

9

Argument structure and argument structure alternations

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9.1 Introduction

One of the major scientific results of Chomskian syntactic theory is the understanding that the symbolic representations of natural language are *structured*, by which I mean that symbols are organized in hierarchical constituent data structures, and are not simply linearly ordered strings or lists of memorized items. The semantic ‘arguments’ of predicates are expressed within natural language data structures, and therefore also form part of structured representations. This chapter is devoted to examining the major theoretical results pertaining to the semantics of verbal predicate argument relations and their systematic patterning in language. However, we will see that even isolating the logical domain of inquiry will involve certain deep questions about the architecture of grammar, and the relationship between listedness and compositional semantics.

Historically, the most important results in argument structure have come from those studying the properties of the Lexicon as a module of grammar, for a number of rather natural reasons as we will see. While this chapter will aim to give the reader a clear historical and ideological context for the subject matter and will document major influential strands of research, it will primarily concentrate on extracting the generalizations that I judge to be the lasting results of the past fifty years, and then secondarily, draw attention to the (still unresolved) architectural and theoretical issues that are specific to this domain.

Section 9.2 gives the perspective on the issues from the vantage point of the Lexicon, i.e. the practical problem of deciding how much and what kind of information is necessary for the listing of verbal lexical entries. It also serves as a kind of historical contextualization and background for the later sections of the article which describe the morphosyntactic patterns more generally. Section 9.3 gives a morphosyntactic overview of the

patterns in argument structure related to SUBJECT selection. Section 9.4 does the same for the OBJECT position. While Sections 9.3 and 9.4 are basically about grammatical function, Section 9.5 reviews the correlations with one other important interacting syntactic phenomenon, namely case (see also Chapter 17). Section 9.6 explores the relationship between argument structure and the architectural interfaces, discussing in particular the interaction with discourse and cognitive facts (9.6.1), and the modular interaction between the Lexicon and the syntactic computation (9.6.2) in accounting for argument structure generalizations.

9.2 The View from the Lexicon

The history of isolating ‘argument structure’ as a distinct domain of inquiry in the modern era begins with notions of subcategorization and the specification of the information that a speaker knows when they know individual words (specifically, verbs) in their language. Thus, it was recognized early on that phrase-structure rules needed to be supplemented with a Lexicon that stated conditions of insertion for individual items, which included not just category membership but also context of insertion (Chomsky 1957, 1965). So, while the phrase-structure rule for VP might allow for optional NP, CP, or other kinds of complements to V, the lexical entry of an individual verb would ensure that it could only be inserted if the ‘matching’ phrase structure rewrite rule had been chosen. A toy example is shown in (1).

- (1) Phrase Structure Rule: $VP \rightarrow V (NP/CP)$
 Lexical Entry for *hit*: V; ___NP
 Lexical Entry for *deny*: V: ___CP
 Lexical Entry for *dine*: V: ___

Variability in a particular verb’s insertion possibilities could be captured in one of two ways: one could either list two distinct lexical entries with slightly different subcategorization frames (2i), or optionality could be built in to the subcategorization frame of a single entry as in (2ii).

- (2) (i) Lexical Entry for *believe*₁: V; ___NP
 Lexical Entry for *believe*₂: V; ___CP
 (ii) Lexical Entry for *eat*: V; ___(NP)

Built into this system is the idea that a distinction needs to be made between lexical information that is relevant to the syntax, and that which is not. The lexical entry for *eat* above does not exhaust what the speaker knows when they know that word of English. A messy and sometimes conventional, sometimes idiosyncratic collection of conceptual information and associations goes along with each lexical item as well. Some of this information is implicated in judgments of infelicity, as opposed to straight up ungrammaticality. For example, the verb *eat*

requires as its SUBJECT an entity which imbibes, or is at least living; an inanimate or abstract SUBJECT sounds nonsensical at worst, and poetic (requiring metaphoric interpretation) at best (3).

(3) ‡ happiness ate the apple

Such information is often discussed under the heading of ‘semantic selectional restrictions (s(ematic)-selection)’ and not included in the formal lexical information about subcategorization for particular syntactic categories (c(ategory)-selection) (Chomsky 1965). Of course, the relationship between these types of information is potentially more complicated. In the case of argument selection, one possibility is that a lexical verb has a semantic selectional requirement, which, because of ‘canonical realization rules’ mapping from denotations to syntactic category, *translates* into particular c-selectional requirements (see Grimshaw 1979, 1981 for the idea that c-selection and s-selection are autonomous subsystems with ‘canonical’ mapping principles). This raises the question of whether c-selection needs to be stated independently at all – Pesetsky (1985) argues that they might be made to follow from independently needed statements about case assignment. However, more recent syntactic thinking casts doubt on the idea of the GB style ‘Case Filter’ as a primitive of grammar (rightly, I think), placing the burden back onto a basic notion of c-selection. There are two important ideas not to lose sight of here. First, the idea that some lexical information is relevant for syntactic behavior and some not remains an important truth, which should not be ignored as more detailed systems of argument classification are proposed. Specifically, distinctions in verb meaning must be encoded only insofar as they have systematic effects in the grammar. Second, some form of syntactic selection seems to be a fact of life, and cannot and should not be ignored when specifying the grammar (Emonds 2000), hopefully reducible to selection for syntactic category of complement (Svenonius 1992).

To an important degree of approximation, the early systems of phrase-structure rule and lexical subcategorization frame worked very well, although they already raised the question of how to decide when separate lexical items were appropriate, or when the ‘same’ item was being used in two different ways. When two distinct alternants are available, as in the case of *give* (V; ___NP NP and V; ___NP PP) a single entry with optionality brackets does not suffice. If two lexical entries are given, how does one represent the fact that the two entries are related? In the case of the dative alternation, it was problematic that the alternation seemed to be *systematic* to a particular class of transfer predicates (see Oehrle 1976 for an important early study). Since the lexicon was supposed to be the repository of idiosyncratic memorized information, listing each transfer verb and its alternants individually raised the obvious spectre of the ‘Missed Generalization.’

Indeed, missed generalizations were to be the driving force behind much of the early work on lexical argument structure: if thematic roles

could be classified abstractly, and if patterns could be discerned across verb classes, then that was an obvious advance on mere listing. Such generalizations were noticed very early in the generative tradition (Gruber 1965, Fillmore 1968) and attempts were made to describe overarching principles that accounted for them. These generalizations could be stated in terms of general transformations as in Fillmore (1968), or in terms of a filter as in the case of the work of Gruber (1965). The publication of Chomsky's 'Remarks on Nominalization' (Chomsky 1970a) convinced many that there was another source or locus for stating generalizations/rules other than through transformations, and the tradition of capturing argument structure regularities in the Lexicon was born. Thus, alternations that were systematic could now be captured by rule, in this case 'Lexical Redundancy Rules' (Jackendoff 1972, 1975) since they represented a general pattern (apparently internal to the Lexicon). Although Chomsky himself did not advocate this move, it was a natural one for people to make, given the number of other generalizations that needed to be captured in the different realizations of related lexical items. I quote from Jackendoff (1975) here, to underline the point.

Without transformations to relate *decide* and *decision*, we need to develop some other formalism. Chomsky takes the position that *decide* and *decision* constitute a single lexical entry, unmarked for the syntactic feature that distinguishes verbs from nouns. The phonological form *decision* is inserted into base trees under the node N; *decide* is inserted under V. Since Chomsky gives no arguments for this particular formulation, I feel free to adopt here the alternative theory that *decide* and *decision* have distinct but related lexical entries. (Jackendoff 1975: 640–41)

Thus, while Marantz (1997) is correct in pointing out that Chomsky's actual position in 'Remarks' may have been closer to the current Distributed Morphology (DM) idea of acategorical roots (see Section 9.6.2), the fact remains that the attack on over-powerful transformations provoked many linguists to seek a systematic alternative in terms of the lexicon, where the notion of selection/projection could be maintained and where generalizations of a different nature could be stated (specifically, argument structure generalizations). (We will return to a discussion of the DM position in relation to lexicalism in the final section of this chapter.) In fact, Jackendoff's solution for expressing the "relations between lexical entries" in terms of 'lexical redundancy rules' was not intended to be a transformational device, but rather the expression of the degree of redundancy between lexical entries that would be input to an economy metric that assessed the overall economy of the grammar which contained them.

The dominance of lexical theories in the domain of argument structure throughout the seventies and eighties is thus largely the result of contingent factors in the way the theory developed. It is important to realize that

the very earliest work (cf. Gruber 1965 vs. Fillmore 1968) was divided about the place in the grammar where such generalizations should be located. I think those questions have resurfaced today, essentially because they were never really resolved. The major portion of the chapter however, will deal with outlining what we know about the actual generalizations themselves. Since much of that work is couched in a lexicalist framework, we need to first examine the tools that became current in the early stages of the theory. As we proceed, it will be important to keep separate the tools used in a specific type of theory, from the generalizations that they aim to express.

9.2.1 The rise and fall of thematic roles and thematic hierarchies

An early and important strategy for enriching the data structures of the Lexicon was the addition of thematic role labels, which were supposed to represent natural classes of participant which were relevant for syntactic patterning. One of the most important syntactic generalizations seemed to involve the choice of SUBJECT, but generalizations about case marking and choice of OBJECT vs. OBLIQUE were recognized early on as being relevant. Once thematic role labels are present in the data structures for individual lexical items, they can be input to statements that map directly to the syntax. Possibly the first thematic hierarchy was implicitly invoked by Fillmore (1968) in the service of stating a SUBJECT selection principle:

- (4) if there is an A [= Agent], it becomes the SUBJECT; otherwise, if there is an I [= Instrument], it becomes the SUBJECT; otherwise, the SUBJECT is the O [= Objective, i.e. Patient/Theme]. (Fillmore 1968:33)

This essentially reduces to a SUBJECT selection principle which takes the highest role on the following hierarchy:

- (5) Agent > Instrument > Patient/Theme

Thematic hierarchies were attractive to linguists because they were general structures which could be appealed to in the statement of a number of different syntactic generalizations. However, that appeal is dependent on there being a single such hierarchy, as opposed to different rank orderings depending on the phenomenon being investigated. Unfortunately, the consensus now seems to be that this simply is not the case. Levin and Rappaport Hovav (2005) list sixteen distinct thematic role hierarchies, organized by where Goal and Location are placed relative to the Patient/Theme roles, for example.

