey blew the ship **up**

(33) Harvey cleaned the mess **up**

(34) Harvey wiped the milk **up**

(35) Harvey called the mayor **up**

(36) Harvey shut his class **up**

(37) Harvey gave **up**

(38) Harvey put the tent **up**

(39) a. Harvey backed his friend **up** (in an argument)

b. Harvey backed his paper **up** (on a flash drive)

c. Harvey backed his sink **up** (and had to call a plumber)

d. Harvey backed his truck **up** (into a road sign)

There is no single consistent meaning that can be assigned to **up** in all of the above examples. In particular, the combination *back up* has a different (and apparently) unrelated meaning in each of the last four examples. In (39a) it means something like “support” and cannot be decomposed into the contribution of *back* and of *up*. In (39b) it means something like “create a back-up of” and is related to the corresponding noun in a regular sort of way. In (39c) it means “clog” and shares the middle voice alternation with this paraphrase. There may be some meaning of “back”-ness in that something that is backed up can no longer move forward, but this meaning is not necessarily immediately accessible to the speaker. In (39d) it means “move back”
with a transparent contribution from *back* and an aspectual contribution from *up*. The only thing overtly changing between these examples is what sort of thing the direct object is. It is therefore not reasonable to assign *up* the same semantics in all of these cases. According to Bach (2005) and others, this non-compositionality is characteristic of compounds and (derivational) affixes, rather than words.

“People make up words...of which the strict meanings of some of the ingredients are only one part and sometimes no part at all because the ingredients have no denotational meanings” (Bach 2005). This is a key difference between word meaning and sub-word meanings - and verb-particle constructions seem to pattern with sub-word meanings. Zwicky also makes reference to a parallel idea, attributed to Carlson 1983, that “particle words and their ilk are in fact both MEANINGLESS and NOT LEXICAL ITEMS at all” (Zwicky 1985).

The semantic idiosyncracy and meaningful- or meaninglessness of particles must be evaluated with respect to each of the semantic classes of VPC described above. Transparent VPCs are the simplest case. Transparent particles almost by definition bear their own meaning, and what apparent idiosyncracies they have I show below to not be crucially different from those of their homophonous prepositions. In this way, again, they pattern just as we would expect from full words.

Idiomatic VPCs are just as straightforward. Their defining characteristic is their non-compositionality - neither the verb nor the particle contributes individual meaning independent of the entire combination. There is no semantic reason to treat the two as separate lexical items.

The interesting case is that of aspectual VPCs. They do contribute some meaning, since examples (40) and (41) do not mean precisely the same thing, although the difference between them is subtle.
Harvey finished up his homework

Harvey finished off his homework

While aspectual particles are clearly meaningful, they do not seem to have model-theoretic denotations. The particle *up* has been described as imparting completive aspect (Denison 1985) or telic aktionsart (Brinton 1985), both of which are decidedly sublexical, rather than lexical, sorts of meanings under this approach. Moreover, within aspectual VPCs involving the same particle there is often more semantic idiosyncracy than is usually observed across syntactic constructions (but which often typifies morphological processes). With respect to this last test, then, aspectual particles more closely resemble affixes or clitics than they do full words.

**Summary**

Zwicky’s tests yield different results for different sorts of particles and verb-particle combinations. Separated particles overwhelmingly pattern as full words, while adjacent particles often yield no result. This is evidence in favor of Farrell’s treatment of them as syntactically distinct. Similarly, and cross-cutting this distinction, transparent particles tend to pattern as full words, combining with their verbs in the syntax, while aspectual particles pattern more as sub-lexical units, combining with their verbs in the morphology. Idiomatic VPCs, by their nature, must be listed as single units in the lexicon.
4 Semantic Distinctions in VPCs

As already remarked on above, I follow Jackendoff (2002) in distinguishing three classes of VPC: transparent, aspectual, and idiomatic. Jackendoff’s distinction, however, is purely semantic, and he gives the three classes a uniform syntactic analysis. I take this a bit farther and distinguish these three classes on both semantic and syntactic grounds, as touched upon in part in the previous two sections. Let us begin with the transparent case.

**Transparent VPCs:** fully compositional with spatial (prepositional) particles.

(42) a. Harvey *put* the cat **out**
    b. Harvey *threw* the cat **out**
    c. Harvey *showed* the cat **out**
    d. Harvey *left* the cat **out**

There is a consistent contribution of spatial meaning: each of the above sentences entails that the cat is “out.” This is the fact that Wumbrand is getting at with her predication test, but it is best understood as a semantic rather than a syntactic criterion. In addition, transparent VPCs can be distinguished by the effect of the particle on the valency of the host verb. In these cases, the VPC selects one fewer (PP) valent than the host verb.

(43) a. Harvey hung *the picture* **up**
    b. Harvey hung *the picture* **on the wall**

---

5In general, I will try to give examples of transparent VPCs in the separated word order and aspectual VPCs in the adjacent word order, for reasons that will become fully clear in the next section. I deliberately use both word orders in example (72) because, as I argue in section 9, neither word order is derived from the other in the idiomatic case.
Emonds (1972), Jackendoff (1973) and others analyze these particles as not merely independent words, but in fact intransitive prepositions, not otherwise different from their transitive counterparts. This analysis is motivated by the facts that a) they can be modified by right; and b) they fulfill the selectional requirements of certain verbs that require locative arguments, such as put (Emonds 1972). In many cases they also contribute the same meaning to a sentence as their homophonous (transitive) prepositions (my examples):

(44)  
a. Harvey threw the cat out

          
       b. Harvey threw the cat out the door

The meaning contribution of out when it occurs the prepositional phrase out the door in example (44b) is the same as its contribution in examples (44a) and (42). In examples such as these we can therefore take particles to be intransitive prepositions.

Cappelle (2005) argues against this view, providing numerous examples where particles and full PPs seem to pattern differently. He also brings up the case of under and behind, which he dubs “genuine” intransitive prepositions, but crucially not particles, as they never display the word order alternation.

(45) The waves pulled John under

(46) * The waves pulled under John

His case is somewhat undermined in that under turns out to pattern more like a particle than like a full PP in the contexts where he shows a difference. The following are Cappelle’s examples (81)-(85), showcasing the tests by which he distinguishes particles from full PPs. In each case, the (a) example represents a full PP, the (b)

---

6On the reading where the cat ends up outside, rather than in a trashcan.
example represents a particle, and the (c) example is my own with the intransitive preposition under.\textsuperscript{7}

(47) a. The taking of the hostages to the front of the building (wasn’t a clever idea)

b. ?? The taking of the hostages out (wasn’t a clever idea)

c. * The pulling of John under (was over in an instant)

(48) a. * The taking to the front of the building of the hostages (wasn’t a clever idea)

b. The taking out of the hostages (wasn’t a clever idea)

c. The pulling under of John (was over in an instant)

(49) a. They took the hostages one by one to the front of the building

b. ?* They took the hostages one by one out

c. * The waves pulled John in an instant under

(50) a. It was into the cinema that she fled

b. * It was down that they pushed the piano

c. * It was under that the waves pulled John

(51) a. At the end of the road there was nowhere for him to go but back to his childhood home

b. * At the end of the road there was nowhere for him to go but back

c. * When the waves gripped John, there was nowhere for him to go but under

\textsuperscript{7}The grammaticality judgments on the (a) and (b) examples are Cappelle’s as well. Some speakers (myself included) find all of the sentences in (51) acceptable; I have nevertheless starred the (c) example to show that it is at least no better than the (b) example.
If there were the sharp categorial difference between intransitive prepositions and particles that Cappelle claims, *under* should pattern with the full prepositional phrases, but instead it patterns with the particles against the PPs. This suggests that something other than prepositionhood vs. particlehood is causing the difference in acceptability between the (a) and (b) examples above. It may well not even be syntactic. Examples (47), 50) and (51) each have the particle or PP in some kind of focus, and are rendered much more acceptable when there is an explicit contrast.

