CHAPTER 5

CONSTRUCTIONS IN THE PARALLEL ARCHITECTURE

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Over the past two decades, I have been developing a theoretical and formal conception of the language faculty, the Parallel Architecture, with an eye to incorporating the insights of many distinct theoretical frameworks (Jackendoff 1997*a*, 2002*a*; Culicover and Jackendoff 2005). The present chapter discusses what the Parallel Architecture has taken from Construction Grammar and what it might contribute to Construction Grammar. Section 5.1 lays out the fundamentals of the architecture; section 5.2 discusses the relation between lexicon and grammar, an area where the Parallel Architecture shares a great deal with certain versions of Construction Grammar. Section 5.3 briefly describes how the notion of phrasal constructions found its way into the Parallel Architecture at about the same time that Construction Grammar was beginning to develop. Section 5.4 addresses the degree of independence of syntax from semantics, arguing that certain variants of Construction Grammar lend themselves to better integration with the Parallel Architecture—and better theoretical generality—than others. Section 5.5 returns to the structure of the lexicon within the Parallel Architecture; it discusses productivity and semiproductivity and their bearing on inheritance hierarchies, an important theoretical construct in Construction Grammar and other lexicalist frameworks.

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5.1. The Parallel Architecture

The basic premise of the Parallel Architecture is that phonology, syntax, and semantics are independent generative components within the language capacity, each with its own primitives and principles of combination. The theory builds on insights about phonology and semantics that arose in the middle and late 1970s. At that time, it became clear that phonology has highly articulated structure that cannot be derived directly from syntax. In particular, hierarchically structured units such as syllables, feet, and prosodic constituents do not correspond one-to-one with syntactic units. Moreover, phonological structure includes several independent substructures or 'tiers,' each with its own type of generative structure: segmental-syllabic structure, the metrical grid, intonation contour, and (in tone languages) the tone tier. The tiers are correlated with each other by 'interface rules': principles that establish optimal correspondence between structures of two independent types. For instance, stress rules are treated not as algorithmic rules that derive stress patterns *de novo*, but as interface rules that negotiate the best compromise between a segmental-syllabic pattern and an optimal metrical grid. In turn, since these multitier phonological structures cannot be derived from syntactic structures, the connection between syntax and phonology as a whole has to be mediated not by derivations, but by a component of interface rules.

The 1970s also witnessed the development of many approaches to meaning, ranging from formal semantics to Cognitive Grammar, with my Conceptual Semantics (Jackendoff 1983, 1990, 2002*a*, 2010) somewhere in between. Despite their differences, all of these approaches see meaning structures as combinatorial and potentially unlimited in complexity. These structures are not built out of or derived from syntactic units such as NPs and VPs, as they were in Generative Semantics. Rather, they are built of characteristic semantic units such as conceptualized objects, events, times, properties, and quantifiers, which do not correspond one-to-one with syntactic categories. As a consequence, semantics too must be treated as a generative component of language which cannot be derived from syntax, but which rather is *correlated* with syntax by a component of interface rules. Moreover, semantic structure, like phonology, demonstrably has an articulation into tiers, including at least propositional structure (who did what to whom) and an orthogonal dimension of information structure (topic/focus/common ground; old vs. new information). Word meanings contribute primarily to propositional structure; but words such as *only* and *even* that associate semantically with topic and/or focus contribute to information structure, as do various prosodic contours and syntactic constructions such as cleft and pseudocleft.

Syntax too may be articulated into independent tiers. The hallmark of Lexical Functional Grammar (LFG) (Bresnan 1982, 2001) is an articulation of syntax into constituent structure (the standard tree) and functional structure (grammatical functions); a stripped-down version of the latter appears as the grammatical function tier of Culicover and Jackendoff (2005). Autolexical Syntax (Sadock 1991) and

Role and Reference Grammar (Van Valin and LaPolla 1997) propose an articulation into phrasal and morphosyntactic tiers—syntactic principles that operate above and below the word level, respectively. This division has also been incorporated into the Parallel Architecture. Again, the tiers of syntax must be brought into registration with each other by interface rules.

The result is an architecture of the overall form in Figure 5.1; phonology, syntax, and semantics also have further internal articulation of a similar sort. In addition to the traditional syntax-to-phonology and syntax-to-semantics interfaces, Figure 5.1 also includes a phonology-to-semantics interface, making possible a direct correlation of prosodic contours with information structure. In this model, a well-formed sentence is a triplet consisting of well-formed phonological, syntactic, and semantic structures, plus links between corresponding constituents of the three, established by the interface components.

One can regard Mainstream Generative Grammar (Chomsky 1965, 1981, 1995) as a variant of this architecture in which the combinatorial properties of phonology and semantics are derived from syntax; hence, there are no independent formation rules for phonology and semantics, only derivational interfaces from syntax into these two components. By contrast, Cognitive Grammar (e.g., Langacker 1987) claims that all (or at least most) syntactic structure is semantically motivated, so it eliminates or minimizes the syntactic formation rules (Broccias, this volume). Within the Parallel Architecture framework, a fundamental empirical issue is the proper balance between these two extremes.

An important constraint on the balance comes from the fact that semantic structure ultimately has to be rich enough to support reasoning (inference) and connection to the perceived world (reference). In the mainstream architecture, which *derives* semantic structure, all this richness has to come from syntax. This puts syntactic theory under constant pressure for greater articulation and complexity. By contrast, the Parallel Architecture grants semantics its own generative capacity, and therefore syntax has to be only rich enough to modulate the mapping between semantics and phonology—a Simpler Syntax (Culicover and Jackendoff 2005). However, this does not entail that syntax can be eliminated or entirely

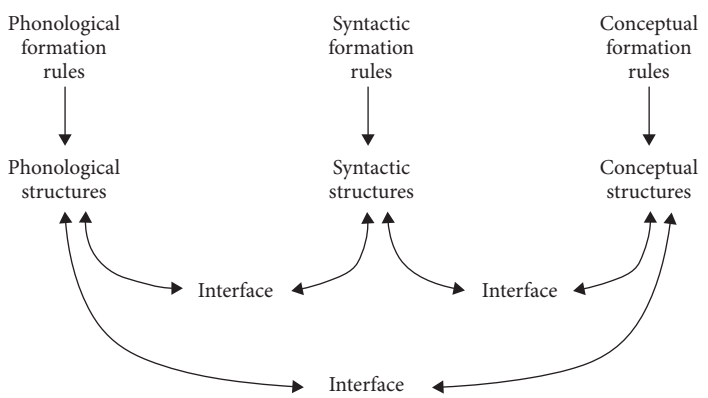


Figure 5.1. The Parallel Architecture

predicted from semantic principles; there is still interesting work to be done by the syntactic component of the grammar.