Indeed, Levin and Rappaport Hovav (2005) give a convincing deconstruction of the types and uses of thematic hierarchies over the years in which they had their heyday. They show that the different thematic hierarchies across researchers arise because a number of different factors. First of all, there is often a difference in scope or granularity involved, directly related

to the type of syntactic phenomenon that is being accounted for. Thus, accounting for SUBJECT selection tends to provoke a different set of roles from the task of accounting for OBJECT selection or case marking. Also, researchers vary in whether they map the thematic hierarchy into syntactic relations in a top-down or bottom-up fashion, with or without fixed points, or in whether they believe that mapping to the syntactic representation is then input to further transformational rules or not. However, even after details of technical implementation are accounted for, it does not appear to be the case that a single hierarchy is relevant for all types of generalizations concerning the mapping to syntax. Rather, individual hierarchies are often simply convenient notations used to state one particular generalization in a particular domain, and are the statement of a pattern rather than an explanation of it. I refer the reader to Levin and Rappaport Hovav (2005) for more detailed exposition and examples.

An important dissenting voice to the thematic role and thematic hierarchy method of expressing the mapping to syntax came from Dowty (1989), who argued that the roles in use in the literature did not have clear definitions or entailments that were testable in a way that was replicable across researchers. In Dowty (1991), he argues further that the thematic roles need to be decomposed and that the primitives are really certain entailments which are 'prototypical' entailments of SUBJECT vs. OBJECT respectively. The choice of SUBJECT in Dowty's theory derives from which argument possesses more of the proto properties of SUBJECT than the others. Dowty (1991)'s list of proto-role properties is given below.

(6) **Dowty's proto-roles (1991)**

Contributing properties for the *Agent proto-role*

- a. volition
- b. sentience (and/or perception)
- c. causes event
- d. movement
- e. referent exists independent of action of verb

Contributing properties for the *Patient proto-role*

- f. change of state (including coming into being, going out of being)
- g. incremental theme (i.e. determinant of aspect)
- h. causally affected by event
- i. stationary (relative to movement of Proto-agent)
- j. Referent may not exist independent of action of verb, or may not exist at all.

Dowty's argument selection principle (Dowty 1991)

The argument of a predicate having the greatest number of Proto-agent properties entailed by the meaning of the predicate will, all else being

equal, be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-patient properties will, all else being equal, be lexicalized as the direct object of the predicate.

General dissatisfaction with the thematic role approach made Dowty's system of proto-roles attractive to many linguists. The system was flexible, and even allowed for cross-linguistic disagreements in cases where the proto-role count was either even, or at least ambiguous. Moreover, the particular entailment properties that Dowty isolated seemed to be both easy to verify truth-conditionally, as well as have a general cognitive plausibility as primitives. Despite these advantages, it is important to realize that Dowty's system is essentially a retreat from a generative systematic treatment of argument structure patterns. The principle of argument selection given above cannot be seen as a fact about the synchronic computational system (since plausibly, grammars should not be able to 'count' (see Prince and Smolensky 1993) and are not actually subject to internal variability in cases of 'ties'). The Dowty principles above basically give up the idea that the generalizations we see should be represented in the core grammar – the principles he gives must have the status of general cognitive tendencies which ultimately underlie how various concepts tend to get lexicalized (memorized) in natural language (as the quote from Dowty's argument selection principle actually makes explicit).

I will say no more about the proto-role approach in this chapter, merely noting that its popularity is an important indicator of the failure of the thematic hierarchy approaches, and that it remains an alternative type of strategy for those who believe that argument structure generalizations lie outside of the grammar proper.¹ The logical conclusion of the Dowty approach takes us back to the method of listing and memorizing each lexical item separately, even when they look identical and exhibit argument alternations that seem to be systematic. This chapter, however, explores the opposite view, that argument structure generalizations tell us something real about the way that linguistic representations are structured (while still conceding that this is probably underwritten by our human cognitive tendencies).

The conclusion of Levin and Rappaport Hovav (2005) is that “it is impossible to formulate a thematic hierarchy which will capture all generalizations involving the realization of arguments in terms of their semantic roles” (p. 183). However, they do argue that *some* apparent thematic hierarchy effects arise because “embedding relations among arguments in an event structure are always respected in argument realization, with more embedded arguments receiving less prominent syntactic realizations” (p. 183). Thus, the dominant lexicalist position and general consensus seems to be moving toward more structured representations of lexical meaning: instead of role lists and an independent statement of ranking, we find event structure templates, or abstract representations of force

dynamical interactions that exist in parallel to other kinds of conceptual information (Levin and Rappaport Hovav 1995, Pustejovsky 1995), or action tier (Jackendoff 1990a, Croft 1998), which are then projected onto the syntax.

9.2.2 Conditions on linking

In a lexicalist theory, the representation of lexical meaning must bear some relation to the syntactic structures those lexical items appear in. In the early days of subcategorization frames and an unstructured lexicon, this could simply be stated in terms of *matching*, since the information in the subcategorization grid was taken from the same vocabulary of symbols and relations as the information in the phrase structure. With the rise of structured lexical representations that utilize semantic primitives that are distinct from syntactic category labels and structures, such theories need ‘mapping principles’ to correlate the two types of representations. Thus, the history of argument structure is closely tied to the history of ‘mapping principles’ of various types, from very general and underspecified, to extremely specific.

The most general of these principles is the the Projection Principle, which merely says that the information encoded in the lexicon cannot be ignored or ‘lost’ during the course of a syntactic derivation; this will include information about category and thematic roles assigned in the classical theory. The Theta Criterion is specific to thematic role information and it enforces a one-to-one mapping between labeled argument positions in the lexicon and syntactically represented arguments.

(7) The Projection Principle

Representations at each syntactic level (i.e., LF, and D- and S-structure) are projected from the lexicon, in that they observe the subcategorization properties of lexical items. (Chomsky 1981:29)

(8) The Theta Criterion

Each argument bears one and only one θ -role, and each θ -role is assigned to one and only one argument. (Chomsky 1981:36)

However, even here we find differences. As Levin and Rappaport Hovav (2005) point out, mapping from thematic hierarchies can either work from the top down or from the bottom up, or directly rely on certain syntactic anchors for elements on the hierarchy. Thus, in Lexical-Functional Grammar (LFG), which takes grammatical functions (SUBJECT, OBJECT, OBLIQUE) to be primitives, the rules do not match up hierarchies so much as use distinguished positions on the hierarchy of thematic roles to map to independent syntactic primitives (Bresnan 2001; see also Chapter 6).

Another difference between theories of linking is the question of whether syntactic transformations can operate on the output of the linking rules or not, to create final syntactic relationships different from the initial ones. This state of affairs is commonplace in Government and Binding (GB)-like theories and their descendants which map to an *initial* structural position (D-structure), while it is not considered an option in LFG where mapping is directly to the F-structure² of the sentence, and where grammatical function does not get changed by syntactic rule. This leads to the classical conflict between the two theories with regard to stating a ‘rule’ in the lexical module, or as a syntactic movement/transformation (cf. Alsina 1992 vs. Baker 1988). I will not pursue this type of debate further in this chapter since it seems to bear more on an argument between LFG and GB than on the substantive issue of what the best statement of the semantic factors correlating with argument structure generalizations are, and on what constraints best express the alternation possibilities.

In general, linking theories tend to divide on whether they assume that the mapping to syntax is ‘absolute’ or ‘relative.’ In absolute systems, a particular thematic role or feature has an absolute syntactic correlate (a particular place in the phrase structure, or a particular syntactic feature); in relative systems, the mapping of a particular thematic role or feature to the syntax depends on what other thematic roles or features are also being mapped for that lexical item or construction. Pure hierarchy matching systems are essentially relativistic, but since the consensus in the argument structure literature seems to be that no single hierarchy has enough generality to provide a principled mapping theory for all the purposes required, I will say nothing further about them here.

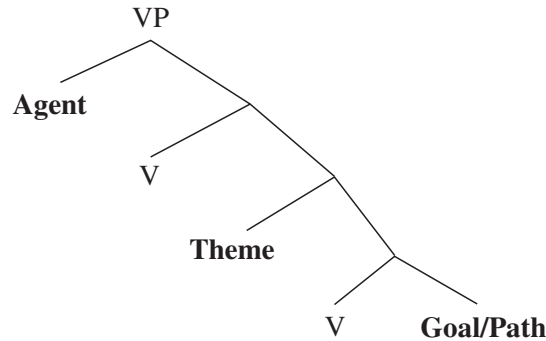
Various absolute mapping principles have been proposed over the years, which have been very influential. The formalization of the intuition goes back to Relational Grammar and its Universal Alignment Hypothesis (UAH) (Perlmutter and Postal 1984), which states that there are universal principles of grammar which determine a nominal’s initial syntactic representation in the relational structure, from its meaning. The intuition is expressed most famously in its GB version as Mark Baker’s Uniformity of Theta Assignment Hypothesis (UTAH), which makes explicit reference to D-structure, but leaves open the nature of the structural relationships (assumed here to be phrase structural position) and thematic relationships (often assumed to be thematic role label, although this is not strictly necessary) involved.

(9) **The Uniformity of Theta Assignment Hypothesis (UTAH)**

Identical thematic relationships between items are represented by identical structural relationships between those items at the level of D-structure. (from Baker 1988:46)

This principle can be interpreted in many ways depending on the number and fine-grainedness of the thematic roles assumed. In a recent version of the UTAH and the roles that go along with it (Baker 1997), a very pared down set of abstract roles is correlated directly to particular syntactic positions at the bottom of the verbal phrase structure.

(10)



The claim that there is a systematic mapping between structure and meaning is clearly consistent with a number of different proposals about what that mapping is. In other words it is not itself a theory of that mapping, but the statement of the assumption that such a mapping does indeed exist.³ Thus, it is consistent with theories such as Tenny's Aspectual Interface Hypothesis (AIH) (discussed more fully in Section 9.4), among others (Tenny 1987, 1994). Interestingly, UTAH-friendly theories are also applicable to architectures which do not employ structured *lexical* representations, since the mapping between semantics and structure is assumed in more constructivist theories as well (e.g., Ramchand 2008).