(52) The marching of the hostages IN rather than OUT was their fatal mistake.

Examples (48) and (49) rely on the comparative prosodic lightness of particles and the comparative prosodic heaviness of full PPs. The fact that a contrastive pitch accent can make the particles (and *under*) acceptable in the other cases suggests that the other three examples can be explained in the same way. Bolinger (1971) notes a similar phenomenon which allows a pronoun to follow a particle if it bears a contrastive pitch accent:

(53) No no no — I told you to put away THEM!

In light of these data, it is reasonable to take transparent particles at face value as prepositions. By this I do not mean to imply or otherwise suggest that they are reduced forms of full prepositional phrases. Nor am I making a point about a fundamental underlying identity. In the current framework, as in most categorial grammars, the notion of syntactic category is entirely based on combinatory potential. As I alluded to above, there need not be any syntactic category corresponding to many traditional lexical categories. Hence, predicative PPs and PP adjuncts belong to distinct syntactic categories, though they can be related via a lexical rule. Therefore arguing whether or not a postverbal partial ‘really is’ some type of preposition is not extremely meaningful in this sort of a framework.
Rather, calling transparent particles intransitive prepositions means that they will be assigned the same syntactic type as full PPs - specifically predicative PPs rather than PP adjuncts. This is because transparent particles can occur as the predicates of small clauses in examples like the following (repeated from above).

(54) a. Harvey put the kettle on

b. (With) The kettle on, Harvey was free to greet his guests

(55) a. Harvey put the casserole in the oven

b. (With) The casserole in the oven, Harvey was free to greet his guests

Unlike, eg, Ramchand & Svenonius (2002), I am not claiming that the (a) examples constitute prepositional small clauses, only the (b) examples. The fact that transparent particles fill an argument slot mediates against them sharing the type of PP adjuncts, as does the fact that they cannot be reordered with respect to (other) PP adjuncts (examples due to Cappelle (2005)).

(56) a. She looked up to the sky

b. * She looked to the sky up

a. He walked down towards the picnic ground

b. * He walked towards the picnic ground down

One last objection to analyzing transparent particles as intransitive prepositions is that they are not necessary as strictly literal as one might like to assume. Consider the case of gulp down. This looks like a transparent combination, but the action of gulping down does not entail that anything actually moves downwards in space:
Hanging from the monkey bars by our knees, we thirstily gulped down the water.

In this case the water has not moved downwards in space; rather, it has moved upwards. On the other hand, we might take the down that appears in *gulp down* to mean something like “stomach-wards.” Put another way, it is down with respect to the contextually salient coordinate system based on the orientation of the person whose deictic perspective is being reported, rather than the more conventional one. In fact, there is a class of verbs of hearty ingestion which all combine with this usage of down: *gulp down, wolf down, scarf down, gobble, down, choke down, drink down, chug down* and so on, as well as related uses in *keep (the food) down or (the food) stays down*. This use of *down* contrasts with a use of *up* in the same coordinate system (that is, meaning “in the direction away from the stomach”) that we see in *throw up, cough up, hack up* etc. We see this in things like:

Well, the beer is down for now — we’ll see if it comes back up again.

Even though the *down* in this case may not at first seem be the same as the down in, for instance *put down*, it still denotes a spatio-temporal region, and the meaning of *gulp down* is the sum of the meanings of *gulp* and *down*. Hence, *gulp down* is still compositional and largely transparent.

It is not unusual cross-linguistically for prepositions to be interpreted with respect to some contextually given orientation - often provided by the human body, as we see here with both *put down* and *gulp down*. Others for which this orientation is relevant in English include *left, right, forward* and *backward*.

There are other marginal cases which can be understood as extensions of a core spatial meaning along one or another of Lakoff & Johnson’s metaphorical concepts.
(such as “UP is GOOD”). This sort of extension does not prevent a combination from being transparent any more than it prevents a normal (transitive) preposition from being prepositional. It is important to note that I am in no way claiming that all particles are metaphorical extensions of spatial prepositions, as is sometimes appealed to in order to account for aspectual and idiomatic meanings - but it would be just as falacious to say that such extensions never occur.

Aspectual VPCs: compositional with aspect-like meanings for the particles

(59)  
a. Harvey ate up his vegetables  
b. Harvey cleaned up the mess  
c. Harvey bought up the last of the fireworks  
d. Harvey used up all his frequent flier miles

Here there is a consistent contribution of completion. In each case, the sentence entails that its direct object is gone now. If Harvey still has carrots on his plate, sentence (59a) is false, and likewise for the rest of the examples in (59). A different particle would license slightly different entailments.

In terms of argument structure, the VPC selects the same number and types of valents as the host verb. That is to say, the presence or absence of an aspectual particle has no effect on the syntactic type of the verb.

(60)  
a. Harvey ate the vegetables up  
b. Harvey ate the vegetables

Although the particle does not affect the valency of the verb, the valency of the verb can affect the acceptability of the particle.
(61) Harvey ate

(62) ? Harvey ate up

This is because aspectual *up* is usually only compatible with a telic environment. Intransitive *eat* strongly privileges an atelic interpretation, while transitive *eat* does not, or, if anything, privileges a telic interpretation.

(63) a. ? Harvey ate in an hour
    b. Harvey ate for an hour

(64) a. Harvey ate his vegetables in an hour
    b. ? Harvey ate his vegetables for an hour

The perceived telicizing (or atelicizing) effect of aspectual particles observed by Brinton (1985) and others is a result of this condition on compatibility, since aspectual *up* will strongly privilege a telic reading when it combines with a verb of neutral telicity. This effect can be seen with non-particle combinations as well (examples due to Cappelle (2005)):

(65) a. She walked across in seven days
    b. *She walked across for seven days

(66) a. She walked across the desert in seven days
    b. She walked across the desert for seven days

(67) a. She walked across the entire desert in seven days
    b. *She walked across the entire desert for seven days

(68) a. *She walked across desert land in seven days
    b. She walked across desert land for seven days

24
The particle should not be analyzed as telicizing in itself, because the combinations are still compatible with expressions showing partiality or progressive aspect:

(69) I’ve been using up my frequent flier miles for months now
(70) I’ve cleaned the room up a bit, but it’s still very dirty inside
(71) She heated up the soup for a minute

Cappelle analyzes aspectual *up* as “resultative in the sense that it directs the hearer’s attention, not to the event itself, but to whatever salient result the event produces” (Cappelle 2005). What is important to my purposes is that it is the particle that enforces selectional restrictions on the verb, and not the other way around. Just as *up* is only compatible with (potentially) telic predicates, so is *around* only compatible with (potentially) atelic predicates. Each particle determines what sorts of verbs it can combine with, and so aspectual particles should be treated as functors in the semantics, rather than arguments.

Hearkening back to section 3, this should not be a surprising result. If aspectual particles are, as I claim, morphological units rather than syntactic ones, they are best analyzed as functions from verbs into verbs, rather than verbal arguments.

**IDIOMATIC VPCs: Non-compositional**

---

8This is not the case in German, where the roughly synonymous particle verbal prefix *herum* has no such selectional restrictions. McIntyre (2002) sees this difference between the two languages as a major problem, and uses it as evidence that aspectual VPCs are only “semi-productive.” I see no reason why the constructions should be identical in the two languages, and maintain that aspectual VPCs are in fact extremely productive within the boundaries of this telicity restriction. For instance, examples such as

*Send me what you have on the program so far and I’ll LaTeX it up for you*

argue against all these forms being listed. Impossible combinations are due to an incompatibility of the lexical semantics of the verb with the aktionsart required by the particle, not semi-productivity or any other idiosyncratic restrictions.
There is no consistent meaning contribution from the particle. Moreover, the VPC and the host verb do not have obviously related valence.