A crucial advantage of the Parallel Architecture over the mainstream architecture is that it extends naturally to the relation between language and other cognitive capacities such as vision. Obviously, the combinatorial structure of the visual field cannot be derived from syntactic NPs and VPs. Nevertheless, speakers refer freely to the structure of the world as understood through vision, for example, in reporting that *The cat is on the mat*. Following the overall conception of the Parallel Architecture, the relation between language and vision can be treated as yet another interface component, this time linking the semantic structure of language to the combinatorial structures responsible for visual understanding (Jackendoff 1987, 2010: chapters 3, 4). Hence, the relationships among faculties such as language and vision are mediated by exactly the same sorts of formal components—interface rules—as the relationships among the components of language and, within these components, the subcomponents or tiers. In other words, the Parallel Architecture is applicable to all scales of mental organization.[1]

5.2. The Lexicon and the Grammar

Every theory of grammar treats words as triples of phonological, (morpho)syntactic, and semantic information. In Mainstream Generative Grammar, these triples are inserted into syntactic structures by lexical insertion (or, in the Minimalist Program, by Merge). At some point in the derivation, their phonological parts are sent to phonology (PF) where they are pronounced; their meanings are sent to the semantics where they are combined with each other and interpreted. In the Parallel Architecture, however, a word functions as a small-scale interface rule: it stipulates that its phonological, (morpho)syntactic, and semantic structures can be linked as part of a well-formed sentence.

For instance, here are (oversimplified) lexical entries for the words *go* and *into*.

(1) a. Phonology: gəʊ$_1$
Syntax: $V_1 - PP_2$
Semantics: $[_{Event}\ GO_1\ ([_{Thing}\ x], [_{Path}\ y]_2)]$

b. Phonology: ˈɪntuː$_3$
Syntax: $P_3 - NP_4$
Semantics: $[_{Path}\ INTO_3\ ([_{Thing}\ z]_4)]$

The subscripts in (1) stipulate parts of the three structures that are to be linked: the phonology /gəʊ/ links to a syntactic V and to the semantic function GO; the phonology /ɪntuː/ links to a syntactic P and to the semantic function INTO. The italicized parts of (1) are typed variables that are to be instantiated by other material in the

phrase. For instance, in the syntax, *go* is to be followed by a PP; in the semantics it has two arguments, a Thing and a Path, the latter of which is linked to the PP in syntax.

For a first approximation, the formalism in (1) can be translated into the Construction Grammar notion of a 'sign,' where phonology and syntax comprise 'form' and semantics comprises 'function.'[2] However, differences will arise below.

It is crucial to distinguish the notion of a 'word' from that of a 'lexical item.' DiSciullo and Williams (1987) show that there are important grammatical distinctions between words and morphemes, on the one hand, and phrases, on the other; that is, there is a *grammatical* notion of word that separates morphology (combinatoriality within words) from phrasal syntax (combinations of words). However, they also assert that the issue of what is listed in long-term memory is "of no interest to the grammarian." In contrast, the Parallel Architecture takes this distinction to be crucial to defining the lexicon: what DiSciullo and Williams have shown is that the notion of 'grammatical word' and the notion of 'lexical item' are not coextensive.

Accordingly, Jackendoff (2002*a*: chapter 6) compares three possible criteria for defining a lexical item.

(2) Lexical items are:
   a. The words (and morphemes) of the language.
   b. The exceptional, idiosyncratic parts of the language that cannot be predicted by rule.
   c. The parts of language that are listed in long-term memory.

Criteria (2a) and (2b) are traditional views of the lexicon, in which it is a component of language altogether distinct from rules of grammar. The Parallel Architecture, however, adopts the more psycholinguistically based definition (2c). The three criteria coincide in the case of a stereotypical lexical item such as *dog*: it is a word of English, it is not predictable by rule, and it is stored in speakers' long-term memory. But the criteria diverge in less stereotypical circumstances. For instance, the pronunciation, syntax, and meaning of the word *unhappy* are completely predictable from the word *happy* plus the regular principle for the structure and meaning of *un-* adjectives. Thus, although *unhappy* is a word of English and therefore satisfies (2a), it does not satisfy (2b); and its status vis-à-vis (2c) is an empirical question (my guess is yes for *unhappy*, though perhaps not for, say, *unzippable*).

For a different case, the idioms *kick the bucket* and *chew the fat* are not words or morphemes of the language, so they do not satisfy (2a). Their phonology and syntax are predictable from the phonology and syntax of the constituent words, just like *throw the bucket* and *chew the gum*; but their meaning is not predictable. So the language must note their idiosyncrasy (2b), and this idiosyncrasy must be stored in speakers' long-term memory (2c). Using the formalism in (1), *kick the bucket* can be encoded as (3) (where the semantics is approximate).

(3) Phonology: $[_{Wd}$kɪk$]_1$ $[_{Cl}$ ðə$]_2$ [bʌkɪt$]_3$
Syntax: $[_{VP}\ V_1\ [_{NP}\ Det_2\ N_3]]_4$
Semantics: $[DIE\ ([_{Thing}\ x])]_4$

What makes this an idiom is that the linking between syntax and semantics (subscript 4) is independent of the linking between phonology and syntax (subscripts 1, 2, 3): in traditional terms, the individual words do not have independent meanings. This treatment of idioms finds parallels in HPSG, Cognitive Grammar, and Construction Grammar.

Clichés and fixed expressions such as *money can't buy me love* and *I don't care* also consist of multiple words. But unlike idioms, such phrases retain (much more of) their literal predictable meanings. Hence, they satisfy neither criterion (2a) nor criterion (2b). Yet they do satisfy (2c): what makes them clichés is precisely that they are phrases everyone knows.

The formalism for lexical entries also generalizes readily to regular affixes. For instance, the regular past tense verb affix of English can be written as (4).

(4) Phonology: $[_{\text{Wd}}\ [_{Wd}\ x]_2\ [_{\text{Aff}}\ \text{-d}]_1]$
Syntax: $[_{\text{V}}\ V_2 + [\text{past}]_1]$
Semantics: $[_{\text{Event/State}}\ \text{PAST}_1\ [_{Event/State}\ y]_2]$

This says that the phonological suffix *-d* attached to a phonological word corresponds to the past tense form of the verb whose pronunciation is that phonological word,[3] and it expresses past time (among other things) of the event or state type expressed by the verb. The upshot is that, in terms of criterion (2c), (4) is a lexical item, but not a word; and a novel inflected verb such as *skyped* is a word—but not a lexical item.

One consequence of this approach is that regular morphology is treated analytically (or declaratively) rather than procedurally. For instance, the English regular past tense is not a *rule* that says "add *-d* to a verb to form its past tense." Rather, the past tense morpheme is the lexical entry (4), which combines with verbs in exactly the same way transitive verbs combine with their direct objects, namely through the instantiation of a variable. In principle, this approach extends to all regular affixation—an issue that becomes far more significant in languages such as Turkish that have massive regular morphology. We return to morphology in section 5.5 (see also Booij, this volume).