In other cases, 'linking' principles impose certain architectural assumptions on the theory. In particular, the Projection Principle, while seemingly innocuous, requires that lexical alternations be underwritten either by highly underspecified lexical items, or by items that have first undergone modification by rule in the lexicon. Clearly, it was designed to disallow a system where syntactic rules could arbitrarily destroy lexically present information. However, such a system also disallows a model of partial projection of information to capture certain alternations (such as that proposed in, e.g., Ramchand 2008). Similarly, the Theta Criterion is designed to work with thematic role labels that label participants holistically, and not for more abstract feature decompositions. The one-to-one mapping that it enforces makes it necessary to posit coreference relationships as rules in the lexicon if 'roles' are to be fused under certain conditions.⁴ Most importantly, these principles assume that the lexicon does contain information *to be* projected, an idea often denied in recent constructivist approaches (Marantz 1997, Harley and Noyer 2000, Borer 2005b). While the Theta Criterion (Hornstein 1990) and indeed the notion of a generative lexicon have come under fire in recent years (Borer 2005b, Ramchand 2008), it is important to keep sight of the fact that these two

conditions together were designed to rule out generating such grossly offending forms as those in (11) below.

- (11) a. *John hit
b. *Mary elapsed the time
c. *John ate dinner the fork

While this chapter does not wish to presuppose the existence of a structured lexical database with database internal rules, any rethinking of the grammatical architecture still needs to deliver these basic results.

This section has attempted to give some overview of the types of mechanisms and assumptions involved in the treatment of argument structure representation over the last thirty years. It is necessary to understand these various positions in reading any of the vast and important literature on this topic, which has contributed to our knowledge of the detailed empirical generalizations at stake. However, there will be certain strands of research that I will not follow up on in discussing the data in subsequent sections. This is because I believe that a certain consensus has been reached on a number of major points. Specifically, I will not assume that simple role lists or thematic hierarchies are adequate to the job of expressing the generalizations we see. I will assume rather that argument relations have an inherent structure to them, and that this is manifest in the syntactic representation. I will also not confine myself to the problem of SUBJECT selection, but look more generally at OBJECTS and PP arguments as well, touching on case, as another possible morphological correlate of argument structure generalizations in the syntax.

9.2.3 Accounting for lexical variability

Nominal projections bear certain semantic relations and bear participant roles in an eventuality described by a verb. The nature and structuring of those participants is what we have been referring to here as ‘argument structure.’ Argument structure, however, often implies a rigid structured representation that is lexically associated with a particular verb. In what follows, I will often use the more neutral terms ‘participant relations’ or ‘event participancy’ to refer to the relationship between a nominal entity and the eventuality that it participates in. The central empirical concern of the ‘argument structure’ literature is to uncover the morphosyntactic patterns that correlate with types of event participancy. This enterprise is often embarked on in conjunction with the separate (and sometimes confounded) architectural question of what a speaker knows when they know the limits and flexibilities of a verb in their language – the ‘User’s Manual’ for each particular verb. The existence of pervasive lexical variability shows us that these are not at all the same question, and answering the first question with a rich listed representation as a ‘lexical’ entry is not sufficient. The existence of systematic regularities and rigidities in verbal

meaning on the other hand, shows us that the strategy of ignoring the second question altogether, as in many radical constructivist accounts (Marantz 1997, Harley 1995, Borer 2005b), invoking convention and real-world knowledge to provide limits to verbal usage, is also not adequate. I give a brief overview here of the most discussed alternations and patterns that have been uncovered in the literature, since these constitute important data for answering both the empirical question, and the architectural question above.

The simplest argument alternation patterns noticed in the literature involved a single set of 'arguments' which offered a choice in realization possibilities. One important class of alternations involves variation in the choice of direct OBJECT. In the DATIVE/DOUBLE OBJECT ALTERNATION, the 'goal' argument can either be expressed as a *to*-PP alongside a 'theme' direct OBJECT (12a); or both participants can be expressed as DPs, with the 'goal' argument acquiring direct OBJECT status (as diagnosed by passivizability) (12b).

- (12) DATIVE ALTERNATION:
 a. John gave the book to Mary
 b. John gave Mary the book

In the LOCATIVE ALTERNATION, either the 'location' (13a), or the 'located substance' (13b) can be the direct OBJECT with the other participant being expressed as a *with*-PP or a location PP respectively.

- (13) LOCATIVE ALTERNATION:
 a. John smothered the toast with marmite
 b. John smothered marmite on the toast

In CONTACTIVE ALTERNATION (classified as the *with/against*-alternation by Levin 1993), either the contacted object can be the direct OBJECT with the instrument a *with*-PP (14a), or the instrument can be the direct OBJECT with the contacted object expressed as a locative PP (14b)

- (14) CONTACTIVE ALTERNATION:
 a. John hit the table with the cricket bat
 b. John hit the cricket bat against the table

Alternations can also occur in two-argument verbs, where a DP OBJECT or SUBJECT argument can be realized alternatively as a PP OBLIQUE. Below we see the alternation between OBJECT and OBLIQUE (15) (better known as the CONATIVE ALTERNATION).

- (15) CONATIVE ALTERNATION:
 a. John ate the apple
 b. John ate at the apple

The important thing about these alternations is that they do not simply involve individual lexical items. Rather, each alternation seems to be

productively available for a wide class of verbs in each case, where the class of verbs has a recognizable semantic profile. Multiple listing of variants simply misses these generalizations. Instead, we must capture the patterns at the level of (lexical or syntactic) rule.

While the above alternations tempt the lexicalist to model them with a single argument list with different realization options, the CAUSATIVE-INCHOATIVE ALTERNATION is less straightforwardly a case of a single lexical entry, because the number of arguments is different in each version.

(16) CAUSATIVE-INCHOATIVE ALTERNATION:

- a. the window broke
- b. John broke the window

Moreover, even viewing the two alternants as related lexical items has provoked controversy over which of the two variants, the transitive or the intransitive, should be considered derived from the other. Authors like Levin and Rappaport Hovav (1995), Reinhart and Siloni (2004) and Chierchia (2004b) argue for deriving the intransitive variant from the transitive one, by means of argument suppression. Other authors (Ramchand 2008, Davis and Demirdache 2000) build the transitive version from the intransitive one. In languages like English, there is no morphological difference between the alternants, but this is far from universal. Haspelmath (1993b) considers the alternation from a typological perspective and points out that there are languages where morphology is added to a transitive/causative form to give an intransitive (e.g., Slavic; Romance), as well as languages where morphology is added to the intransitive to give the transitive (e.g., Hindi; Indonesian). In English, however, the morphology does not give us any indication about which alternant, if any, is the derived form.

A lexical theory containing linking principles such as those described above essentially has three main options in dealing with such flexibility. The first option is to make the linking principles themselves flexible and non-deterministic. This is in a sense the option taken by Dowty (1991) and certain versions of LFG (cf. Bresnan 2001). The second option is to claim that the (a) and (b) sentences above involve the same underlying configurations, but at least one of them involves a non-trivial syntactic derivation. This, for example, is the option taken by Larson (1988a) in his treatment of the DATIVE ALTERNATION, and the solution advocated by Baker (1997). The extent to which this general strategy is plausible will depend on the syntactic principles required being independently justifiable, and not ad hoc additions to the syntactic toolbox merely to save the UTAH and its kin. The third strategy of course is to claim that the thematic roles in the (b) sentences are actually different from those in the (a) sentences (cf. Oehrle 1976, Pesetsky 1995, Harley 2000 for the double object construction). This is in fact the claim Baker (1997) makes for the

LOCATIVE ALTERNATION, although not for the DATIVE ALTERNATION. The success of this strategy revolves around resolving the tension between the need to use fairly abstract thematic labels to capture the natural classes which exist but which are nevertheless subtle enough to distinguish between thematic relationships in the closely related pairs above.

Further instances of argument structure variability are less easy to classify as ‘alternations’ *per se*, since they involve the addition of material or deletion of arguments, and do not simply manipulate a single ‘role list.’ Moreover, these instances of variability turn out to be pervasive, and not merely marginal characteristics of verbal behavior. It is the existence of variability such as the list of examples shown below for *eat* (17), which have persuaded many constructivists that the ‘construction’ is the domain of argument structure information, not the lexical item (Borer 2005b, Goldberg 1995). The examples of *siren* in (18) taken from Borer (2005b) are especially striking because the verb in question has been ‘productively’ formed from the nominal *siren*, making the memorization of multiple lexical items unlikely.

(17) CONSTRUCTIONAL VARIABILITY:

- a. John ate the apple
- b. John ate at the apple
- c. the sea ate into the coastline
- d. John ate me out of house and home
- e. John ate
- f. John ate his way into history

- (18) a. the fire stations sired throughout the raid
 b. the factory sired midday and everyone stopped for lunch
 c. the police sired the Porsche to a stop
 d. the police car sired up to the accident
 e. the police car sired the daylights out of me

(from Borer 2005b)

- (19) a. Kim whistled
 b. Kim whistled at the dog
 c. Kim whistled a tune
 d. Kim whistled a warning
 e. Kim whistled me a warning
 f. Kim whistled her appreciation
 g. Kim whistled to the dog to come
 h. the bullet whistled through the air
 i. the air whistled with bullets

(from Levin and Rappaport Hovav 2005)

Levin and Rappaport Hovav (2005) point out that with this kind of phenomenon, once again, we are not just dealing with a single verb like *whistle*, but with a whole class of noise emission verbs in the case of (19)

above. They also point out that many of the sentences in the above examples involve the *addition* of linguistic material. They use the term Event Composition for constructions of this type, avoiding the term ‘complex predicate formation,’ although some of these phenomena have been known under that label, or under specific construction labels such as ‘the resultative construction.’ These kinds of examples are important because they show that a static lexicon with a rigid mapping to syntactic structure is untenable – the kinds of syntactic transformations that one would need to convert one ‘sentence type’ to another would be way more powerful than any modern theorist would countenance, including both deletions and contentful additions (cf. Chomsky 1970a).

To drive home the point, consider the case of the resultative construction, shown below in (20). The (a) sentence contains a verb *break* which selects for a direct OBJECT, but in general *run* does not allow a direct OBJECT of this type. On a very basic distributional level, removing the adjectival predicate in (a) leaves a grammatical sentence, while removing it in (b) does not.