A full analysis of idiomatic VPCs is given in section 9. The conclusions of this section are that transparent particles are best analyzed as predicative PPs, combining via normal syntactic means, whereas aspectual particles are not words at all, but post-verbal affixes supplied by the morphology.

It is in fact possible to distinguish four classes of VPC based purely on degree of idiomaticity: those which entail the (spatial) meaning of the particle, those which entail the verb, those which entail both, and those which entail neither (Bannard et al. 2003). The latter three of these are recognizable as aspectual, transparent, and idiomatic, respectively. The first case, which I will not be addressing separately, consists of those combinations where the presence of a particle forces a verbal interpretation of an item that is not traditionally understood as a verb. This can occur for both transparent and aspectual particles.
McIntyre (2002) appeals to the notion of “niches” with individual construction-specific meanings, to which new forms can be analogically added - such as the case of *down with verbs of hearty ingestion that I discussed above. I have very little to add to this, except the following: Firstly, apparent construction-specific meanings can often be inferred from context, as I discussed above, obviating the need for either constructions or niches as theoretical primitives. Secondly, the coercion of lexical items into unfamiliar argument structures is by no means limited to VPCs.

A sufficiently rich account of N-to-V conversion and of argument structure alternations to predict the strictly prepositional cases should also capture the particle cases without difficulty.

The analysis given above accounts for the patterns in valence, but does not account for the word order alternation. For that, I turn to Farrell (2005).

5 Syntactic Asymmetries in VPCs

If transparent particles always followed the direct object, like prepositional phrases, and aspectual particles always preceded it, like sublexical parts of the verb, then we
wouldn’t need to say any more about them than to assign them to the appropriate categories. However, despite their differences, all three types of VPC display the same word order alternation. Transparent, aspectual, and idiomatic particles can all show up both adjacent to and separated from the verb. Moreover, there are no differences in meaning between the two available word orders. There are, however, syntactic asymmetries between them (examples and judgments based on Farrell 2005).

**Modification:**

(78) a. Harvey hung the picture right up  
    b. *Harvey hung right up the picture

(79) a. Harvey ate the vegetables all/right up  
    b. *Harvey ate all/right up the vegetables

(80) a. Harvey turned the lights the heck off  
    b. *Harvey turned the heck off the lights

(81) a. Harvey looked the number right up  
    b. *Harvey looked right up the number

The (a) examples, featuring the particle separated from the verb, all admit syntactic modification, while the (b) examples, where the particle is adjacent to the verb, do not. Put another way, a separated particle may project a phrase, while an adjacent particle may not (eg Cappelle 2005, Pollard & Sag 1987). This is consistent with the finding from section 3 that separated particles behave like full words, and thus can be expected to participate in phrase-grammatical structures, whereas adjacent particles

---

9Cappelle 2005 claims that the separated order has a greater resultative connotation than the adjacent order. This distinction is much subtler than the level I am considering.
behave like word-grammatical objects - clitics or affixes, or the second member of a compound (Farrell 2005).

**COORDINATION:**

(82)  

a. She turned these lights on and those lights off  
b. She took the newspaper in and the cat out  
c. She told my brother about the movie and my sister about the play  
d. *She turned on these lights and off those lights  
e. *She took in the newspaper and out the cat

Again, this asymmetry is predicted if we give the two word orders distinct syntactic structures - specifically, if the separated particle is a normal (predicative) PP, but the adjacent particle is of some other type of object which cannot be separated from the verb, like an affix or clitic. Moreover, this category has to be blind to the selectional requirements of the verb. Rather than attaching at the level of, say, the transitive verb phrase, these particles are always adjacent to the verb, regardless of how many arguments it selects. Reproduced from example (27).

(83)  

a. Harvey stood  
b. Harvey stood *around

(84)  

a. Harvey ate the vegetables  
b. Harvey ate *up the vegetables

(85)  

a. Harvey gave the book to John  
b. Harvey gave *back the book to John

In example (83) there is no transitive verb phrase, so the particle must be licensed by an intransitive verb. Example (84) is the transitive case primarily discussed in
this paper. Example (85) shows that ditransitive verbs license particles in the same way as intransitives and simple transitives, whatever that may happen to be. In all cases, the particle has the same properties whatever the valence of the host verb. We therefore require a mechanism that will allow the particle to occur immediately following the verb, no matter what else the verb selects for.

This is exactly the behavior we expect of a sub-lexical unit, which would interact with the morphological category of verb, rather than with syntactic a syntactic category which will be different in each of the three cases.

**AFFIXATION:**

Farrell further supports this approach with real-world data showing (necessarily adjacent) particles being realized inside of derivational morphology. The (b) examples are mine.

(86)  
\begin{align*}
a. & \text{You might want to unplug the VCR and then } \textit{re-plug in} \text{ the unit} \\
  b. & \text{?You might want to unplug the VCR and then } \textit{re-plug} \text{ the unit } \textit{in} \\
\end{align*}

(87)  
\begin{align*}
a. & \text{The plumber will be out on Monday to } \textit{re-hook up} \text{ the washer and dryer} \\
  b. & \text{?The plumber will be out on Monday to } \textit{re-hook} \text{ the washer and dryer } \textit{up} \\
\end{align*}

Since these particles are also realized outside of inflectional morphology, this creates a bit of a paradox (since derivational morphology is typically understood to apply inside of inflectional morphology), the resolution of which is outside the scope of this investigation.

Farrell writes “Although the re-V-DP-P pattern does occur, it is quite rare” (Farrell 2005). His analysis, which takes the separated case to be a discontinuous lexeme, does not provide any particular reason why the (b) examples should be less acceptable, but speculates that it would require an affix attaching to a phrase rather than a word.

Bob Levine (personal communication) points out that this order is not as rare as Farrell makes it; it is nevertheless the less common configuration.
(88)  a. ... after which it has to go back to the source server to *re-look up* the domain name

   b. ?...  after which it has to go back to the source server to *re-look* the domain name *up*

The prefix *re-* affixes equally well to transparent, aspectual, and idiomatic VPCs, provided the particle is adjacent to the verb. Likewise,

(89)  a. Bring a *pin-upable* or projectable version of this artifact

   b. Construct an *un-mess-upable* drawing of triangles

   c. I am considered to my friends and family the most reliable (and *un-shut-up-able*) source

   d. *...rip-offable* GIF and JPEG files...

In this example, the particle is sandwiched between the verb and the adjectivalizing suffix *-able*, often with the prefix *un-* as well for good measure. In each of these cases the adjacent particle is clearly operating on a word-grammatical level, regardless of its semantics.

Overall, adjacent particles systematically behave in a manner consistent with affixes, while separated particles behave just like (prepositional) phrases.

To summarize these two sections, dividing particle verbs along semantic lines and examining the asymmetries of the two available particle positions both suggest assigning different syntactic categories to different particles. However, the conclusions from these two sections crosscut each other, producing mismatches in two of the four compositional cases. The table below summarizes these findings:
Each of the cells in the above table represents one of the possible combinations of semantic class and word order for VPCs, six in all. The two problematic cases are the transparent adjacent (90) and aspectual separated (91) cases:

(90) Harvey hung up the picture
(91) Harvey ate the vegetables up

The observations in section 4 suggest that the up in (90) is a predicative PP, because it is transparent, and the up in (91) is morphological - a postverbal affix or clitic - because it is aspectual. On the other hand, the observations in section 5 suggest precisely the opposite - that the adjacent particle is the sublexical thing and the separated particle is a predicative PP. In order to account for all six cases, we need to be able to capture this mismatch between evidence from the syntax and from the semantics.