A lexical item need not be a full triple of phonology, syntax, and semantics. Words such as *yes*, *hello*, *wow*, *ouch*, and *allakazam* do not participate in phrasal combination, and therefore they are best thought of as having phonological and semantic features but no syntactic features.[4] Words that function as 'grammatical glue,' such as expletive *it* and the *do* of *do*-support for inversion and negation, have phonological and syntactic features but no semantics. Similarly, nonsense phrases like *fa-la-la*, *hey nonny nonny*, *doodah doodah*, and *inka-dinka-doo*, used to fill up space in song lyrics, have phonology but neither combinatorial syntax nor combinatorial semantics (though they may convey affect). So although a stereotypical lexical item consists of a full triple of three structures—a Saussurean sign—there also exist items with less than the full complement. In other words, like every other human category, lexical items have many nonstereotypical cases with partially divergent properties.

Next, consider the syntactic structure of the idiom *kick the bucket* in (3). This is nothing but a realization of the normal phrase structure rules for VP and NP shown in (5).

(5) a. $[_{VP}$ *V NP*]
b. $[_{NP}$ *Det N*]

If these structures are admissible as *part* of a lexical item, there is no reason they cannot also stand as lexical items on their own. The Parallel Architecture therefore views phrase structure rules as lexical items that have only syntactic features. Since they lack phonology and semantics, they also lack linking subscripts—and hence they are not Saussurean signs. In the same way, the regular rules that link grammatical functions such as subject and object to thematic roles such as Agent and Patient are treated as lexical items that link syntax and semantics but lack phonological features. (Goldberg, this volume, and others in Construction Grammar call these linking rules 'abstract constructions,' precisely because they lack phonology.)

In short, the overall conception is:

- Lexical items can contain any combination of phonological, syntactic, and semantic structures, plus links among them.
- Lexical words such as (1), idioms such as (3), regular affixes such as (4), and rules of grammar such as (5) are encoded in a common format (concurring with Langacker 1987 and Croft 2001).
- The grammar of a language consists of stored pieces of structure in the three components and stored links among them.
- The combinatorial 'engine' that builds and/or licenses phrases and sentences is the operation of unification (Shieber 1986), which 'clips together' stored pieces into a full utterance.

5.3. Constructions in the Parallel Architecture

The notion of construction arose in my own work in the course of studying unusual cases of verb argument structure (Jackendoff 1990). One phenomenon that particularly attracted my attention was the *Way* construction:

(6) a. Bill belched his way out of the restaurant.
b. Joe joked his way into the meeting.
c. Babe Ruth homered his way into the hearts of America.

Although the VPs in these sentences have canonical syntactic constituency (V-NP-PP), the NP and PP complements are not licensed by the verbs, which are normally intransitive. Moreover, the phrase *his way* apparently occupies direct

object position, as it is impossible either to add a direct object (7a) or to substitute another direct object for *his way* (7b).

(7) a. *Joe told jokes his way into the meeting.
b. *Babe Ruth hit home runs into the hearts of America.

The sentences in (6) are understood as expressing motion on the part of the subject, either literal (6a,b) or metaphorical (6c), and the PP expresses the path of motion. The verb is understood as a manner or means modifier of the motion, as shown in the approximate paraphrases in (8).

(8) a. Bill came out of the restaurant, belching (all the while).
b. Joe went into the meeting, joking (all the while).
or Joe got into the meeting by joking.
c. Babe Ruth entered the hearts of America by/through homering.

Jackendoff (1990) explored three possible approaches to this phenomenon. The first derived (6) from an underlying syntactic structure that more directly reflects the semantic role of the verb, following standard mainstream practice. Essentially, the verb started out in an adjunct, as in (8), then moved to the main verb position of the sentence. It was easy to show the empirical inadequacy of such a derivation, and I abandoned it without regret. The second approach (later advocated by Levin and Rappaport Hovav 1995) was to treat the construction along the lines of the passive in LFG and HPSG: there is a 'lexical rule' that converts intransitive verbs of the appropriate semantic sort into idioms of the form *V X's way PP*, which then undergo lexical insertion and argument satisfaction. This can be made to work, but it has the effect of littering the lexicon with idioms such as *belch X's way* and *homer X's way* whose existence is entirely predictable. Surely these combinations need not be stored.

The third approach was to treat *V X's way PP* itself as an idiom—a meaningful construction—that combines productively in syntax with intransitive verbs of a particular semantic type. From the point of view of description, this is a notational variant of the second approach, in that all the same conditions on the verb, the PP, and the interpretation obtain. However, this approach also accounts for the fact that the rule is productive, the way syntax is supposed to be. In particular, it does not require one to say that the *lexicon* contains all the possible combinations of *X's way* with verbs. The price is that one has to abandon the notion that the verb, as head of the verb phrase, is invariably also head in the interpretation—the element that determines the VP's argument structure. Rather, in the *Way* construction, the construction itself determines the argument structure of the VP, and the verb functions semantically as a means or manner modifier.

Jackendoff 1990 discussed a number of such VP constructions and left open the question of which of these two latter approaches is correct. However, at about the same time, a number of papers by Adele Goldberg (eventually leading to her 1995 book) dealt with many of the same constructions I had been addressing. This and other early work on constructions persuaded me that the constructional approach was the more promising of the two.

Within the Parallel Architecture formalism, the *Way* construction can be treated as a lexical item with approximately the following structure:

(9) Phonology: we_{1}
Syntax: $[_{\text{VP}}\ V_{2}\ [_{\text{NP}}\ pro_{bound} + gen\ \text{N}_{1}]\ PP_{3}]$
Semantics: [GO ($[_{Thing}\ x]$, $[_{Path}\ y]_{3}$); WHILE/BY $[F\ ([_{Thing}\ x])]_{2}$]

The formalism in (9) is exactly the same as for words, idioms, affixes, and phrase structure rules. The difference is in the complexity of the phonology-syntax-semantic correspondence, indicated by the subscripts. In particular, the only part of the syntax that is linked to phonology is *way*, the distinctive mark of the construction, and the semantic functions *GO* and *BY/WHILE* are not linked to any particular syntactic or phonological constituent. The virtue of this complexity is that it compresses two conceptual clauses—motion and manner/means—into a single syntactic clause.

Since then, a large number of constructions have been investigated in the Parallel Architecture framework; a list appears in the Appendix.

5.4. Integrating Construction Grammar and the Parallel Architecture

It is easy to see that various versions of Construction Grammar can be construed as realizations of the Parallel Architecture. In particular, given that the Parallel Architecture's lexicon displays a continuum among words, multiword expressions, and phrase structure rules, constructions such as the *Way* construction fit into the lexicon altogether naturally. The main question is which version of Construction Grammar is most appropriate.