- (20) a. John broke the safe open
 b. Mary ran her shoes ragged

The paradox of the resultative construction thus resides in the failure of lexical statements about a verb like *run* to carry over to its behavior when different adjectival resultative predicates are present. In fact, the problem may occur in more subtle form for *all* resultatives, even the ones like (a) where it looks like there is no problem. For example, it has been argued that the semantic entailments over the direct OBJECT in a resultative construction are simply different from those found with the very same verb and OBJECT alone (Hoekstra 1988). If this is correct, then one might argue that the OBJECT in a resultative construction such as (20) above is *never* in a direct selectional relationship with the main verb (this is the position assumed by all ‘small clause’ analyses of the resultative construction; Kayne 1985, Hoekstra 1988, den Dikken 1995). Possibly, not all resultatives should be analyzed the same way, but even those analyses which maintain a selectional relationship between the verb and the direct OBJECT must find a way of ‘adding’ the entailments/selectional restrictions of the resultative secondary predicate (as in the ‘complex predicate’ analysis of the construction; Johnson 1991, Neeleman 1994a, Zeller 2001). Thus, not only does ‘the safe’ in (20a) get ‘broken,’ it also becomes ‘open’ as a result of the breaking. The resultative construction shows that generalizations over semantic role and syntactic behavior are not exclusively properties of a single lexical item, since the whole VP has to be taken into account. There seems to be an emerging consensus in the literature that sentences of this type require some kind of complex event structure, although whether these are built by systematic mechanisms (Carrier and Randall 1992, Levin and Rappaport 1998, Wunderlich 1997), or memorized

as chunks (Goldberg and Jackendoff 2004) is still a matter of controversy. Among the theorists who choose to model the generalizations generatively and build up possible event structures using rules or constraints, it is a much debated architectural question whether that generative capacity should be located within a lexical module (Levin and Rappaport Hovav 1995 on 'template augmentation') or within the syntax proper (Ramchand 2008).

9.3 The view from morphosyntax: subject selection

Morphosyntactic representation is a hierarchically structured representation of individual signs. From this point of view, one should ask about which generalizations within the morphosyntax are correlated with the semantics of participant roles. Initially within the literature, argument structure properties were used to predict 'SUBJECT' selection, but in principle, argument properties have correlations with selection for other grammatical functions as well, such as 'OBJECT' and 'INDIRECT OBJECT.' Some theories assume that grammatical function in this sense is a primitive in its own right (e.g., Lexical-Functional Grammar), while other theories deconstruct these notions as positional ones in the morphosyntactic hierarchical representation.

Be that as it may, in the clear cases, there is general agreement on empirically isolating SUBJECT vs. OBJECT in natural languages, where many diagnostics coincide. Thus, even in languages with rather different typological properties, it has been argued that the notion of SUBJECT can be defined and has a number of recognizable properties within grammatical patterning. Keenan (1976) argues that the notion of SUBJECT is necessary to account for linguistic generalizations with regard to accessibility for relativization and agreement (see also Perlmutter and Postal 1984). SUBJECT also serves as the antecedent for reflexives, and it is the SUBJECT function that is deleted and referentially resolved in 'control' structures (see Chapter 16), the SUBJECT function is also the deleted element in 2nd person addressee imperatives (Keenan 1976). Generalizations about choice of SUBJECT therefore remain a robust source of evidence for argument structure, which have some potential for being compared crosslinguistically, even where details of morphosyntactic representation vary.⁵

In this section, I summarize what I take to be the major patterns and generalizations that have emerged from essentially forty years of research in this area. In doing so however, I include established alternations that are mediated by overt morphology side by side with those that are not. The general philosophy behind this choice is that from the point of view of syntax to meaning generalizations, it is artificial to make too sharp an a priori distinction between alternations that look like alternations in

argument structure for a single lexical item, and alternations mediated by explicit verbal morphology.⁶

The SUBJECT position is an obligatory grammatical function in many of the world's languages, and it does not exclude any type of event-related participant in principle. Thus, 'Themes' and 'Patients' can end up in SUBJECT position in monotransitive verbs as easily as 'Agents' can. However, when there is more than one event participant, languages universally choose the 'Agent' argument as SUBJECT over the 'Theme' or 'Patient' if both are to be expressed as DPs. Having said that, there is still a wide variety of participant roles available to DPs in SUBJECT position, even in transitive verbs.

As a general crude summary, we can say that in dynamic eventualities (those that express some sort of change), a *causing* participant (one whose existence directly or indirectly, deliberately or inadvertently, is asserted to bring about the change in question) is privileged to hold the SUBJECT position, and this includes both inanimate and abstract causes, and facilitators like instruments.

In the case of stative verbs, the situation is a little more difficult to pin down: 'experiencers,' 'figures' of spatial relationships (cf. Talmy 1978, 2000), and 'topics' seem to be ways of characterizing the SUBJECTS of stative predications. In particular, Talmy (2000) defines Figure as the entity whose spatial location, or movement through space is at issue, while the Ground is the entity with respect to which that position or motion is defined.

(21) *The Figure–Ground asymmetry:*

The Figure is a moving or conceptually movable entity whose path, site, or orientation is conceived of as a variable, the particular value of which is the relevant issue.

The Ground is the reference entity, one that has stationary setting relative to a reference frame, with respect to which the Figure's path, site or orientation is characterized. (Talmy 2000)

However, this structural asymmetry can be seen in stative verbs as well, and one is tempted to extend the definition of Figure/Ground from the purely spatial domain to encompass stative properties more generally: the Figure of a property predication is the entity whose degree of possession of a particular property is at issue; the Ground is the reference property, or property scale which the Figure is predicated to 'hold' to some degree. Clear intuitions in the spatial domain thus give rise to a natural analogy in the domain of more abstract properties, and Figure and Ground can be profitably used in these more general terms as the asymmetrical roles of a stative property ascription.

This predicational asymmetry corresponds to a syntactic one, with adpositional elements overwhelmingly, and possibly universally,

selecting for Grounds as complements (see Svenonius 2007 for discussion), with the Figure as the implicit ‘subject’ of the relation (Talmy 2000, Svenonius 2007). Another commonly used label is the participant role of ‘Holder’ of a particular property (see Kratzer 1996 for the introduction of and use of this general role label). Fine grained differences in thematic role are not usually proposed for the stative SUBJECT position;⁷ saliency and functional considerations seem to go into determining which entity in a static eventuality is chosen as the bearer of a property ascription. The bearer of a property ascription (Figure, or Holder) then contrasts with the non-SUBJECT participants in a static eventuality which provide additional information specifying the property being ascribed.⁸

It is important to emphasize that we should not expect to determine SUBJECT-hood deterministically from real world properties of a particular event. Rather, language users use language to structure an event and *give* it an interpretation in terms of predication. Thus, a natural language representation implies a particular choice of ‘topic’ or Figure for the static situation described. Similarly, there is no objective way of isolating the cause of a particular dynamic change in the world, although there *are* constraints on the cognitively natural ways in which human beings construe things as being caused. The claim here is that the morphosyntactic representation in the language carries reliable entailments about the assertion of the speaker and the way she is representing the force dynamics of the situation. Here, and in the discussion that follows, I reverse the standpoint of the traditional (lexicalist) position and ask not how meaning maps onto syntax (the direction of mapping that the UTAH and its kin regulate) but to what extent syntactic representations systematically deliver semantic entailments about event structure and role relations.

9.3.1 Causative–inchoative

Cross-linguistically, alternations between transitive and intransitive versions of lexical items sharing some core conceptual and morphological content are extremely common. As mentioned earlier, typological work (Haspelmath 1993a) shows that while some languages like English have verbs like *break* which alternate without any explicit morphology (‘labile’ verbs), other languages have explicit causativizing morphology (Indonesian, Japanese, Salish and the languages of the Indian subcontinent), while still others show decausativizing/reflexive morphology to create the alternation (e.g., *si* in Italian, *se* in French, *sja* in Russian).

An example of the causative–inchoative alternation in Hindi/Urdu is shown below, where the addition of the suffix *-aa* to the verbal root seems to ‘add’ a direct causer to the eventuality.

- (22) a. *makaan ban-aa*
 house make-PERF.M.SG
 ‘the house was built’

- b. anjum-ne makaan ban-aa-yaa
 Anjum-ERG house make-aa-PERF.M.SG
 ‘Anjum built a house’ (from Butt 2003)

In Italian, on the other hand, we can find pairs where the intransitive/inchoative version of the verb shows up obligatorily with the marker *si* (which elsewhere functions as a reflexive clitic pronoun).

- (23) a. il vento ha rotto la finestra
 the wind has broken the window
 ‘the wind broke the window’
 b. la finestra *(si) è rotta
 the window REFL is broken
 ‘the window broke’ (from Folli 2001)

In English, as we have seen before, the alternation requires no morphology and verbs like *break* are classified as ‘labile.’

- (24) a. the wind broke the window
 b. the window broke

What is important to note about this alternation is that it is extremely common and pervasive cross-linguistically, and that the additional expression of a causer is what makes the difference between the transitive and the intransitive version. Thus, whether the alternation appears to be ‘lexical,’ as in English, or morphological as in Hindi/Urdu, or even analytic as in Romance, the pairing of causative and inchoative is linguistically natural and productively formed. Moreover, it is the causer that is always the external argument or SUBJECT in the verb’s transitive version. No theory of argument structure can ignore this kind of relationship between events, or the idea of causer as a more prominent participant when it comes to SUBJECT selection. One might even argue that Causer or Initiator in a general sense is prototypically the most prominent participant in any event structure.⁹

As noted earlier, there is a debate in the literature concerning the direction of the causative–inchoative alternation. Levin and Rappaport Hovav (1995), Chierchia (2004a), and Reinhart (2002) all agree in deriving the inchoative alternant from a lexically causative base. For example, Levin and Rappaport Hovav (1995) argue that the transitive is the base form, and that the intransitive is derived by a lexical suppression of the Cause component in the item’s lexical conceptual structure. Since not all transitive verbs with a Cause component actually have intransitive counterparts, a lexicon internal condition must be placed on the suppression mechanism. Basically, Levin and Rappaport Hovav argue that Cause may be suppressed precisely when the verb can be conceived of as being able to take place without any external causation.