6 Introduction to the Convergent Grammar Framework

The formal framework I employ to tackle these problems is Convergent Grammar or CVG (Pollard 2008). I have chosen this framework because it is simultaneously
mathematically precise and flexible enough to capture the mismatch between the syntax and semantics that characterizes this problem. CVG is a multimodal type-logical grammar in which linguistic expressions are modeled as proof terms that represent ordered triples of the phonology, syntax, and semantics. The semantics and syntax are built up in parallel, but I am going to assume that the phonology is functionally\textsuperscript{13} derived from the syntax. This parallel derivation of the syntax and semantics is the crucial advantage of this framework in handling the type of mismatch described above. These proof terms are built from lexical entries (the axioms of the system) via standard rules of natural deduction. A typical lexical entry might look like:

\[
\vdash /hAô.vi/, Harvey, h: \text{phon, NP, e} \vdash
\]

This is read “It is an axiom that there is a lexical item Harvey of syntactic type NP\textsuperscript{14} that denotes the constant h of semantic type e and which is pronounced /hAô.vi/.” All phonological objects are taken to be of type phon and do not, for present purposes, participate directly in the derivation of linguistic expressions. This will no longer be the case, however, when discussing the word-grammatical component of the framework in the next section.

It is worth noting that this is a highly lexicalist framework, with the lexical items bearing most of the combinatorial information as axioms of the logical system. Such a system does not permit any optionality of combination - either a theorem can be derived from the axioms or it cannot be. Thus, things like optional arguments must

\textsuperscript{13}Phon, the phonetic interpretation of an expression, need not necessarily be a function, but it is minimally a relation. This distinction does not impact the analysis given here.

\textsuperscript{14}NP is technically a supertype that abbreviates (for English) the type Nom $\cup$ Acc $\cup$ Gen. Harvey should really be of type Nom $\cap$ Acc, since it can appear as either a subject or an object, taking the right or left projection as necessary in either case. For the purposes of this paper, this degree of detail is irrelevant, so I will treat all noun phrases as being of type NP, regardless of where they appear in the sentence.
be encoded in the selectional requirements of distinct lexical items. The distinction between transitive and intransitive *eat* mentioned in section 4 must be treated as a case of separate words each with its own valence, rather than a single verb *eat* which optionally selects a direct object. This restriction leads to a proliferation of lexical items, but eliminates any ambiguity of application.

Local dependencies are modeled via implication elimination rules (*modus ponens*). Thus, we can combine *Harvey* with other axioms to prove larger linguistic expressions. Take, for instance, the following lexical entry:

\[ \vdash /\text{slips/}, \text{sleeps, sleep'}; \text{phon, NP} \rightarrow S_{\text{fin}}, e \rightarrow t \not\vdash \]

The \( \rightarrow \) represents linear implication, which is the primary way in which linguistic elements are combined. This is a multimodal framework, so there are multiple modes of combination, represented by different "flavors" of implication. In this case, the connective is \( \rightarrow S \), which represents the way in which things combine with their subjects. The entire formula can therefore be read off as "*sleeps* is the type of thing that combines with an NP subject to form a finite sentence (*S_{\text{fin}}*)." These connectives are subscripted with grammatical function names based on the idea that expressions combine differently depending on the grammatical function of the thing they’re combining with. In English there is reason to believe that expressions combine differently with subjects and with complements (for instance, subjects always linearize to the left of the thing that selects them), and so we have different modes of combination for the two grammatical functions. We can formalize this with implication elimination rules, given below:
Subject Modus Ponens (Pollard 2008)

if

\[ \vdash a, c : A, C \rightarrow \text{ and } \vdash f, v : A \rightarrow_\text{s} B, \ C \rightarrow D \rightarrow \]

then

\[ \vdash (Sf a), v(c) : B, D \rightarrow \]

This means that if you have an expression \( f \) with meaning \( v \) that wants something of type \( A, C \) as a subject to be an expression of type \( B, D \) and another expression of type \( A, C \), you can prove the existence of an expression of type \( B, D \). Informally, this says that expressions that select subjects can combine with other expressions of the appropriate type to produce expressions that no longer select subjects. In other words, this is simply the formal mechanism for taking subject valents.

Because in English subjects appear to the left of the things that select for them, we define the Phon function for subjects as follows:

\[
\text{Phon}(S a f) = \text{Phon}(a) + \text{Phon}(f)
\]

where + is the concatenation operator, corresponding to immediate linear precedence. This says that the pronunciation of an expression that has selected a subject is the pronunciation of the subject immediately followed by the pronunciation of the selecting expression. Moreover concatenation involves something like a phonological bracket erasure, so we can say:

**Concatenation**: +

\[
/ A \mid + \mid / B /
\]

\[
/ A \ B /
\]

where \( A \) and \( B \) are phonological representations. This says that if you have two
phonological objects joined by the concatenation operator, they can be treated as a single phonological object with the linear order of the subparts preserved. This ensures that no other material can intervene between two objects joined by the concatenation operator.

We can now prove the sentence *Harvey sleeps* using the axioms and rule schemata given above:

\[
\vdash Harvey, h: \text{NP}, e \vdash \text{sleeps, sleep}' ; \text{NP} \rightarrow_S S_{fin}, e \rightarrow t \vdash
\]

\[
\text{SMP}
\]

\[
\vdash (S Harvey sleeps), \text{sleep}'(h): S_{fin}, t \vdash
\]

The phonological component of the triple is given by:

\[
\text{Phon}(S Harvey sleeps) = \text{Phon}(Harvey) + \text{Phon}(sleeps) = /hAô.vi/ + /slips/ = /hAô.vi slips/
\]

The complete proof term is then:

\[
\vdash /hAô.vi slips/, (S Harvey sleeps), \text{sleep}'(h): \text{phon}, S_{fin}, t \vdash
\]

This is read “it is a provable theorem of English that there is an expression *Harvey sleeps* of syntactic type $S_{fin}$ (finite sentence) whose meaning is given by $\text{sleep}'(h)$ of type proposition, and which is pronounced */hAô.vi slips/*.”

We can likewise define Complement Modus Ponens to model dependencies between verbs and their complements.

**Complement Modus Ponens** (Pollard 2008)

if
$\vdash a, c : A, C \rightarrow 15$ and $\vdash f, v : A \circ C B, C \rightarrow D \vdash$

then

$\vdash (f \ a^C), v(c) : B, D \vdash$

This is precisely the same rule schema in the syntax and semantics as Subject Modus Ponens, except for the subscripted $C$ designating the complement, rather than subject, mode of combination. However, in English, subjects and complements differ in how they get spelled out in the phonology.

Complements in English appear to the right of the thing that selected them. Moreover, an expression may select several complements, but only one subject, so their linearization with respect to each other also needs to be determined. Dowty (2006) argues that verbs take their most oblique arguments first, which then get appropriately linearized in the phonology via “Wrap.” I will follow this analysis and say that $\text{Wrap} \ (\circ_w)$ is the phonological interpretation of complement modus ponens in English.

$$\begin{align*}
\text{Wrap:} & \quad \circ_w \\
& \quad (a, b) \circ_w c \\
& \quad (a, c + b)
\end{align*}$$

where $a$, $b$ and $c$ are phonological objects (terms of type phon). I use $\cdot$ to create ordered pairs of phonological objects. This differs from concatenation because there is no phonological bracket erasure, and so later material may intervene between two objects joined by $\cdot$ (but not between two objects joined by $+$). This is necessary

$15$Throughout I will omit the phonological component in derivations, to be calculated from the syntactic component at the end.