I first have to clear away a terminological issue. Croft (2001, this volume) and Goldberg (2006*a*, this volume) use the term *construction* for *all* stored pieces of structure, including words, idioms, and phrase structure rules. I think this use of the term *construction* is coextensive with the term *lexical item* as used here—it is a piece of linguistic structure stored in long-term memory. For my part, I find it convenient to retain a terminological distinction between words (which they call 'lexical constructions'), idioms, phrase structure rules, linking rules (or 'abstract constructions'), and meaningful constructions, the latter being canonical or noncanonical pieces of syntactic structure linked to noncanonical meanings, such as the *Way* construction. But there is no *theoretical* distinction among them—they are all encoded in a common format, with no sharp dividing lines.

A more substantive issue concerns the content of constructions. On one approach, which I will call *homogeneous Construction Grammar* (e.g., Goldberg 1995, 2006*a*, this volume; Croft 2001, this volume; Barðdal 2008; Michaelis, this volume, Broccias, this volume), all syntactic form is taken to be determined by

meaningful constructions; there are no autonomous syntactic principles, free of semantic implications; all linguistic units are taken to be full Saussurean signs. On another approach, which I will call *heterogeneous Construction Grammar* (e.g., my reading of Fillmore and Kay 1993), meaningful constructions are just one kind of abstract stored structure. The grammar of a language can also contain independent principles of syntactic form such as (5), as well as independent principles of semantic structure that have no syntactic effect, which I will discuss shortly. I would like to argue that the heterogeneous approach is more satisfactory. On the latter view, the typical lexical item is a Saussurean sign, but, as suggested in section 5.2, there are also numerous atypical lexical items that are not signs.

To set the stage, we first note that there are independent principles of structure in domains other than syntax and semantics. Phonotactics are principles of phonological structure that have nothing to do with any other linguistic domain; they might be considered 'purely phonological constructions,' with no syntactic or semantic effects. At a larger scale in phonology, poetic meters such as iambic pentameter and poetic forms such as the haiku and the sonnet can be thought of as prosodic constructions to which relevant phonological structures must conform, but with no implications for the meaning of the text. Even further afield, musical forms such as the 12-bar blues and minuet form impose a metrical and harmonic structure on compositions, without any implications for interfaces with language. If we desire to integrate our theory of syntax/semantics with an overall view of the architecture of language and of the mind, these considerations should play a role.

Turning back to syntax, there are syntactic structures that do not support meaning distinctions and are present just to marshal the form. One obvious case is the principle of invariable head position within a phrase: it makes no difference for meaning that the English verb is phrase-initial and the Japanese verb is phrase-final. (Note that diachronic and/or processing motivations for fixed head position have no bearing on the synchronic form of the grammar, which still has to say where the verb goes in the clause.) Similarly, English *do*-support is present in inverted and negated clauses only to provide a bearer for tense, not to express a difference in meaning, and expletive *it* is present only to satisfy the requirement that a tensed clause must have a subject. In languages with grammatical gender, principles of gender agreement make no semantic difference (except where a gendered pronoun or other item can be fortuitously used for disambiguation).

Other syntactic structures are correlated with meaning, but not uniformly. Consider for instance the English Transitive Verb construction. Depending on the choice of verb, the postverbal NP may be a theme, a goal, an experiencer, a stimulus, and so on. In order to maintain a homogeneous Construction Grammar, one might say that the general meaning of the construction is that the NP's meaning is a semantic argument of the verb's meaning; Goldberg (this volume) expresses this intuition by saying that the V NP construction expresses predication. In turn, each of the particular thematic roles for the direct object might be its own subconstruction (Predicate-Theme construction, Predicate-Goal construction, etc.), falling in an inheritance hierarchy under the general Transitive Verb construction.

However, such a construal of the transitive verb construction would exclude a sizable number of constructions in which the direct object is not an argument of the verb. First, it would exclude the many idioms such as *kick the bucket* that have the form of transitive VPs, but whose direct object has no discrete meaning. Second, it would exclude the *Way* construction in (10a) and the Time-*away* construction in (10b), in which the postverbal NP is licensed by the construction and the verb functions as a manner or means.

(10) a. Bob drank his way through the whole meeting.
b. Bob drank the afternoon away.

Third, it would exclude obligatorily reflexive verbs such as those in (11), where the reflexive is a syntactic argument but not a semantic argument.

(11) a. Dick perjured/asserted himself.
b. Sue availed herself of the opportunity.

Fourth, it would exclude so-called object raising verbs such as *expect*, which can have objects that have thematic roles only with respect to a subordinate verb, or no thematic role at all, as in (12).

(12) a. Bob believes the shit to have hit the fan.
b. Bob expects it to rain.

Fifth, it would exclude Light Verb constructions such as (13), in which the syntactic direct object carries most of the semantic content of the predicate.

(13) a. Bill took a walk/a shower/a nap.
b. Sue made a decision/a vow.
c. Fred put the blame on Bill for the accident.
d. Amy gave Tom a kiss on the ear/a punch in the arm.[5]

Thus, a Transitive Verb construction with the semantic function 'predication' is not general enough to encompass all the cases of transitive verbs in English.

The transitive VP idioms and the constructions in (10)–(13) have the syntax of the normal Transitive Verb construction, but they use the object for something other than its normal thematic function—each in a different way. Since there is no point of semantic generality, a homogeneous Construction Grammar must treat it as an accident that these all display the same syntax. A better solution is to set the syntactic configuration $[_{VP}$ *V NP*] at the top of the inheritance hierarchy, independent of semantics. Then the Predication construction, as well as all of the constructions in (10)–(13), can inherit their syntax from this configuration, while differing in their semantics. This amounts to calling $[_{VP}$ *V NP*] a 'form-only' construction, which is possible only if one adopts a heterogeneous conception of Construction Grammar.

A similar situation arises with the English Verb-Particle construction, which has at least five different interpretations, each with a different relation between syntactic and semantic constituency.[6]

(14) a. *Particle is a directional (path) argument of the verb, alternating with path PPs; postverbal NP and Particle are independent semantic constituents.* John pushed Bill in/out/through/into the hole/out the window/through the pipe.

b. *Particle forms an idiom with the verb; postverbal NP is an independent semantic constituent.*
John looked the answer up. John freaked Bill out.

c. *Particle marks aspect; particle is an independent semantic constituent, but not a verbal argument.*
John ate the sandwich up. John read the book through. The band played on.

d. *Time-away construction; particle marks construction in which verb is semantically subordinate; NP is an argument of the construction but not an argument of the verb.*
We're twistin' the night away. (≈ 'We're spending the night twistin')

e. *Particle forms an idiom with the NP; NP and Particle form a semantic constituent functioning as degree adverbial.*
John sang his heart out. John programmed his butt off.

Because of the heterogeneity of meanings, in particular the different combinations of elements that form the construction (V + Prt in (14b), NP + Prt in (14e)), there is no way to combine these all under a single abstract form-meaning pairing. Thus, in a homogeneous Construction Grammar, each of these constructions has to be stipulated separately, and it is a coincidence that they all happen to converge on the form V-NP-Prt.