However, since these verbs are the very ones where we can conceive of the event without a cause component, it seems unintuitive to insist that it must be present in the lexical representation. Reinhart (2002), who also takes the transitive-to-intransitive position, is forced to claim that intransitive unaccusative verbs with no transitive counterpart, do nevertheless have a transitive counterpart in the lexicon which is ‘frozen’ and never surfaces. In the case of English, a far more satisfying system emerges if we take the derivation to occur in the other direction: while very many causative transitives fail to have intransitive counterparts, only a very small number of unaccusatives, if any, fail to causativize. Under this view (espoused in Ramchand 2008), English is the morphologically non-overt counterpart of Hindi/Urdu, not of Italian. In fact, the only reason Levin and Rappaport Hovav (1995) and Reinhart (2002) run the derivation from transitive to intransitive is because their lexicalist assumptions do not sanction the idea that a syntactic formative can bear the semantics of causation and systematically add structural meaning to an underspecified lexical item. This is precisely what the causative morpheme, or Cause head in syntactic accounts, is intended to do. However, as discussed briefly in Section 9.2.3, there is no reason to suppose that the direction of derivation in one language is the same for another. If one takes overt morphology seriously, one would argue that the direction is from inchoative to transitive/causative in the case of Hindi/Urdu, and Salish (Davis and Demirdache 2000), and transitive/causative to inchoative in the case of Slavic and Romance. How exactly this is done in each language is an interesting question, but one which I put aside here – the generalization independent of these analyses is that there exists a linguistically privileged relationship between event descriptions and their direct causation counterparts, with a correspondingly privileged status of ‘causer’ for the SUBJECT position.

9.3.2 Passivization and Voice

What distinguishes Passive, and Voice alternations more generally, from the alternations discussed in the previous subsection is that they morphologically encode alternations of case and/or grammatical function. As we have seen, both case and grammatical function are logically separable from argument structure, but since they are demonstrably sensitive to argument structure properties they provide some of our best evidence for argument structure itself.

While the inchoative version of transitive–intransitive pairs discussed above involves the absence of the Cause argument, the passive is usually considered to be a morphological alternation which affects the *realization* of the arguments of a transitive verb and allows a previously non-SUBJECT

In the (c) example, the single DP argument passes the tests for SUBJECT-hood in Hindi, as Bhatt (2003) shows, whereas in (b) it does not. Many languages also have impersonal passives of intransitive verbs, where there is no OBJECT to begin with, and where an expletive occupies SUBJECT position (see Afarli 1992). In these cases, passive is only possible with intransitives that have ‘agent’-like SUBJECTS and not intransitives with ‘patient’ or ‘theme’-like SUBJECTS (Bhatt 2003 for Indo-Aryan; Afarli 1992 for Norwegian). This shows, in particular, that the most important function of passivizing morphology in these languages is the demotion of the external argument, and not the suppression of accusative case. Note that this operation, unlike the causative–inchoative alternation, seems to keep the basic argument structure intact but instead of the most prominent argument being promoted to SUBJECT, passive signals the syntactic demotion of that otherwise winning argument where it is either suppressed altogether or optionally expressed in the form of a *by*-phrase. In Baker *et al.* (1989), the presence yet syntactic inertness for SUBJECT-hood of the external argument is implemented in an analysis which argues that the participial ending itself in English is actually the incorporated external argument. Alternatively, to use recent Minimalist terminology, the expression of the external argument in a PP structure would remove that argument from the class of possible targets for the SUBJECT probing feature.¹⁰

As I have emphasized, the notion of SUBJECT, and also of nominative case (as I will discuss in Section 9.5) are logically distinct from argument structure roles (and from each other), by assumption. The question is whether we need a level of representation that encodes argument structure in addition to the morphosyntactically obvious things like case and agreement (cf. Jackendoff 1983, 1990a for the position that argument structure is encoded at a level of lexical conceptual structure distinct from syntax). We do need such a representation, if it is input to important generalizations about how verbs behave within and across languages.¹¹ Recall that the reason SUBJECT selection is important is that there seems to be a universal asymmetry in the relationship between event participancy and the choice of SUBJECT across verb types: ‘causers’ have priority over ‘non-causers’ within the same event, and the opposite alignment is never attested unless the ‘causer’ is unexpressed or licensed as an oblique.¹² This means that whatever syntactic mechanisms are responsible for choice of SUBJECT, they are fed in a systematic way by event structure/argument structure information. The existence of explicit morphology for ‘demoting’ external arguments shows that they have a special status in the systems of grammatical function.

I started this subsection with a sharp principled distinction between Passive and the inchoative or unaccusative version in a causative/inchoative alternating pair. The differences in English are clearly seen: in the inchoative there is no morphology different from the causative and the missing external argument cannot be expressed or invoked, it is simply

missing; in the passive, explicit morphology creates the version without the external argument and the latter is implicitly present and/or can be expressed with a *by*-phrase.

- (28) a. the ship sank (*to collect the insurance) / (*by the torpedo)
 b. the ship was sunk (to collect the the insurance) / (by the torpedo)

The picture becomes more complicated, however, when cross-linguistic morphological patterns are taken into account. If we consider the whole range of sentence types where it has been argued that an internal argument of a related transitive appears to make it to SUBJECT position in a related intransitive, we find: (i) anticausatives (as in intransitive *break*, or *sink*); (ii) ‘reflexive’ interpretation of bodily function verbs (as in *shave*, and *wash*); (iii) dispositional middles as in *This bread cuts easily*; (iv) passives as in *The bread was cut by Mary*. Moreover, languages differ as to what morphological devices they use to build these meanings. As Alexiadou and Doron (2007) point out, some languages have a morphological ‘middle’ voice, side by side with the ‘passive’ voice, where the former is used for (i)–(iii) and the latter is used for (iv) (Classical Greek, Modern Hebrew); some languages have only a ‘middle,’ or ‘non-active’ voice which is used for all of (i)–(iv) (Modern Greek); yet others only have ‘passive’ which is used for (iv) while (i)–(iii) appear with active morphology (English). This morphological syncretism is not confined to members of the verbal paradigm. In the Romance languages, Slavic, and to some extent Germanic, clitic reflexives are also employed in all of the environments in (i)–(iii) (Kemmer 1993).

In the examples (29a–d) (from Alexiadou and Doron 2007), we see the non-active verbal morphology being used on lexical reflexives, intransitive members of the causative–inchoative alternation, middle and passive respectively.

- (29) a. i Maria htenizete
 the Maria combs-NACT
 ‘Mary combs herself’
 b. i supa kaike
 the soup burnt-NACT
 ‘the soup burnt’
 c. afto to vivlio diavazete efkola
 this the book read-NACT easily
 ‘this book reads easily’
 d. i times miothikan apo to diefthindi
 the prices lowered-NACT by the director
 ‘the prices were lowered by the director’

Alexiadou and Anagnostopoulou (2004) argue for distinct constructions here, based on the fact that different PP adjuncts are acceptable in each case. In general, while the anticausative shows no evidence of a syntactically or semantically active ‘causer’ argument in the licensing of adjuncts

and the control of purpose clauses, the passive construction does. The dispositional middle seems to be an intermediate case, with some researchers arguing that the external argument is syntactically active (Stroik 1992, Hoekstra and Roberts 1993) and others that it is not (Ackema and Schoorlemmer 1995, Lekakou 2005). All agree however that the middle differs from the anticausative in that the external argument is implicit or *semantically* present in the former, but not in the latter.

For our purposes here, it is relevant to note that the dispositional middle itself has additional properties that makes it relevant for a theory of argument structure. Unlike passive, the possibility of forming a dispositional middle is strongly dependent on the argument structure of the verb in question. This is the fact that Hale and Keyser (1987) set out to account for in their important early discussion of the construction. They argue that a necessary precondition for middle formation is that the internal argument to be promoted be the participant in the *central change subevent* of the verb's event structure (cf. also Jaeggli 1986 for the intuition stated in terms of an 'affectedness' constraint). This condition correctly rules out middles such as the ungrammatical (30) below, under the assumption that OBJECTS of verbs of contact are not represented as undergoers of a change, but as the final location of contact, and that stative verbs have no change event in their lexical representation at all.¹³

- (30) a. *physics knows easily
 b. *the wall hits easily

It is not possible here to do justice to the range of analyses offered for this cluster of phenomena, the differences among them, and the differences in morphosyntactic representation cross-linguistically. What this section has shown, however, is that there is remarkable cross-linguistic agreement on what criteria are in play when coding an argument as SUBJECT or OBJECT. 'Agents' and 'causers' make good SUBJECTS, and a language tends to employ explicit morphological devices when an 'undergoer of change' is expressed as the SUBJECT in preference to the 'agent' or 'causer.' The role of Holder or Figure is expressed as the SUBJECT of statives, and it is interesting that the notional object acquires this entailment in the dispositional middle. In many cases, the existence of identical morphology even blurs the simple division between passive as a grammatical function changing operation and causative-inchoative as an argument structure changing operation (and straddling the ambiguous case of the middle), as we saw above in Greek. Plausibly, what all these 'constructions' have in common is the fact that the argument that ends up as the SUBJECT *undergoes some change* as a criterion for the eventuality to hold. If this characterization is on the right track, then NonActive morphology in Greek is the morphological indicator of a generalization at the level of argument structure. It is also significant that special morphology is often required for 'undergoer of change' arguments to appear as SUBJECT of an underlyingly transitive relation.