37
because what wrap does is to cause a third phonological object to intervene between two objects joined by ,

\textbf{Pairing}^{16}: ,

\[
/\text{A}/, /\text{B}/
\]

\[
/\text{A}/ /\text{B}/
\]

where A and B are phonological representations, as above. This preserves an insertion point for later applications of wrap in second position. Hence, the schema shown above is technically \textit{right} wrap (which is the version of wrap appropriate for English) because the wrapped-in item concatenates with the thing to its right, but preserves the , to its left. This means that subsequent material will always be interpreted to the immediate right of the leftmost element in the relevant string. The practical upshot of this is that complements will linearize in the reverse order of the order in which they were selected. The phonological interpretation of the complement mode of combination is therefore:

\[
\text{Phon}(f \ a^C) = \text{Phon}(f) \circ_w \text{Phon}(a)
\]

^{16}Two additional clean-up rules are required to ensure that , works properly with respect to + and \(\circ_w\). The first issue is that every verb must have a first complement, which under this formulation lacks an insertion point. So we have to allow vacuous wrapping — that is to say, wrapping around the empty string:

\[
/\text{v} /\circ_w /\text{c}/
\]

\[
/\text{a}, /\text{c}/
\]

where \(\epsilon\) represents the string of length zero. The second thing we need to be able to do is to remove the , so as to not leave gaps in the phonological representation. For this, we just say:

\[
/\text{a}, /\text{b}/
\]

\[
/\text{a} + /\text{b}/
\]

That is to say, pairing can always be simplified to concatenation.
For a thorough defense of why Wrap is the appropriate linearization strategy for complements in English, see Dowty (2006) and earlier works. The effect of the reverse linearization in particular will be crucial for my analysis of the word order variation in verb-particle constructions.

7 A Toy Morphology for CVG

I have put forth that certain particles should be understood as independent words, while others should be understood as sub-lexical or morphological units. In order to make sense of this alternation, we need a theory of morphological combinatorics in addition to a theory of syntactic combinatorics.

I follow Bach (1983) and others in taking morphology and syntax to be distinct components of the grammar, often termed word-grammar and phrase-grammar respectively. Like expressions in the phrase-grammar, expressions in the word-grammar must minimally have a tecto-grammatical level for basic combinatorics, a pheno-grammatical level for issues of linear order and pronunciation, and a semantic interpretation. Under this view, the morphology-syntax interface is a function \( \mathcal{I} \) from the word-grammar to the phrase-grammar. That is to say, certain word-grammatical elements may, but need not, correspond to phrase-grammatical axioms: precisely those things that we call “words” or “lexical items.” Notably, not every expression in the word-grammar is a lexical item in this sense.

I am assuming an Item and Process style of morphology, in which “words” are expressions with atomic types and “morphemes” or “morphological processes” are expressions with functional types. This is accomplished by making the pheno-side of the morphological triple lambda terms over formatives. The typing system in the word-grammar is wholly distinct from the typing system in the phrase-grammar.
For example, there is one basic pheno type, wd, for those expressions which have independent pronunciations (phonological words).\textsuperscript{17} Morphemes (or morphological processes), which we do not understand as having independent pronunciation, are of pheno type wd \(\rightarrow\) wd. Take, for example, the English derivational affix -ness, which might be expressed as follows\textsuperscript{18}

\[ \vdash \lambda \Phi (\Phi + /n\text{ess}/) : \text{wd} \rightarrow \text{wd}; \text{NESS}: \text{a} \rightarrow \text{n} \]

Here, \(\Phi\) is a variable of type wd ranging over phonological terms. I use all-caps to represent tecto terms, which may be abstract morphemes, and lower case roman letters for morphological types. The expression above can combine with an expression of type a - an adjective such as \textit{good} - to produce an expression of type n.

\[ \vdash /g\text{ood}/ : \text{wd}; \text{GOOD}: \text{a} \]

In order to combine these, we need a \textit{modus ponens} rule of the same sort we used for syntactic combination above. \textbf{Morphological Modus Ponens}

If

\[ \vdash \Phi : \phi; \text{L}: \text{l} \text{ and } \vdash \text{p}: \phi \rightarrow \psi; \text{M}: \text{l} \rightarrow \text{m} \]

then

\[ \vdash \text{p}(\Phi):\psi; \text{f}(\text{L}, \text{M}): \text{n} \]

Applying this, we can combine the word \textit{good} with the affix -ness straightforwardly.

\textsuperscript{17}I use the term “phonological word” somewhat informally - fully worked-out prosodic system should eventually replace the skeleton I am sketching out here.

\textsuperscript{18}This is only a toy morphology, limited to only what it strictly needs to address the problem at hand. For notational ease, therefore, I omit the reverse turnstiles needed to introduce the cocontext in the phrase-grammatical component.
As I discussed earlier, the categories that are syntactically relevant can be very different from the categories that are morphologically relevant. While there may be no reason to treat one-, two-, and three-placed predicates as comprising a single syntactic category, the notion of “verb” is useful for word-grammatical combinatorics. The ability of an expression to combine with the progressive affix -ing is not particularly influenced by its valence, but does correlate with its ability to combine with other verbal inflections. The morphological system of English is such that the morphological logic requires many more basic types than does the syntactic logic, and there is no direct correspondence between these two.

Because syntactic (tecto) types cannot be derived functionally from morphological (tecto) types, the fully worked out system will require some kind of syntactic (and semantic) bookkeeping in the lexicon which does not participate in word-grammatical combinatorics. Likewise, it will also need to include information about argument structure and lexical semantics, but formalizing those aspects is outside the scope of this investigation. On the semantic side of the triple, it will be sufficient for my present purposes to give the word-grammar the same semantics as the phrase-grammar. Apart from that, the precise nature and mechanics of 3 must remain a black box. One thing that can be said, though, is that its domain does not cover the entirety of the word-grammar. Only expressions which are “words” can have corresponding expressions in the phrase-grammar. That is, the function 3 maps atoms of the word-grammar to axioms of the phrase-grammar. The above example
with -ness is functional in both its pheno and its tecto types. This need not be the case - a type mismatch here might be one way to account for, say, phrasal affixes and other such marginal phenomena. For simplicity of representation, I am going to say that only expressions of phonological type wd are in the domain of the interface function ℑ.

In distinguishing separate grammars for morphological and syntactic combinatorics, one last point is crucial. In syntax, expressions and rules are expected to be completely productive and exceptionless. That is, if a rule can legally apply, its result is part of the language. This is not true of morphological rules and expressions. A function cannot be expected to apply to every expression in its domain. This is the most important and fundamental difference between Syntax and Morphology: morphology need not be productive or compositional. Smirniotopoulos and Joseph (1998) describe such lexical rules as “one-time-only rules”, which are “not a ‘generative’ rule in the strict sense but rather only in the sense that it provides a pattern for producing new words that may or may not be ‘enshrined’ more permanently in the lexicon” (Smirniotopoulos & Joseph 1998). It is notationally convenient to model word-grammar as if it were a proof-theoretic derivational/generative logical system of the same character as the phrase-grammar, but that is all it is. It is important to remember that the productivity and compositionality that follow necessarily from genuine formal logics can not be assumed for this morphological ‘logic.’

8 A CVG Analysis of Compositional VPCs

Armed with these tools, we can return to the the problem at hand. Predicative PPs are of syntactic type NP $\rightarrow_{S} S_{prep}$ where $S_{prep}$ is a prepositional small clause as
shown in examples (54) and (55) which I will abbreviate as PP. A verb like *hang* therefore has the following lexical entry:

$$\vdash /\text{han}/, \text{hang}, \text{hang}': \text{phon}, \text{PP} \rightarrow (\text{NP} \rightarrow (\text{NP} \rightarrow (\text{S} \rightarrow \text{fin}))),$$

$$(e \rightarrow t) \rightarrow (e \rightarrow (e \rightarrow t)) \vdash$$

This says that *hang* first selects a PP complement of semantic type $e \rightarrow t$, then an NP complement of semantic type $e$, and finally an NP subject of semantic type $e$, ultimately yielding a finite sentence of semantic type $t$.