A heterogeneous Construction Grammar, in contrast, can say that English has a Verb-Particle construction with certain syntactic properties, for example, the particle can occur before or after the direct object, but it must appear *after* a pronominal object and *before* full PPs. In turn, this syntactic configuration can be used to express five independent semantic configurations. Most likely, the 'basic' semantic configuration is (14a), in which the particle is a genuine argument of the verb, transparently related to directional prepositions. But the same syntax has been utilized by the other four constructions, each in a different way.

In other words, all the different meanings associated with [$_{VP}$ *V NP Prt*] are indeed daughters of a common node in an inheritance hierarchy. However, this common node is the pure syntactic structure itself: this is precisely what they all have in common. And since nodes in the inheritance hierarchy are themselves lexical items, the purely syntactic structure is also a lexical item. In turn, this syntactic structure inherits properties from the more abstract item [$_{VP}$ V…], which expresses the purely syntactic fact that English has a syntactic category VP that is verb-initial.

In the examples so far, a single syntactic structure maps into multiple unrelated meanings. But there are also cases where the mapping between syntax and

semantics is many-to-many. For instance, many of the same semantic relations can be expressed by either N *of* NP, NP*'s* N, or a noun-noun (NN) compound. Example (15) offers a sample.

(15)

	N of NP	*NP's N*	*NN compound*
Part	leg of a chair	the chair's leg	chair leg
Unit	grain of rice	*rice's grain	rice grain
Aggregation	pile of sand	*sand's pile	sand pile
Agent	attack of the zombies	the zombies' attack	zombie attack

A homogeneous Construction Grammar approach forces us to say that English has ten distinct constructions that happen to relate the same four semantic relations to the same three syntactic structures. There is no single most abstract form-function schema under which they all fall. This leaves it apparently an accident that the syntactic structures are the same across all the cases. In contrast, a heterogeneous Construction Grammar allows for a lexicon that includes three autonomous (form-only) syntactic schemas and four autonomous (function-only) semantic schemas. Each of the particular constructions in (15) then inherits its form from one of the syntactic schemas and its function from one of the semantic schemas. In other words, (15) is a rather good representation of the multiple inheritance structure of these constructions. Hence, the grammar gains generality through admitting purely syntactic constructions.

One might contend that there is a common element of meaning among the instances of N *of* NP in (15), namely that the N is semantic head and the complement is some sort of argument or modifier. However, a further N *of* NP construction, illustrated in (16), reverses this relation: the complement of *of* is the semantic head, and the syntactic head serves as a semantic modifier (Asaka 2002; Booij 2002).

(16) a. that scoundrel of a doctor (= 'that doctor, who is a scoundrel')
b. that travesty of a theory (= 'that theory, which is a travesty')
c. a gem of a plumber (= 'a plumber who is a gem')

The syntactic structure is the garden-variety N *of* NP, and we would like the grammar to be able to express this generalization. But a homogeneous Construction Grammar approach does not let us say this, since the semantics of the construction is entirely different from other uses of *N of NP*. Again, a heterogeneous CxG lets us see the construction in (16) as pouring a new meaning relation into an old form.

A heterogeneous Construction Grammar also allows a further possibility: there may be autonomous semantic constructions that are not linked directly to syntax. This is one way of understanding principles of 'coercion,' which permit (partly) conventionalized alternative interpretations of phrases, with no syntactic reflex. A typical case is 'reference transfer,' illustrated in (17).

(17) a. [One waitress to another:] The ham sandwich in the corner wants some coffee.
(ham sandwich = 'the person who ordered/who is eating a ham sandwich')
b. Plato is up there on the shelf, next to Chomsky.
(Plato = 'book by Plato/bust of Plato')
c. I'm parked out back. I got hit in the fender. (I = 'my car')

In the Parallel Architecture, reference transfer is treated as a semantic operator that happens to have no realization in syntax. Since reference transfers are conventionalized, they have to be listed in the lexicon as constructions approximately along the lines of (18) (Jackendoff 1991, 1997*a*).

(18) Syntax: NP_1
Semantics:
a. $[_{\text{Thing}}$ PERSON CONTEXTUALLY ASSOCIATED WITH $[_{Thing}\ x]_1]_1$
b. $[_{\text{Thing}}$ REPRESENTATION OF $[_{Thing}\ x]_1]_1$
c. $[_{\text{Thing}}$ BOOK WRITTEN BY $[_{Thing}\ x]_1]_1$
d. $[_{\text{Thing}}$ VEHICLE BELONGING TO $[_{Thing}\ x]_1]_1$

The effect of these constructions is to permit an NP to refer at the same time to its normal referent (the sandwich) and to the associated individual (the person with the sandwich), with no syntactic marking at all. From the point of view of the speaker, these extra pieces of meaning are things that one need not say overtly; from the point of view of the hearer, these are things that one may have to add into one's interpretation to recover the speaker's intended meaning. That is, like the *Way* construction, these coercions afford economy of phonological and syntactic expression.

In a homogeneous Construction Grammar, coercions must be treated as another sort of phenomenon altogether, since they are not Saussurean signs—they have no form. At best they are operators that change one sign into another (see Michaelis, this volume for one account), or purely semantic processes that have nothing to do with constructions. But in a heterogeneous Construction Grammar, they are just another sort of stored structure.

This partial independence of components is characteristic of the Parallel Architecture. It makes it possible to incorporate the insights of Construction Grammar without committing to a lockstep correspondence between semantic and syntactic combinatoriality.[7]

5.5. Productivity vs. Semiproductivity in Constructions

As laid out in section 5.2, the Parallel Architecture conceives of the lexicon as the long-term memory store of pieces of linguistic structure: words, idioms, affixes, phrase structure rules, abstract linking rules, meaningful constructions, and so

on. Therefore, a central question is: What pieces of structure must be stored in the lexicon, and what pieces can be built from stored parts by online processing? Notice the difference in modality between the two parts of the question. Anything *can* be stored in memory; after all, people memorize the whole Koran. So the issue is what *must* be stored versus what *need not* be.

This question has an important bearing on a crucial issue for Construction Grammar and all lexicalist theories: the nature of productivity and the status of inheritance hierarchies. I find it useful to make a distinction between what I will call 'full productivity' and 'semiproductivity.' Kay (this volume) addresses the same distinction in a different way, which I will discuss below.[8]

A typical fully productive construction is the phrase structure of the English VP: one can learn new transitive verbs and compose them without limit with novel direct objects and novel adjuncts. Within morphology, a typical fully productive construction is the English regular plural. This can be applied to new nouns one has never heard before, and there are no surprises. The classic illustration of speakers' knowledge of its full productivity is the 'wugs test' (Berko 1958), in which 6-year-old children reliably produce plurals for nonsense nouns (and 4- and 5-year-old children do so somewhat less comprehensively). Another well-known fully productive morphological construction is English expletive infixation (McCarthy 1982), which, given proper prosodic constraints, is perfectly reliable in licensing forms such as *kanga-fuckin-roo*.