9.3.3 Classes of intransitive

The unaccusative–unergative distinction (Perlmutter 1978) refers to the important grammatical difference in the behavior of monotransitive verbs, which is correlated with participant role. In brief, for some linguistic phenomena, ‘theme/patient’ SUBJECTS of single argument verbs behave more like the the OBJECTS of transitive verbs than the ‘agent’ SUBJECTS of single argument verbs do (even though both behave like grammatical SUBJECTS in a broad sense). To illustrate from Italian, (31) shows a classic example of an ‘unergative’ verb which has an agentive SUBJECT, while (32) gives an example of an ‘unaccusative’ verb which has a ‘theme’ SUBJECT.¹⁴

(31) Gianni telefona
 John telephones
 ‘John is telephoning’

(32) Gianni arriva
 John arrives
 ‘John is arriving’

In Italian, the SUBJECT of unaccusatives can be the nominal related to the *ne* clitic (roughly meaning ‘of them’) which cliticizes to the verb, and it shares this property with OBJECTS of transitive verbs.¹⁵

(33) a. *ne telefonano molti
 of-them telephoned.PL many
 b. ne arrivano molti
 of-them arrived many
 ‘many of them arrived’

In addition, when it comes to the formation of the periphrastic past tense, in many dialects the two different types select different auxiliaries to combine with the participle: roughly speaking, the unaccusative verbs tend to select *essere* ‘to be,’ while the unergatives select *avere* ‘to have,’ like transitives.

(34) a. Gianni ha telefonato
 Gianni has telephoned
 ‘Gianni telephoned’
 b. Gianni è arrivato
 Gianni is arrived
 ‘Gianni arrived’

Thus, the systematic existence of two types of monotransitive verbs shows that the notion of SUBJECT is not the only grammatically relevant distinction and that the semantic relationship of the participant to the event is also important for determining linguistic behavior. Unfortunately, as with thematic relations in general, the class of unaccusative verbs is not

easily defined semantically. While there are some accounts that propose a purely semantic (i.e., non-syntactic) account of the two classes of intransitive (Van Valin 1990, Bentley 2006), most treatments in the literature attempt to relate the classes either to thematic role (Belletti and Rizzi 1988), or lexical semantic structure (Hale and Keyser 2002, Levin and Rappaport Hovav 1995), which in turn maps in a deterministic way to syntactic structure. Thus, most of these accounts assume that there is a structural difference between an unaccusative phrase structure and an unergative one, which underpins their different syntactic behavior.¹⁶ The debate here mirrors the debate about argument structure more generally, with competing accounts of what semantic features of the participant relationship are criterial for class membership, and competing accounts of where the criterial semantic information resides: in the lexicon, (as in Levin and Rappaport Hovav 1995), in a derivational level of syntactic representation as in early GB and Relational Grammar accounts (Perlmutter 1978, Rosen 1984, Belletti and Rizzi 1988), or in a single syntactic phrase structural representation (McClure 1994, Borer 1998).

As has been known for a long time, many verbs actually show variable behavior with respect to the standard diagnostics: differences in telicity at the VP level affect the classification of that VP as either unaccusative or unergative with telicity correlating with an ‘unaccusative’ choice of auxiliary in Italian and many other languages (35) (Zaenen 1993, Folli 2003); differences in control or volitionality tend to push the verb in the other direction, toward more ‘unergative’ behavior (see Sorace 2000 for discussion).

- (35) a. Gianni ha corso
 Gianni has run
 ‘Gianni ran’
 b. Gianni è corso a casa
 Gianni is run home
 ‘Gianni ran home’

The existence of these effects threatened to undermine early accounts that relied on lexical specification of verb types. However, as we have shown in this survey chapter so far, the existence of alternations and verbal flexibility is the normal pattern, not the exception. Any account of the behavior of verbal lexical items is going to have to deal with the fact that argument structures come in clusters of possibilities (with telic modulation and agentive modulation being extremely common). In this respect, the unaccusative vs. unergative classification is no different from the general situation of argument structure alternations.

Since the unaccusative–unergative distinction was discovered, it has been uncovered in many other languages and seems to be a pervasive fact: monotransitive VPs systematically fall into two natural classes, one of which has a more theme-like SUBJECT and the other of which has a more

agent-like SUBJECT. It is important to reiterate that this is a formal linguistic distinction which can only be justified by language internal diagnostics and that these diagnostics can vary considerably from language to language. Another word of caution about the diagnostics is that since it is still an open question exactly what the structural distinction is between unergative and unaccusative structures, it can also sometimes be the case that different diagnostics are sensitive to different aspects of that structure. For example, it is not clear whether the structural representation of telicity is logically independent of whether a verb has a structural external cause or not. The two do not seem to go together in the normal intransitive case. In extreme cases, different diagnostics might pick out slightly different natural classes.

If we turn to English, we see that there is no equivalent of auxiliary selection or any equivalent of the clitic *ne*, but there is still evidence that the two classes of verbs exist. As we have seen already, there is a class of verbs which systematically undergoes the causative-inchoative alternation. The intransitive member of those pairs have been called ‘ergatives’ by Hale and Keyser (1987),¹⁷ but are probably more properly thought of as unaccusative. They clearly have a SUBJECT argument that is non-agentive and can be embedded under further causation.

- (36) a. the glass broke
b. John broke the glass

- (37) a. Mary danced
b. *John danced Mary

Correlating with this difference is the behavior of perfect participles when used attributively: perfect participles can attributively modify the argument that would have been the SUBJECT of an unaccusative verb, but not the SUBJECT of an unergative verb.

- (38) a. the broken glass
b. *the danced girl

In addition, resultative formation is possible with the direct OBJECT of a transitive verb, the SUBJECT of a passive, the single argument of a change of state verb (unaccusative, by hypothesis), but not the single argument of an agentive process verb (unergative, by hypothesis) (see Levin and Rappaport Hovav 1995 for discussion) (see examples in (39)).

- (39) a. John broke the safe open
b. the safe was broken open
c. the safe broke open
d. *Mary danced tired (on the reading: ‘Mary danced until she became tired as a result’)

Since it is an important cross-linguistic distinction, it is important to try to understand exactly what properties of participation in the event

volitional agents have intentions and desires that lead them to initiate dynamic events; instrumental SUBJECTS are entities whose facilitating properties are presented as initiating the event because they allow it to happen. It seems to be this sort of initiating or facilitating argument that is privileged when it comes to SUBJECT selection, when in competition with an argument that merely undergoes change. ‘Unergative’ verbs seem to have a representation that reflects an event structure that has just such an initiating or facilitating argument; ‘unaccusative’ verbs have a single argument that is not represented as an initiator in the event structure.¹⁹

9.4 The view from morphosyntax: object selection

While the history of argument structure started off with principles of SUBJECT selection, it can fairly be said that in the modern era, OBJECT selection and its semantic correlates have gained more and more prominence and stimulated much important work at the syntax-semantics interface. I have argued that initiation, broadly construed, was the key to many of the empirical argument structure generalizations that have been noted in the literature when it comes to SUBJECT selection. When it comes to OBJECT selection, the leading idea in the literature has been ‘affectedness,’ although this notion has been notoriously difficult to define, and it is caught up with notions of aspect and event measuring in a way that is sometimes difficult to disentangle.

It seems that what is crucial here is the notion of the argument ‘undergoing’ some sort of identifiable change/transition, whether it is with respect to its location or different kinds of property states. In the following three examples, we see that the DPs are equally respectable ‘OBJECTS’ regardless of whether the change is that of location (41a), state (41b), or material properties (41c) (see Ramchand 1997 and Hay *et al.* 1999).

- (41) a. John pushed the cart
 b. Mary dried the cocoa beans
 c. Michael stretched the rubber band

The broad notion of Undergoer (after Van Valin 1990) seems to be the one responsible for class membership here, and includes OBJECTS of verbs of change of state like *dry*, as well as OBJECTS of verbs of translational motion like *push* and *drive*. In some very general sense, all of these OBJECTS count as ‘affected,’ since they *undergo* the change that is criterial of the event in question. Influentially, Tenny (1987, 1994) argued that aspect is the critical semantic information relevant to the establishment of OBJECT-hood and accusative case in the syntax (see also Section 20.3). In particular, she argues that only direct OBJECTS have the function of ‘measuring out’ the event. Leaving the notion vague for the moment, we note that there are a number of alternations in OBJECT choice which show that an intuitive difference in ‘affectedness’ is correlated with OBJECT-hood.

Consider the *SPRAY-LOAD* alternation in many languages, where the choice of *OBJECT* alternates, and where the argument that ‘measures out’ the event covaries with that choice (Jackendoff 1996a, Tenny 1994).

- (42) a. John loaded the hay on the truck
 b. John loaded the truck with hay

The semantic judgment here is that while the (a) sentence above describes an event which is complete when all of ‘the hay’ has been loaded, the (b) sentence describes an event which is complete when ‘the truck’ is completely loaded.²⁰ The *CONATIVE* alternation shows a similar semantic shift, this time between the interpretation of a DP *OBJECT* (43a) as opposed to a DP embedded inside a prepositional phrase (43b). In the former case, the event of eating the apple is over once the apple itself is totally consumed; in the latter case, the eating event does *not* have a natural endpoint, and it is implied that the apple never gets fully consumed.

- (43) a. John ate the apple
 b. John ate at the apple

Correlations like these have given rise to syntactic theories which exploit features like [+telic] (van Hout 2000, Kratzer 2004) or [+quantity] (Borer 2005b) which are checked at some aspectual projection, bounding the event, and often at the same time being associated with accusative case. However, I think these theories are too strong. First of all it is important not to conflate the notions of ‘affected argument,’ ‘measuring out,’ and ‘telicity.’ I take telicity to refer to the notion of an inherent, or ‘set temporal endpoint’ (after Krifka 1989). As one can easily demonstrate, the mere existence of an Undergoer does not necessarily imply telicity, as the English examples in (44) show.

- (44) a. the chocolate melted for hours (atelic unaccusative)
 b. John melted the chocolate for hours (atelic transitive)

Verbs which have an argument that undergoes a gradual change (without attainment of a definite result) often display unaccusative behavior in the languages where the diagnostics are clear, indicating that they actually have internal arguments in the relevant sense (Sorace 2000, Rappaport-Hovav and Levin 2000).

However, once we have the notion of Undergoer, telicity does become a logical possibility since an object undergoing a change may undergo a determinate change to attain a final state, or the change can be given a determinate measure phrase, both of which will bound the event (see Hay *et al.* 1999 for an important discussion of the semantics of scales and measuring with regard to change of state verbs).

Thus, while Undergoer of a change and the achievement of a definite change of state often go together on a direct OBJECT, the two notions are logically separable. Ramchand (2008) calls the entailment type for the participant that achieves a change of state the Resultee. The following sentences from English show a pure Undergoer and a composite Undergoer-Resultee role respectively.