We can now begin to formally fill out the chart at the end of section 5. For the two cases where the syntax and semantics match, the transparent separated case and the aspectual adjacent case, the typing of the particle is straightforward. So, in the transparent separated case, the particle is precisely a PP:

$$\vdash /\text{up}/, \text{up}_1, \text{up}'_1: \text{phon}, \text{PP}, e \rightarrow t \vdash$$

Because $\text{up}_1$ is just a normal PP, it fulfills the PP valent of *hung*. That is to say, it is of the appropriate type for *hang* to select it as its first PP complement. Like any other PP, it linearizes after the direct object, thanks to Wrap.

For the adjacent aspectual case, on the other hand, we want the particle to be a functor in the semantics and linearize adjacent to the verb. More than this, it needs to be an expression in the word-grammar rather than in the phrase grammar. The verb to which it attaches, as a word in its own right, will have an expression in both the word-grammar and in the phrase-grammar, related via the function $\mathfrak{S}$.

So, for a case like *eat up (the vegetables)* the lexical entries of the verb and particle are as follows:

$$\vdash \lambda \Phi(\Phi+/\text{up}/): \text{wd} \rightarrow \text{wd}; \text{UP}_2: \text{v}_a \rightarrow \text{v}_a; \text{up}'_2: A \rightarrow A$$

43
This is a functor in both its pheno and tecto types, showing that it is a morphological process rather than a lexical item *per se*, and thus not in fact a word. Rather than having a pronunciation of its own, it systematically tacks a bit of phonology onto the end of the verb to which it attaches. Its tecto type shows that it attaches to verbs and yields slightly more complex verbs. The subscript $\alpha$ on the morphological types is a variable ranging over inflectional forms, showing that this is a process that applies after inflection.\(^{19}\) A is a variable that ranges over semantic types. The word-grammatical version of the verb it selects is:

$$\vdash /it/: \text{wd}; \text{EAT}: v; \text{eat'}: (e \rightarrow (e \rightarrow t))$$

Combining these two via the Morphological Modus Ponens rule described in the last section yields the following expression:

$$\vdash /it\alpha p/: \text{wd}; \text{EAT-UP}: v; \text{up}_2'(\text{eat'}): (e \rightarrow (e \rightarrow t))$$

This in turn corresponds (via the interface function $\Im$) to the phrase grammatical expression:

$$\vdash /it\alpha p/, \text{eat-up, up}_2'(\text{eat'}): \text{phon, (NP} \circ C (\text{NP} \circ S \text{fin}), (e \rightarrow (e \rightarrow t)) \dashv$$

In the other two compositional cases, separated aspectual and adjacent transparent, the problem is that they behave syntactically in accordance with where the particle appears, but nevertheless mean the same thing as their counterparts displaying the alternative word order. The solution is to encode this mismatch directly into their lexical entries. This is only possible because the syntax/semantics interface is *parallel-derivational*. This means that the syntactic and semantic components are

\(^{19}\)Otherwise, we would predict “Harvey eat ups his vegetables” rather than “Harvey eats up his vegetables.”
built up simultaneously and in parallel, rather than the meaning being derived functionally from the syntax once the derivation is complete. For this reason, as long as the rules of natural deduction can still apply properly, there is no reason the syntax and semantics have to match at intermediate stages in the derivation. Hence we can write a lexical entry for something with the syntactic properties of *up*₁ but the meaning of *up*₂ - and vice versa.

Because we are trying to set up a correspondence across the morpho-syntactic interface, the alternation must take place within the word-grammar. We can model this alternation with the following bi-directional rule:

**Morphological Rule Schema** p

\[
\vdash \lambda \Phi (\Phi + \Psi) : \text{wd} \rightarrow \text{wd}; L : v_\alpha \rightarrow v_\alpha ; \Sigma : A \\
\vdash \Psi : \text{wd}; g(L) : p; \Sigma : A
\]

Read from top to bottom, what this says is that if you have an adjacent aspectual particle as a morphological process in the word grammar, you also have a full word of category preposition with the same formative and semantics. Read the other way, this amounts to syntactic incorporation - taking an expression that is a full word and realizing it as a morphological process. This differs from traditional incorporation accounts, though, in that it is a morphological rule rather than a syntactic transformation. By orienting the alternation entirely within the morphology, it preserves the distinction between word-grammar and phrase-grammar. One major criticism of standard incorporation accounts (eg, in Smirniotopoulos & Joseph 1998) is that they treat the morphology as if it were syntax, which this approach avoids.

Using this rule schema, we can derive expressions for the particles appearing in the transparent adjacent and aspectual separated cases. Applying Rule Schema p to the transparent separated case yields the transparent adjacent case:
\[ \vdash \lambda \Phi(\Phi+/\Delta p/): \text{wd} \rightarrow \text{wd}; \text{UP}_4: v_\alpha \rightarrow v_\alpha; \text{up}_1': e \rightarrow t \]

The result of this rule, UP$_4$, is an abstract morpheme with the combinatorics of UP$_2$ and the meaning (and, hence, effect on argument structure) of up$_1$ - in other words, a transparent particle which is necessarily realized adjacent to the verb. We can likewise construct the separated aspectual case from the adjacent aspectual case in the same way.

\[ \vdash \lambda \Phi(\Phi+/\Delta p/): \text{wd} \rightarrow \text{wd}; \text{UP}_2: v_\alpha \rightarrow v_\alpha; \text{up}_2': A \rightarrow A \]

\[ \vdash /\Delta p/: \text{wd}; \text{UP}_3: p; \text{up}_2': A \rightarrow A \]

In this way, we have obtained four distinct expressions, populating the four compositional cells from the chart in section 5 - the four compositional possibilities for VPCs.

20 Confining these operations to the word-grammar has the added benefit of ensuring that Schema p cannot apply to full PPs, which are constructed phrase-grammatically and thus do not correspond to expressions in the morphology. Successfully constructing these additional particles accomplishes nothing, however, unless they are able to combine with appropriate verbs. In order to make that possible, we need verbs with a corresponding mismatch between their syntactic and semantic typing. We can construct such verbs via a lexical rule:

\[ \text{It so happens that up}_1 \text{ and up}_3 \text{ are syntactically identical (as UP}_2 \text{ and UP}_4 \text{ are morphologically identical). I am, however, hesitant to collapse them, as the correspondence between up}_1 \text{ and up}_3 \text{ is one of homonymy rather than polysemy, and I would not want to imply otherwise for the sake of conserving a few indices. However, nothing in this analysis rides on these being distinct syntactic entities, nor on them being the same. The dissenting reader can therefore take these subscripts to be no more than handy mnemonics for distinguishing the two meanings in the prose of this paper with no theoretical significance.} \]
Syntactic Rule Schema $r$

if

\[ \vdash \text{Phon}(v), v, c: \text{phon}, A, C \vdash \]

then

\[ \vdash \text{Phon}(v), r(v), c: \text{phon}, \text{PP} \setminus C A, C \vdash \]

This rule allows a verb to select an extra PP complement without picking up a corresponding additional argument in the semantics.

Applying the term constructor $r$ to $eat$ above, we get an $eat$ that takes a PP complement in the syntax, but gives an unchanged result in the semantics:

\[ \vdash /it/, r(eat), \text{eat'}: \text{PP} \setminus C (\text{NP} \setminus S_{fin}), e \rightarrow (e \rightarrow t) \vdash \]

$r(eat)$ is a verb that combines syntactically with a PP but selects no corresponding term in the semantics. Since $up_3$ is syntactically a PP but semantically an aspectual particle (and hence does not contribute a semantic argument), we can put them together.\(^{21}\) When we do so, the whole VP ends up with the exact same meaning as it would have were the verb and particle adjacent to each other, as I will show below.

The transparent adjacent case is a little different, in that there is nothing to prevent $\text{UP}_4$ from combining with any verb that could select $up_1$.