For fully productive constructions, then, it is unnecessary to store instances, since they can be built online. At the same time, this does not preclude storing particular instances, for example, VP idioms such as *kick the bucket*, plurals lacking a singular such as *scissors*, and (for linguists) well-known exemplars such as *manu-fuckin-facturer*. These will fall under the fully productive construction in an inheritance hierarchy.

Experimental research has further shown that high-frequency derived instances of fully productive schemas may be stored (Baayen, Levelt, and Haveman 1993; Pinker 1999; Nooteboom, Weerman, and Wijnen 2002). Moreover, since the learner has to induce the existence and form of a productive construction from heard and stored instances, a number of stored instances of such constructions are likely to remain after acquisition, at least for some period of time.

A fully productive construction can be subject to listed exceptions, which may be either instances or more specialized constructions. In this case, the fully productive construction functions as a default. This is, of course, the status of the English regular plural, which has various exceptions, both idiosyncratic instances like *women* and semiproductive classes like *sheep/deer/fish*.

The overall point, however, is that the inheritance hierarchy for a fully productive construction is 'open'; it does not exhaust the forms that speakers are ready to produce and understand on demand.

Semiproductive phenomena too display a regularity that can be stated as a rule or construction. However, acceptable instances must be learned and stored individually. Often speakers have the intuition that a new form sounds unusual (a coinage, in Kay's terms); they may observe that they have never heard it before,

and/or they may find it amusing. In other words, the inheritance hierarchy for semiproductive constructions is (relatively) 'closed.'

A typical case of semiproductivity is the class of English denominal verbs such as *butter* (*the bread*), *pocket* (*the money*), *weed* (*the garden*), *hammer* (*a nail*), *father* (*a child*), *mother* (*one's students*), *waitress* (*in a restaurant*), and so on, plus cases using affixes such as *disrobe, de-claw* (*a cat*) and *behead* (*a person*). Alongside *butter* (*the bread*), we might expect to find **mustard* (*the bread*), but we do not (except, if Google can be trusted, *very* rarely in the context of recipes); alongside *carpet the floor* we might expect **linoleum the floor*; alongside *pocket the money* we might expect **envelope the letter* (where *envelop* means something rather different synchronically).

Another case of semiproductivity, where multiple forms compete for the same grammatical slot, is the class of English deverbal nouns such as *contribution, destruction, appraisal*, and *harassment*. To some extent the form of the nominal is phonologically predictable; for example, verbs ending in *-ate* invariably have a nominal in *-ation*. But not every case is predictable. *Recite* has the two nominals *recital* and *recitation*, with different meanings. The phonologically parallel *incite* has *incitement* rather than **incital* or **incitation*, and *excite* has *excitation* and *excitement* but not **excital*.

In addition, the meanings of the existing forms are not entirely predictable. For instance, a *recitation* is only vaguely related to *reciting*, and *excitation*, unlike *excite*, can pertain to electrons but not to people. And despite the semantic similarity of the nouns *father* and *mother*, the corresponding verbs have radically different meanings (I might mother my students, but Adele couldn't possibly father hers). Many other examples appear in Booij (this volume).

Within a semiproductive pattern, there may be subconstructions with full productivity. For instance, the English denominal verb construction has a subconstruction that means 'fasten with N,' such as *nail*, *screw*, *tape*, and *glue*. This case seems fully productive, in that the new fastener *velcro*, unlike *mustard*, occasions no hesitation in forming a related verb. Another fully productive subconstruction is 'communicate via N,' which has given us the new verbs *email*, *text(-message)*, and *skype*. There is no evident morphological or semantic reason for one subclass to be fully productive and the next semiproductive. If anything, the reasons are historical, so they have no bearing on the synchronic grammar.

The distinction between full productivity and semiproductivity has always been a staple of morphology. What has been less noticed is that the same distinction appears in phrasal constructions. For instance, the *Way* construction, the Time-*away* construction, and the Sound+Motion construction are fully productive within the constraints imposed by their selectional restrictions. One need not store instances of these constructions for each verb that occurs in them—only for the idiomatic ones, such as *wend* and *worm* in the *Way* construction and *fritter* in the Time-*away* construction. If we invent a new verb of sound production, say *grimble*, we automatically know that the sentences in (19) are possible, and we know exactly what they mean (Zwicky 1971).

(19) a. *Way* construction:
Joe grimbled his way along the river.
(= 'Joe went along the river making grimbling sounds')
b. Time-*away* construction:
Joe grimbled the afternoon away.
(= 'Joe spent the afternoon making grimbling sounds')
c. Sound+Motion construction:
The car grimbled over the bridge.
(= 'the car made grimbling sounds as a result of its moving over the bridge')

However, some constructions are semiproductive. One case is Sluice-stranding (Culicover 1999; Culicover and Jackendoff 2005). In ordinary Sluicing, which is fully productive, a *wh*-phrase appears in place of a full indirect question (20a), and this *wh*-phrase can include a pied-piped preposition (20b). In Sluice-stranding, however, a preposition appears *after* the *wh*-phrase, as though it were left over from the ellipted clause (20c).

(20) a. John left the meeting, but I don't know when. [Sluicing]
b. John left the meeting, but I don't know with whom. [Sluicing with pied-piped P]
c. John left the meeting, but I don't know who with. [Sluice-stranding]

In ordinary Sluicing with pied-piping, any combination of *wh*-word and pied-pipable preposition is possible, consistent with the semantics; the combinations need not be stored. However, in Sluice-stranding, it turns out that only certain *wh*-words are possible, and each one permits a different collection of prepositions.

(21) . . . but I don't know

a. who with/to/from/for/*on/*next to/*about/*beside
b. what with/for/from/of/on/in/about/at/*before/*into/*near/*beside
c. how much for/*by/*with (*note also* *how many for)
d. where to/from/*near
e. *which (book) with/to/from/next to/about/beside

Culicover and Jackendoff conclude that the acceptable cases of Sluice-stranding must be learned individually, despite their conforming to a common constructional template. Hence, the construction is semiproductive.