- (45) a. John pushed the cart (Undergoer; no transition to final state)
 b. John broke the stick
 (Undergoer-Resultee; transition to final state)

The other distinction that needs to be made is that between OBJECTS whose quantizedness have a direct effect on the telicity of the resulting VP and OBJECTS that do not. The following examples make the point (this type of example was originally discussed by Verkuyl 1972).²¹

- (46) a. John ate porridge for an hour / *in an hour (mass object; atelic VP)
 b. John ate five apples in an hour / ??for an hour
 (quantized object; telic VP)

The quantization property has been conflated with the ‘affectedness’ or Undergoer property in some of the literature, as a part of a general move to correlate OBJECT-hood with telicity. Basically, one prominent idea is that the OBJECT is the distinguished argument whose quantizedness gives rise to VP telicity, as opposed to SUBJECTS, whose quantizedness is irrelevant to telicity (MacDonald 2008). However, well-known examples already show that temporal boundedness is possible for a transitive VP even without a quantized OBJECT (47a), provided the verb itself is inherently telic; and temporal unboundedness is possible for a transitive VP *with* a quantized OBJECT (47b), especially for change of location verbs.

- (47) a. the rocket re-entered breathable airspace in twenty minutes
 (mass object; telic VP)
 b. John pushed the cart for hours (quantized object; atelic VP)

The quantization effect occurs in a class of verbs sometimes called ‘creation/consumption’ verbs and is due to a homomorphism between the run-time of the event and the material extent of the direct OBJECT (see Krifka 1987, 1992b for seminal work on this topic). The best we can say is that *if* we are dealing with a creation/consumption verb, then quantization of the internal argument corresponds to telicity of the VP. So, this is indeed a special property of internal arguments as opposed to external arguments, but it turns out to have rather restricted applicability.

The general notion of Undergoer as the holder of a changing property/location is a simple and powerful one, which covers a lot of central cases of direct OBJECTS. However, it does not accurately describe *all* the kinds of OBJECTS found cross-linguistically, even in English. In addition to Undergoers (and Resultees), we also find DP OBJECTS that are more accurately described as the DP Path travelled by a changing/moving entity. In (48a) we see a PP path argument of the motion verb *run* in English, and in (48b), we see a DP OBJECT filling the same semantic role.

- (48) a. Mary ran along the beach
 b. John walked the trail

One of the exciting developments in the understanding of VP semantics is the deepening of our understanding of the notion of ‘path’ or ‘scale,’ which cross-cuts a number of distinct cognitive domains (see Schwarzschild 2002b on measures in general, Zwarts 2005 for spatial paths, Wechsler 2001 and Kennedy 1999a for gradable states). As Hay *et al.* (1999) point out, the case of creation/consumption verbs is simply a special case of some attribute of the OBJECT contributing the measuring scale that is homomorphic with the event. This property is shared by all paths, whether they are derived from the OBJECT as in the case of creation/consumption, whether they come from the scale that can be inferred from a gradable adjective, or whether it is a more obvious physical path as contributed explicitly by a PP with a motion verb. Dynamic verbs themselves combine with temporal information to create a temporal scale/path. All of these scales in different modalities combine in systematic ways in complex verb descriptions, a detailed discussion of which would take us too far afield here (but see the references cited above), but which often need to exploit the notion of homomorphism between one path/scale and another. When it comes to argument structure notions, I note only that a range of path-of-change related participants tend to make ‘good’ OBJECTS. In (49), we see examples of Undergoer, Undergoer-Resultee, Path, and even Measure in OBJECT position (although the latter type of OBJECT is notorious in not showing all the canonical properties of direct OBJECTS in some cases).

- (49) a. John rolled **the cart** (Undergoer)
 b. John rolled **the cart** over (Undergoer-Resultee)
 c. John walked **the West Highland Way** (Path)
 d. John passed **two pleasant hours** in Mary’s company last night (Measure)

Looking at the motion verb *push* below, we can clearly distinguish the Undergoer, from the Path, from the Measure of the path, where it is the Undergoer that is expressed as the direct OBJECT while the Path is a PP adjunct (‘along the river’) and the measure is a DP adjunct (‘two miles’).

(50) John pushed the cart two miles along the river

It is clear that Path in this sense is not a species of Undergoer at all, but complementary to it: in (50), the path describes the ground that the Undergoer traverses. However, what all of these cases have in common is that the internal argument is either part of the description of the path/scale of change itself or is the Undergoer of that change. I take this intuition to be the main result of the last fifteen years of research on the topic of ‘affectedness’ and the OBJECT position. In what follows, I will use the more specifically defined terms above (Undergoer, Resultee, Path) in place of ‘affectedness’ or ‘measuring out’ because the latter terms have been used to pick out sometimes contradictory notions in the literature. However, I believe that the generalizations arrived at here show a clear intellectual path starting with Verkuyl (1972), Krifka (1987), and Tenny (1987), preserving in particular the core intuitions of Tenny’s research agenda when it comes to argument structure and the internal argument.

We need to say something here about the class of stative verbs, and in particular transitive stative verbs that have direct OBJECTS in some languages (like English) and take accusative case. The notion of affectedness is clearly irrelevant to non-dynamic predications, where nothing ‘affects’ anything else. Thus, we know right away that OBJECT-hood or accusative case cannot be in a one-to-one relationship even with the role cluster of Undergoer, Path, and Resultee.

(51) Katherine fears nightmares

(52) Alex weighs thirty pounds

In (52), and (51) above, the OBJECTS simply further specify or describe the state of affairs: ‘the fear’ that ‘Katherine’ has is ‘of nightmares,’ in (52), ‘the weight’ in question is the weight ‘of thirty pounds.’ The difference between the DP ‘Katherine’ and the DP ‘nightmares’ in (51) is a matter of predicational asymmetry: ‘Katherine’ is the theme or Figure of the predication (in the sense of Talmy 1978), i.e., the entity that the state description is predicated of; ‘nightmares’ is part of the description itself.

As we saw in the discussion of SUBJECT selection with regard to stative verbs, the difference between Figure and Ground (following Talmy 1978, 2000) is a potentially extremely important one when it comes to stative relationships, extrapolating from the example of prepositions in the spatial domain. If one extends the definition of FIGURE/GROUND from the purely spatial domain to encompass stative properties more generally, ‘the nightmares’ is part of the property description for ‘fear’ and is thus a Ground of that relation, while ‘Katherine’ is the Figure.

In our discussion of dynamic verbs above, the predicational asymmetry between Themes/Figures and Paths/Grounds was present as well, if we generalize the holders of static properties to the holders of dynamic

properties as well. The Undergoer, the object in motion, or undergoer of a change is the holder of a changing property/location, and Paths are rhematic, being the part of the description of the path covered by the Undergoer. In Ramchand (2008), I argue that Paths are in fact in a distinct structural position from Undergoers. Specifically, Paths and Grounds of stative projections are in complement position (like the Grounds of prepositions), while Undergoers and Figures are ‘subjects’ of predication and are generated in the specifier position of phrase structural head that denotes that subevent description. If this is correct, then natural language builds in a close fit between hierarchical structure and predicational structure very generally.

To summarize, the notions of ‘affectedness,’ ‘measuring out,’ and ‘telicity’ have become associated with the internal argument position in much recent theoretical discussion. I have argued here that our current knowledge shows that there is indeed a privileged relationship between the internal argument and the path of change represented by the dynamic event. I have also tried to argue that arguments associated with the path of change description (aspectually internal arguments) still must be separated into at least three distinct notions – Undergoer, Path, Resultee – even within DP OBJECTS that bear ‘accusative’ case. It seems clear from the patterns discussed here that just as causation or initiation feeds the subsequent notions of nominative case and SUBJECT in a privileged way, being related to the path of change gives an argument privileged status when it comes to the OBJECT relation and accusative case. This special feeding relationship with grammatical OBJECT-hood is one which all theories of argument structure effects need to deliver. However, as I hope to have made clear, a single feature checking relationship between DP internal arguments and a feature such as [+telic] or [+quantized] is inadequate to the job. Further, when it came to stative verbs, a generalization of the Figure–Ground relation seemed to be the best macro-role account of the asymmetry between SUBJECT and OBJECT.

9.4.1 Applicatives

Just as overt morphology such as causative heads or Voice morphology can alter the natural choice of SUBJECT, cross-linguistically we find that certain kinds of morphology can appear on a verb to alter its OBJECT-taking abilities. In particular, applicative morphemes generally allow the promotion to OBJECT of an argument that was previously an OBLIQUE or prepositional element. The following examples from Bantu (Chichewa) are taken from Baker’s (1988) book *Incorporation*, an early and extremely influential work on grammatical function changing. The applicative morpheme is shown in bold.

- (53) a. mlimi a-ku-dul-a mitengo (Chichewa)
 farmer SP-PRES-cut-ASP trees
 ‘the farmer is cutting the trees’
 b. mlimi a-ku-i-dul-**ir**-a mitengo nkhandwe
 farmer SP-PRES-OP-cut-**for**-ASP trees fox
 ‘the farmer is cutting trees for the fox’ (Baker 1988:237)

In the (a) example, the direct OBJECT is ‘trees’ as diagnosed by its ability to undergo passive, and to trigger optional OBJECT marking agreement on the verb. However, with the addition of the applicative morpheme *-ir*, the benefactive argument ‘the fox’ becomes the new direct OBJECT and takes over the syntactic properties associated with that role.

As Baker (1988) notes, it is extremely common cross-linguistically for languages to have applicative morphemes that can advance dative/goal arguments in this way, and also benefactive/malefactive arguments (including Tzotzil (Mayan), Chamorro (Indonesian) and Tuscarora (Iroquoian), and the whole of Germanic (Indo-European) if the dative alternation is considered a member of this species despite the lack of overt applicative morpheme). If a language has only one possible kind of thematic relation that can be promoted to direct OBJECT-hood it is this one, and if it allows alternation without overt morphology it is with dative/goal arguments (Baker 1988). However, these are not the only ‘oblique’ relations that can be converted to OBJECT by the use of applicative morphemes. Less widespread, though common on the African continent, are applicative OBJECTS which bear underlying instrumental (54) and locative (55) relations.²² (Once again the data here is taken from Baker 1988:238).