\(^{21}\)Since aspectual particles are functors in the semantics, in order for it to really be able to combine with $up_3$, we would have to type-raise $eat$ in the semantics. Hence, the full lexical entry for the form of $eat$ that selects a separated aspectual particle is

\[ \vdash /it/, r(eat'), \lambda f(eat'): \text{PP} \setminus C (\text{NP} \setminus S_{fin}),
\]

\[ (e \rightarrow (e \rightarrow t)) \rightarrow (e \rightarrow (e \rightarrow t)) \rightarrow (e \rightarrow (e \rightarrow t)) \vdash \]
\[ \vdash \text{/hæN/}: \text{wd; HANG: } v; \text{ hang}': (e \rightarrow t) \rightarrow (e \rightarrow (e \rightarrow t)) \]

\[ \vdash \lambda \Phi(\Phi+/\text{/ap/}): \text{wd} \rightarrow \text{wd; UP}_4: v_a \rightarrow v_a; \text{ up}'_1: e \rightarrow t \]

\[ \vdash \text{/hæN}/\text{ap/}: \text{wd; HANG-UP: } v; \text{ hang}'(\text{up}'_1): (e \rightarrow (e \rightarrow t)) \]

The mismatch comes about when we bring this compound expression into the phrase-grammar, where it becomes:

\[ \vdash \text{/hæN}/\text{ap/}, \text{ hang-up, hang}'(\text{up}'_1): \text{phon, PP} \circ \text{C} (\text{NP} \circ \text{C} (\text{NP} \circ \text{S} \text{fin})), (e \rightarrow (e \rightarrow t)) \vdash \]

This verb is still looking for a PP complement, but the corresponding semantic argument has already been fulfilled morphologically. We can correct this with the inverse operation to Schema \( r \) above, which ends up amounting to just a clean-up rule taking care of the extraneous PP in the syntactic typing.

**Syntactic Rule Schema \( r' \)**

if

\[ \vdash \text{Phon}(v), v, c: \text{phon, PP} \circ \text{C} A, C \vdash \]

then

\[ \vdash \text{Phon}(v), r'(v), c: \text{phon, A, C} \vdash \]

This says that for any verb \( v \) that selects a complement of syntactic type PP, there is a homophonous verb \( r'(v) \) with identical semantics that doesn’t. Such verbs are usually not interesting, since they won’t be able to fill their semantic arguments

\[ ^{22}\text{This rule is precisely the inverse of } r \text{- hence } r'(r(v)) = v. \]

48
syntactically. In those cases, like the ones described here, where those arguments have already been fulfilled elsewhere, however, this is precisely what we want.

By manipulating the syntactic and semantic combinatorics of the particles and their host verbs, we can now correctly capture both the syntactic asymmetries of the word order alternation, the correlation of semantic compositionality and change in valence, and the fact that across the semantic differences and despite the syntactic differences, both word orders carry the same meaning. This is achieved despite the fact that the two word orders inhabit disparate parts of the grammar with totally distinct combinatoric systems. Full derivations follow.
Derivations: Transparent Separated and Adjacent

Transparent Separated: *Harvey hung the picture up*

\[ \vdash \text{hung, hung': PP } \circ C (\text{NP } \circ C (\text{NP } \circ S_{fin})), \]
\[ (e \rightarrow t) \rightarrow (e \rightarrow (e \rightarrow t)) \vdash \]
\[ \vdash \text{up, up': PP, } e \rightarrow t \vdash \]
\[ \text{CMP} \]
\[ \vdash (\text{hung up}'_1 C), \text{hung'}(\text{up}'_1): \text{NP } \circ C (\text{NP } \circ S_{fin}), \]
\[ e \rightarrow (e \rightarrow t) \vdash \]
\[ \vdash \text{the picture, picture': NP, } t \vdash \]
\[ \text{CMP} \]
\[ \vdash ((\text{hung up}'_1 C) \text{the picture } C), (\text{hung'}(\text{up}'_1))(\text{picture}'):: \]
\[ \text{NP } \circ S_{fin}, e \rightarrow t \vdash \]
\[ \vdash \text{Harvey, h: NP, } t \vdash \]
\[ \text{SMP} \]
\[ \vdash (S \text{ Harvey } ((\text{hung up}'_1 C) \text{the picture } C)), ((\text{hung'}(\text{up}'_1))(\text{picture}')\text{(h)}): \]
\[ S_{fin}, t \vdash \]

For the Phon side, we get:

\[ \text{Phon}(S \text{ Harvey } ((\text{hung up}'_1 C) \text{the picture } C)) \]
\[ = \text{Phon}(\text{Harvey}) + \text{Phon}((\text{hung up}'_1 C) \text{the picture } C) \]
\[ = \text{Phon}(\text{Harvey}) + [\text{Phon}(\text{hung up}'_1 C) \circ w] \]

50
\[ \text{Phon}(\text{the picture})] \\
= \text{Phon}(\text{Harvey}) + [[\text{Phon}(\text{hung}) \circ_w \text{Phon}(\text{up}_1)] \circ_w] \\
= \text{Phon}(\text{Harvey}) + [[\text{Phon}(\text{hung}) , \epsilon \circ_w \text{Phon}(\text{up}_1)] \circ_w] \\
= \text{Phon}(\text{Harvey}) + [\text{Phon}(\text{hung}) , \text{Phon}(\text{up}_1) + \epsilon] \circ_w \\
= \text{Phon}(\text{Harvey}) + [\text{Phon}(\text{hung}) , \text{Phon}(\text{up}_1) \circ_w] \\
= \text{Phon}(\text{Harvey}) + \text{Phon}(\text{hung}) + \text{Phon}(\text{the picture}) + \text{Phon}(\text{up}_1) \\
= /\text{hAô.vi/} + /\text{hN/} + /\text{dpi.k.tSô/} + /\text{AP/} \\
= /\text{hAô.vi hN }\epsilon \text{dpi.k.tSô AP/} \\

\text{Transparent Adjacent: Harvey hung up the picture}

\text{Word-Grammar}

\[
\vdash \lambda \Phi(\Phi+/\text{AP/}): \text{wd} \rightarrow \text{wd}; \text{UP}_4: v_\alpha \rightarrow v_\alpha; \text{up'}_4: e \rightarrow t \\
\begin{array}{c}
\hline
\text{type-raise} \\
\vdash \lambda \Phi(\Phi+/\text{AP/}): \text{wd} \rightarrow \text{wd}; \text{UP}_4: v_\alpha \rightarrow v_\alpha; \text{up'}_4: ((e \rightarrow t) \rightarrow (e \rightarrow (e \rightarrow t))) \\
\rightarrow (e \rightarrow t) \\
\end{array}
\]

\[
\vdash /\text{hN/}: \text{wd}; \text{HUNG: v}_{PAST}; \text{hung'}: (e \rightarrow t) \rightarrow (e \rightarrow (e \rightarrow t)) \\
\begin{array}{c}
\hline
\text{MMP} \\
\end{array}
\]

51
⊢ /hajʌp/: wd; HUNG-UP: v_{PAST}; hung'(up)\': (e → (e → t))

Phrase-Grammar

⊢ hung-up, hung'(up)\': PP →_C (NP →_C (NP →_S S_{fin})),

\[ e → (e → t) \]

⊢ r'(hung-up), hung'(up)\': NP →_C (NP →_S S_{fin}),

\[ e → (e → t) \]

⊢ the picture, picture\': NP, e ⊣

CMP

⊢ (r'(hung-up) the picture \^C), ((hung'(up)\')(picture)'): 

NP →_S S_{fin}, e → t ⊣

⊢ Harvey, h: NP, t ⊣

SMP

⊢ (\^S Harvey (r'(hung-up) the picture \^C)), ((hung'(up)\')(picture)')(h):