A more complex case of a semiproductive construction is the NPN construction (Jackendoff 2008*b*). This structure appears in a number of idioms such as *hand over fist*, *hand in glove*, *tongue in cheek*, and *tit for tat*. It appears more productively with five prepositions, all of which require the two nouns to be identical:

(22) a. day by day, paragraph by paragraph, country by country
b. dollar for dollar, student for student, point for point
c. face to face, bumper to bumper

d. term paper after term paper, picture after picture
e. book (up)on book, argument (up)on argument

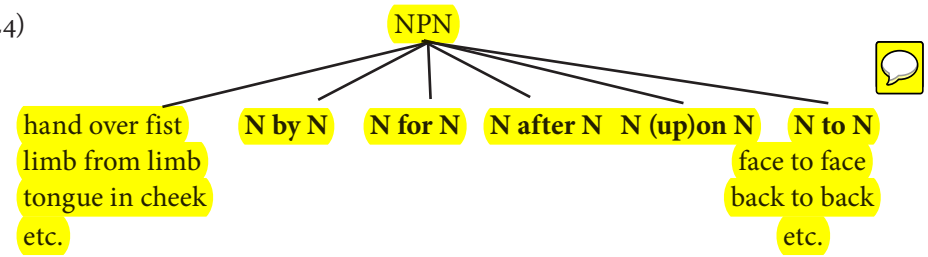
Each of these has its own idiosyncrasies of meaning (whose details I will not go into here). Syntactically, they can all be used as sentential adjuncts (23a) and as prenominal modifiers (23b). However, N *after* N and N (*up*)*on* N are more flexible than the other three, in that they can also be used in NP positions (23c).

(23) a. We studied the world country by country.
Student for student, we have the best record in the state.
b. a day-by-day improvement
a face-to-face meeting
c. Student after/*by student turned in terrible term papers.
She piled up argument upon/*for argument against my position.

By, *for*, *after*, and *upon* are fully productive as to the choice of noun, within the semantic constraints of the construction. But at least one sense of N *to* N, the sense that denotes juxtaposition of parts of two objects, is only semiproductive. Two people can stand *back to back* but not *front to front*—rather they are *face to face*. *Hand to hand* occurs mostly only in the context of combat; *cheek to cheek* in the context of dancing; *eye to eye* in the context of *seeing eye to eye*. The juxtaposition meaning of *side to side* is usually expressed instead by the idiomatic *side by side*; and, unexpectedly, *side to side* can also denote oscillatory motion, parallel to *back and forth*, *up and down*, and *round and round*.

In short, the NPN construction as a whole is semiproductive: it consists of a list of idioms plus the five subconstructions illustrated in (22), each of which has its own semantic and syntactic peculiarities. In turn, four of the five subconstructions are fully productive, but the one with *to* is semiproductive. (24) is a partial inheritance hierarchy for the construction. The fully productive subconstructions, whose instances need not be stored in memory, are notated in boldface.

(24)



To sum up, both fully productive and semiproductive constructions are found in both morphosyntax and phrasal syntax. Both sorts of constructions can be encoded in exactly the same form: expressions consisting of some combination of variables and constants. Both types of constructions can store instances as daughters in an inheritance hierarchy. Fully productive rules are different only in that an indefinite number of further instances can also be created online without any effort or sense of 'coining' and therefore need not be stored in memory.

How should the grammar encode the difference between fully productive and semiproductive constructions? That is, what does the distinction between bold and ordinary type in (24) mean? The similarities between the two types of constructions suggest that we should not segregate them formally, for instance, by putting fully productive constructions in the grammar but semiproductive constructions in a 'meta-grammar,' as urged by Kay (this volume). Rather, we want an account that says the two kinds of rules are formally the same, except for something that marks whether they are fully productive or not.

One's first impulse might be to localize the difference as a diacritic on constructions, in effect taking the difference shown in bold in (24) as theoretically significant. However, a better solution is to mark the distinction with a diacritic on the *variable* in the construction. The reason is that there exist constructions that are fully productive on one variable and semiproductive on another variable. Consider the four constructions of English that yield names of geographical features.

(25) a. Beaver/Wissahickon Creek (also *lake*, *bay*, *island*, *pond*, *mountain*, *hill*, *street*)
b. Lake Michigan/Superior/Geneva (also *mount*)
c. the Atlantic/Pacific/Arctic Ocean (also *sea*, *river*, *desert*, *fault*, *turnpike*)
d. the Bay of Fundy/Biscay (also *gulf*, *isle*)

The variable for the name is fully productive: if you are naming a creek after Dick Cheney, you know it will be *Cheney Creek* (or *Dick Creek*). But you have to learn which pattern a particular type of geographical feature (creek, crater, col, ridge, etc.) fits into, and therefore this variable is semiproductive (though (25a) might be a default).[9] Example (26) shows how the four patterns might be encoded, notating fully productive *variables* in bold. Their shared semantics places them in competition with each other.

(26) Syntax:
a. $[_{\text{ProperN}}\ \boldsymbol{X}_1\ Y_2]$
b. $[_{\text{ProperN}}\ Y_2\ \boldsymbol{X}_1]$
c. $[_{\text{NP}}$ the $\boldsymbol{X}_1\ Y_2]$
d. $[_{\text{NP}}$ the $Y_2\ [_{\text{PP}}$ of $\boldsymbol{X}_1]]$
Semantics:
GEOGRAPHICAL-FEATURE$_2$ NAMED $\boldsymbol{X}_1$

In other words, it is not *constructions* per se that are fully productive or semiproductive; it is the variables in the constructions.

There is a further problem. Children acquiring a language have to pick out the regularities in the input and thereby add constructions with variables to their lexicons. But how does a child discover whether a particular variable is fully productive or only semiproductive? It is not given in the data. How is it that everyone comes up with essentially the same answer?

In morphology, sometimes there is competition between regularities, for instance, in the English past tense, between the *-d* affix, ablaut, zero marking, and

ending in *-ought* (*caught, bought*, etc.). At most one of these can be a fully productive default, so the others must be treated as semiproductive. One might guess that fully productive combinations are generally more frequent in primary linguistic data than semiproductive combinations. For instance, this is presumably a clue for the child that the *-d* past is the default form.

However, not all semiproductive phenomena are in competition with a default. For instance, *N to N* forms such as *face to face* and zero denominal verbs such as *butter* are not in competition with anything, yet they are still semiproductive. Hence, the relative frequency of competing forms cannot be the only factor distinguishing fully productive from semiproductive constructions in acquisition.

Nor are fully productive constructions always frequent. Consider the construction illustrated in (27).

(27) (all) X-ed out = 'exhausted from experiencing X to excess'
  a. I'm Olympic'd out. [recorded in conversation with someone who worked at the Olympics]
  b. He's all knitted out. [after knitting for three days solid]
  c. I'm Bogarted out. [after watching a Humphrey Bogart marathon]

This construction, presumably a calque on *tired out/worn out*, freely allows either nouns or verbs in the variable position, and one clearly does not learn all possible instances. Hence, the construction is fully productive. Yet it is exceedingly infrequent—I would guess one hears it perhaps three times a year in conversation. How do language learners come to the conclusion that it is fully productive on the basis of so little evidence?

It is plausible that children observing a regularity initially encode it as semiproductive, and later upgrade it to fully productive if evidence warrants. This would comport with the evidence that on the whole children are cautious about extending generalizations to new items, but do eventually 'go productive,' going beyond item-based learning (Tomasello 2003). On the other hand, it is not clear how such an account applies to (27), for which there is such skimpy input. Moreover, children are known to overgeneralize semiproductive constructions (e.g., Bowerman's (1982*a*) example *Mommy, giggle me*, overgeneralizing the English causative), so it is not clear that there is a uniform one-way move from semiproductive to productive.

Ideally, we would like an account in which children do not have to 'decide' whether a phenomenon is productive or not. Rather, we would hope that the course of acquisition would follow from the distribution of the data in speech and independent properties of how the brain learns.

This is not the place to solve these problems, only to lay them on the table. Insofar as productivity is an issue not only for phonology and morphology but also phrasal syntax and the theory of constructions, in my opinion it must take a place as one of the central issues of linguistic theory for the coming years (as emphasized also by Barðdal 2008).

5.6. Summary

The motivating insight of Construction Grammar is that the relation of syntax to semantics is established not merely through word-by-word composition but also through a large collection of constructions, in which the meaning of the whole goes beyond the meanings of the words, and in which syntactic structure can itself carry idiosyncratic meaning. This insight finds a comfortable home in the Parallel Architecture, in which phonology, syntax, and semantics are each autonomous combinatorial components, linked by interface components. Within the Parallel Architecture, the constructions of Construction Grammar are particular sorts of interface rules. Both approaches emphasize the contribution of meaning to syntactic form; both approaches argue for the continuity between words, idioms, morphological affixes, and meaningful syntactic constructions; both approaches conceive of the lexicon as organized in terms of inheritance hierarchies.

I have tried to show here that the relatively formal perspective of the Parallel Architecture helps sharpen two issues within Construction Grammar. First, a number of considerations from the Parallel Architecture, some within the immediate ambit of the syntax-semantics mapping and some from further afield in language and cognition, argue that a heterogeneous Construction Grammar is more promising than a homogeneous Construction Grammar. Second, the Parallel Architecture's psycholinguistically based criterion for inclusion in the lexicon, namely being stored in long-term memory, helps clarify the issue of productivity. The distinction between full productivity and semiproductivity is not due to these phenomena being in different parts of the grammar, nor is it due to some difference in the overall form of the constructions in question. Rather, the distinction appears to be localized in a diacritic on the variables within the construction. It is to be hoped that the close compatibility of the two frameworks leads to further useful interchange.

Appendix: Constructions Addressed Within the Parallel Architecture Framework

Argument Structure constructions
- *Way* construction (*belch his way down the road*) (Jackendoff 1990, 1997*b*)
- *With*-Theme (*butter the bread with margarine*) (Jackendoff 1990)
- Recipient NP (*throw Bill the ball*) (Jackendoff 1990)
- Beneficiary NP (*bake Bill a cake*) (Jackendoff 1990)
- Resultative (*hammer the metal flat)* (Jackendoff 1990; Goldberg and Jackendoff 2004)
- Time-*away* (*drink the afternoon away*) (Jackendoff 1997*b*)
- Sound+Motion (*rumble around the corner*) (Goldberg and Jackendoff 2004)
- Disappearance+Motion (*vanish into the woodwork*) (Goldberg and Jackendoff 2004)
- Verb-Particle constructions (Jackendoff 2002b)

Phrasal constructions
- X + *else* (*someone else, anything else*) (Culicover and Jackendoff 1995)
- *the N E* (*the sound p*^{h}) (Jackendoff 1984)
- Focus Reduplication (*you make the salad-salad*) (Ghomeshi et al. 2004)
- NPN (*day after day*) (Jackendoff 2008*b*)
- Noun compounds (*doghouse*) (Jackendoff 2010)
- *No matter* (Culicover 1999)

Sentential constructions
- NP *and* S (*One more beer and I'm leaving*) (Culicover 1972)
- Implicational *and* (*you cough and I'll hit you*) (Culicover and Jackendoff 1997)
- Comparative Correlative (*the more S, the more S*) (Culicover and Jackendoff 1999)
- *Not*-topics (*Not in my car you won't*) (Culicover 1999)

Ellipsis constructions (all in Culicover and Jackendoff 2005, Culicover and Jackendoff 2012)
- *one*-anaphora
- *do it/so* anaphora
- Bare Argument Ellipsis
- Sluicing
- Gapping
- VP ellipsis
- Pseudogapping
- Comparative ellipsis
- Sluice-stranding (*I wonder who with*) (Culicover 1999; Culicover and Jackendoff 2005)

NOTES

1. Detailed comparisons of the Parallel Architecture with Mainstream Generative Grammar appear in Jackendoff (1997*a*, 2002*a* (especially chapters 5–8), 2007, 2008*a*, 2011); Culicover and Jackendoff (2005); Pinker and Jackendoff (2005). These references also offer arguments that some aspects of the language faculty are the consequence of faculty-specific cognitive specializations, in contrast with the consensus among Construction Grammarians (Goldberg, this volume) that all crosslinguistic generalizations can be explained by domain-general cognitive processes.
2. Interestingly, Head-Driven Phrase-Structure Grammar (HPSG) groups these components differently: syntax and semantics together form SYNSEM, which is taken to be the 'function' part of a sign, in opposition to phonology, which constitutes 'form.'
3. I gloss over the issue of how the affix's allomorphy is encoded.
4. They can however be paratactically combined, as in *Yes, you may go* or Michaelis's example (this volume), *Damn, I'm tired*. They can also appear in quotative contexts such as *"Yes," she said* and *words such as "yes."* Such contexts have no syntactic restrictions and so do not depend on syntactic features for their instantiation.
5. This example furthermore uses the syntax of the Ditransitive construction to express something normally couched as a simple transitive: *Amy gave Tom a kiss* paraphrases *Amy kissed Tom*.
6. See Jackendoff (2002*b*, 2010: 249 note f.). Note also that in (14d, e) the syntactic direct object is not an argument of the verb.
7. I am unaware of evidence in favor of homogeneous Construction Grammar. Rather, the assumption of homogeneity seems to be held over from the roots of these particular versions of Construction Grammar in Cognitive Grammar. In both Cognitive Grammar and Construction Grammar, it has been correctly argued that some—even many—syntactic structures bear meaning. But for the reasons adduced in this section, I believe it is inappropriate to extend the existential quantifier to a universal.
8. Barðdal (2008) regiments a large number of senses of the term 'productivity' in the literature, but does not appear to pick out the exact contrast I am concerned with here. A full discussion of where her approach and mine overlap and where they diverge is beyond the scope of this chapter. However, her 'cline of productivity,' which depends on type frequency and degree of coherence, appears to me to be a characteristic of what I am calling semiproductivity; it is semiproductive constructions in my sense that can be 'more or less productive' in her sense.
9. A further complication is that *lake* and *bay* appear in two different patterns, so one has to learn instances of *lake* and *bay* one by one.