S_{fin}, t ⊣

This is result is semantically identical to the above, but will differ in the phonology:

Phon(\^S Harvey (r'(hung-up) the picture \^C))

= Phon(Harvey) + Phon(r'(hung-up) the picture \^C)
= Phon(Harvey) + [Phon(r'(hung-up))] o_w
= Phon(Harvey) + [[Phon(r'(hung-up))] o_w]
= Phon(Harvey) + [[Phon(hung-up)] o_w

52
$$\text{Phon}(the \ picture) = \text{Phon}(Harvey) + [\text{Phon}(\text{hung-up})], \epsilon \circ w$$

$$\text{Phon}(the \ picture) = \text{Phon}(Harvey) + [\text{Phon}(\text{hung-up})],$$

$$\text{Phon}(the \ picture) + \epsilon$$

$$\text{Phon}(Harvey) + \text{Phon}(\text{hung-up}),$$

$$\text{Phon}(the \ picture)$$

$$\text{Phon}(Harvey) + \text{Phon}(\text{hung-up})$$

$$\text{Phon}(the \ picture)$$

$$=/h\text{al}.vi/ + /h\text{alap}/ + /\delta \text{pik.tsf}/$$

$$=/h\text{al}.vi \ h\text{alap} \ \delta \text{pik.tsf}/$$

A direct comparison of the two word orders is as follows:

<table>
<thead>
<tr>
<th>Separated</th>
<th>Adjacent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phon:</td>
<td>/h\text{al}.vi \ h\text{alap} \ \delta \text{pik.tsf}/</td>
</tr>
<tr>
<td>Syn:</td>
<td>(S Harvey ((hung up C)the picture C))</td>
</tr>
<tr>
<td>Sem:</td>
<td>((hung'(up'))(picture'))(h)</td>
</tr>
</tbody>
</table>

As desired, the two forms match in the semantics, but have different word orders in the phonology, as mediated by the syntax. The same derivation can be done for the aspectual cases as well, with the same result.

9 Idiomatic VPCs

The idiomatic case displays the same word order variation as the two compositional cases, but does not have compositional semantics. As idioms, they do not need to be
built up in either the word-grammar or the phrase-grammar, but can nevertheless be “distributed across ordinary syntactic structures” (Jackendoff 2002).

Unlike in the compositional cases, the particle does not contribute meaning independent of the construction in which it appears. I am therefore going to pack all of the meaning of the combination into the verb, and leave the particle semantically vacuous. Because idiomatic verb-particle constructions are non-compositional, the syntactic choice of particle must be listed. In order to let verbs select only for a particular particle, I give each idiomatic particle its own syntactic type. So, for instance, the lexical entry for the up that participates in the separated case of look up is:

\[ \vdash /\text{ap}/, \text{up}, * : \text{phon}, \text{UP}, \text{T} \vdash \]

* is a semantic constant of type True — in terms of type logic it is logically true. This constant is used to signify semantic vacuity. In other words, the up that participates in the idiomatic construction look up contributes nothing to the meaning of the whole. The lexical entry for the look part of look up is:

\[ \vdash /\text{lo}/, \text{look}, \text{look-up}^\prime: \text{phon}, \text{UP} \rightarrow \text{C} (\text{NP} \rightarrow \text{C} (\text{NP} \rightarrow \text{S}_{\text{fin}})), \text{T} \rightarrow (e \rightarrow (e \rightarrow t)) \vdash \]

This is specifically the case when look up occurs in the separated position. This analysis already takes the verb and particle to comprise a single word when they occur in the adjacent position. The only thing that differs for the idiomatic case is to treat that word as atomic, rather than having been built up productively in the morphology. The lexical entry for the adjacent case is therefore simply:

\[ \vdash /\text{loap}/, \text{look}^\prime, \text{up}, \text{look-up}^\prime: \text{phon}, \text{NP} \rightarrow \text{C} (\text{NP} \rightarrow \text{C} (\text{NP} \rightarrow \text{S}_{\text{fin}}), e \rightarrow (e \rightarrow t)) \vdash \]
Unlike in the compositional cases, these two formulations are not directly connected to each other. This is intentional, and allows us to analyze idiomatic VPCs that do not display a word order alternation. Consider:

(92) a. Harvey gave **off** a foul odor
   b. *Harvey gave a foul odor **off**

(93) a. Harvey always bosses **his sister around**
   b. *Harvey always bosses **around** his sister23

We account for these cases by either treating the combination as atomic, for the obligatorily adjacent examples, or having the verb select for a semantically vacuous particle, for the obligatorily separated examples, just not both.

\[ \vdash /\text{givaf}/, \text{give}, - \text{off}, \text{give-off}^\prime: \text{phon}, \text{NP} - \circ C \]
\[ (\text{NP} - \circ S_{fin}), e \rightarrow (e \rightarrow t) \vdash \]

\[ \vdash /\text{bas}/, \text{boss}, \text{boss-around}^\prime: \text{phon}, \text{AROUND} - \circ C (\text{NP} - \circ C) \]
\[ (\text{NP} - \circ S_{fin})), T \rightarrow (e \rightarrow (e \rightarrow t)) \vdash \]

The *give* and *off* of *give off X* comprise an unanalyzed unit straight from the lexicon, yielding the adjacent word order only.Likewise, the *boss* of *boss X around* selects a semantically vacuous *around* in separated position, via the $-\circ C$ mode of implication.

---

23 Some speakers find the (b) examples here to be grammatical. My analysis accounts for those who do not — for those who do, the analysis is identical to *look up*. 

55
10 Conclusions

I have shown that the variable word order of English verb-particle constructions can be accounted for by recognizing the different combinatorial systems of word-grammar vs. phrase-grammar. I argued that compositional and non-compositional VPCs require different analyses, and further divided the compositional cases into Transparent and Aspectual VPCs. This distinction allowed me to account syntactically and semantically for the different selectional patterns of the two cases, as well combine two distinct threads of analysis in the literature. I demonstrated that aspectual and transparent VPCs each have a “natural” word order based on their valence patterns, but that each can take on the syntactic properties of the other via operations within the lexicon itself.

In so doing I developed the rudiments of a morphological system compatible with the CVG syntactic framework, combining the insights of a realizational approach to morphology with those of a categorial approach to syntax. Further developing the toy morphology presented here into a fully worked-out and predictive theory is an important topic for future research. However, even in its earliest form, the system I outlined here is powerful enough to capture alternations between syntactic and morphological objects, while nevertheless maintaining a firm boundary between these two components of the grammar.
REFERENCES

Bach, Emmon: 1983, ‘On the relationship between word grammar and phrase
grammar,’ Natural Language and Linguistic Theory 1, 65-89.

and Francis Jeffrey Pelletier (eds.), Reference and Quantification: The Partee Effect,
107-112, CSLI Publications.

Bannard, Colin, Timothy Baldwin and Alex Lascarides: 2003, ‘A Statistical Ap-
proach to the Semantics of Verb-Particles.’ Proceedings of the ACL 2003 Workshop
on Multiword Expressions: Analysis, Acquisition and Treatment 18, 65-72.

Brinton, Laurel: 1985, ‘Verb particles in English: Aspect or

Cappelle, Bert: 2005, ‘Particle patterns in English: A comprehensive coverage.’

Dehé, Nicole: 2002, Particle Verbs in English: Syntax, information structure and

den Dikken, Marcel: 1995, Particles: On the syntax of verb-particle, triadic, and

Denison, David: 1985, ‘The origins of completive up in English.’ Neophilologische
Mitteilungen 86.37-61.

Dowty, David: 2006, ‘Compositionality as an Empirical
Problem,’ Papers from the Brown University Conference on Direct Compositionality


Wurmbrand, Susi: 2000, ‘The Structure(s) of Particle Verbs’ (ms).