- (54) a. fisi a-na-dul-a chingwe ndi mpeni (Chichewa)
 hyena SP-PAST-cut-ASP rope with knife
 ‘the hyena cut the rope with a knife’
 b. fisi a-na-dul-**ir**-a mpeni chingwe
 hyena SP-PAST-cut-**with**-ASP knife rope
 ‘the hyena cut the rope with a knife’
- (55) a. umwaana y-a-taa-ye igitabo mu maazi (Kinyarwanda)
 child SP-PAST-throw-ASP book in water
 ‘the child has thrown the book into the water’
 b. umwaana y-a-taa-ye-**mo** amaazi igitabo
 child SP-PAST-throw-ASP-**in** water book
 ‘the child has thrown the book in the water’

Baker’s (1988) analysis of these alternations involves the incorporation of an abstract preposition into the verb. The ‘object’ of the preposition is then left as a DP and receives case from the V+P complex, thus acting like the main OBJECT of the clause.

Applicative constructions, broadly construed, are those in which extra morphology on the verb allows a DP that was either not present before, or present in oblique form, to be expressed as the direct OBJECT. In certain languages, as we have seen in Bantu examples above, the morphology in question is specialized dedicated morphology. In many of the more familiar European languages on the other hand, adpositions or elements of the category P seem to be implicated in a wide variety of processes that add a DP to the direct arguments of a verb. This is not surprising, since small clause predications constructed with P-like material are some of the most productive ways of modifying argument structure relationships in the syntax (see Section 9.2 on accounting for variability). P-like elements show up as prefixal morphology in the Germanic, Slavic, and even Romance languages with concomitant changes in argument structure. The interesting question for us here is how the argument structure of the prepositional/adpositional elements integrates with the argument structure of the verb to create these ‘applicative’ structures.

As we saw in the discussion of Baker’s work above, the derived object of an applicative construction in Bantu is argued there to be the Ground of a preposition-like relation (i.e., the complement of P). And indeed, a number of prefixed verbs in German and Slavic can also be argued to involve the promotion of the Ground element of P to the direct OBJECT position (Svenonius 2003). However, this is not the only possibility for prefixed verbs. Particles (which have been argued to be intransitive Ps; cf. Emonds 1985), introduce unselected OBJECTS of complex predications, but here the introduced element is most commonly the Figure of the P predication, at least in English. Thus, in languages where such a ‘particle’ incorporates, the derived OBJECT also turns out to be the Figure of the prepositional relation (once again, see Svenonius (2003) for a detailed examination of these different prefixed verb types across the Germanic languages).

In the examples from Russian below, I show a prefixed verb where the derived OBJECT is the Ground of the P-relation (a), and a prefixed verb where the derived OBJECT is the Figure of the P-relation as in a large, possibly a majority, of cases if Svenonius (2003) is correct.²³

- (56) a. Boris vy-brosil sobaku
 Boris out-threw dog
 ‘Boris threw out the dog’
 b. samolet pere-letel granicu
 plane across-flew border
 ‘the plane flew across the border’

(from Ramchand 2005, Russian examples from E. Romanova, p.c.)

According to one prominent analysis of the the double object construction (Baker 1988, den Dikken 1995, and to some extent Larson 1988a), the goal argument is generated as the complement of a *to* preposition, and

then it is a syntactic movement that gets it into a derived, structurally superior specifier position. Under this view, the double object version in fact is a kind of applicative where the applicative head for goals is systematically null in English (and many other languages).²⁴ Other analyses propose that the double object version and the dative version both involve small clause P predications embedded under the verb, but with different prepositions (a null P of possession, in the case of the double object version) (Pesetsky 1995, Harley 2000).

The study of applicatives is important because it allows us to decompose the contributions of different predicational elements. For the purposes here of understanding the nature of the OBJECT relation, it allows us to minimally compare DPs deemed ineligible for OBJECT-hood in the absence of applicative morphology, with their behavior and semantic properties in the presence of it. While there are many open issues here, both GROUNDS of Ps selected by the verb, and FIGURES of resultative predicates integrable with the verbal process, seem to be able to be promoted to direct OBJECT position of the verb itself, when given the appropriate morphological help.

More recently, the notion of applicatives and applicative heads has been further refined in the work of Pylkkänen (1999). Pylkkänen's work moves away from relating applicative formation to the behavior of P, and argues for a set of very abstract functional head types that introduce arguments in their specifier positions. The relation of the applied argument to the main verb depends in turn on the type of applicative head, and its position in the VP structure. In her analysis, there are two distinct types of applicative head: an inner applicative head that occurs between the verbal categorial head and the root, and an outer one which is situated between little *v* and the root.²⁵ The lower applicative head is said to mediate a predicational relationship between the original direct OBJECT and an applied argument (which is equivalent to the P_{poss} assumed by Pesetsky 1995 and Harley 2000 for the double object construction). Low applicatives in Pylkkänen's sense are thus dependent on the existence of the direct OBJECT for their introduction. Baker (1988) also points out that many applicatives that he treats in his analysis are possible only on originally transitive verbs, but he ascribes this to their ability to assign accusative case. Pylkkänen's analysis is quite different from Baker's in that it essentially gives a Figure or 'subject' of predication analysis for introduced OBJECT arguments. In other words, the applied argument is not the complement of a P relation in her analysis.²⁶ High applicatives for Pylkkänen are introduced outside the argument domain of the clause. Once again, they are arguments introduced in the specifier of a functional head, and semantically they apply to the event as a whole and do not just establish a relationship with an already present internal argument. Plausibly, malefactive and benefactive are of this category.

To summarize the results of this subsection, participant relations that are not straightforwardly related to the inner aspectual scale of a core verbal dynamic event, can nevertheless be ‘promoted’ to direct OBJECT position under certain syntactic and morphological conditions. The incorporation of P into the verb is one well-established way of making the complement of that preposition the derived OBJECT of the V+P complex. Baker (1988) has argued that the ‘applicative’ morphemes found in many languages should also be analyzed as instances of P incorporation. Applicatives have also been treated more recently as functional heads in their own right which introduce arguments of certain types in their specifier position. Interestingly, one of the common applicative types cross-linguistically, and one which often doesn’t require explicit morphology, can plausibly be interpreted as Resultee addition (i.e., Figures of a resultative stative relation integrated with the verb), bringing them in line with the resultative construction and the particle shift construction in English more generally. Thus the pattern of unmarked alternations vs. morphologically mediated alternations confirms the pervasiveness of inner aspectual event mapping as the relation straightforwardly made available by a verb for the semantics of its direct OBJECT relation.

9.4.2 Antipassive

The antipassive construction is in some sense the analogue to the Passive discussed in Section 9.3, except that instead of removing the normal external argument from eligibility as SUBJECT, the antipassive ‘demotes’ the argument that would have been the direct OBJECT and expresses it as an OBLIQUE instead. (This is functionally an important construction in some ergative languages, where the absolutive argument controls certain syntactic behaviors.) The following examples are from Greenlandic Eskimo (originally from Sadock 1980, cited by Baker 1988).

- (57) a. angut-ip arnaq unatar-paa (Greenlandic Eskimo)
 man-ERG woman(ABS) beat-INDIC:3sS/3sO
 ‘the man beat the woman’
 b. angut arna-mik unata-a-voq
 man(ABS) woman-INSTR beat-**apass**-INDIC:3sS
 ‘the man beat a woman’

The resulting verbal form behaves like an intransitive verb, and the single remaining argument is marked with absolutive case. Greenlandic Eskimo is an ergative-absolutive language, but there are no attested instances of a productive piece of antipassive morphology on the verb in a nominative-accusative language (Dixon 1994, Manning 1996).²⁷ On the other hand, having both passive and antipassive morphemes is quite common for an ergative-absolutive language, as the further examples

from Greenlandic Eskimo show (taken from Sells 2010). Like the anti-passive examples in (57), the passive examples in (58) show intransitive agreement.

- (58) a. angut-ip arnaq taku-vaa
 man-ERG woman.ABS see-3SG:3SG
 ‘the man saw the woman’
 b. arnaq (anguti-mit) taku-tau-puq
 woman.ABS (man-by) see-PASS-3SG
 ‘the woman was seen (by the man)’

The passive and the antipassive further have in common that the ‘demoted’ argument appears as an ‘optional’ adjunct. In the absence of the adjunct, the demoted argument is felt to be semantically present, and according to Baker (1988), interpreted as a non-specific indefinite. Baker’s (1988) analysis is that the antipassive morpheme is an incorporated OBJECT argument with vague/generic semantics, which pragmatically supports the existence of an adjunct phrase. This is directly contra the analysis in Marantz (1984) who argues that the oblique in the antipassive is a true argument of the verb. The debate is exactly paralleled by a similar debate concerning the *by*-phrase in passives, with researchers like Baker *et al.* (1989) analyzing the participial ending of the passive as an incorporated agent argument, and others like Collins (2005b) arguing that the *by*-phrase is the agent argument.

Antipassive therefore seems tightly bound up with case marking and grammatical function coding, a level that we have said is logically distinct from argument structure, but systematically fed by it. Both passive and antipassive use morphological means to disrupt the ‘normal’ mapping of argument structure to case or grammatical function. Thus the relevance of the antipassive to theories of argument structure is similar to that of the passive – understanding how this morphology works technically to affect the mapping to grammatical function is an important clue to the argument structure configurations and the way they connect to the syntax. But as with the passive, many of these issues remain unresolved, partly because our understanding of SUBJECT vs. OBJECT and case are still imperfect.

9.5 Case

So far I have assumed that the distinctions that we find in participant relations (which I have been calling ‘argument structure’) are logically distinct from grammatical function (which I have been calling SUBJECT and OBJECT). I further assume that distinctions of case are logically independent of the previous two modes of organization,²⁸ although this is another domain where argument structure effects are found across

languages. Case and its interaction with argument structure have had a long history which I cannot hope to do justice to here.²⁹ I briefly summarize the main issues involved and refer the interested reader to the relevant literature.

When one considers the relationship to argument structure, or thematic role, there are three main categories of case that are normally distinguished in the literature: structural case, inherent case, and lexical or idiosyncratic case (see Butt 2006). Structural cases are those which clearly show an independence from thematic role, and which seem to be defined by their structural position in the phrase marker; inherent cases are related directly to semantic generalizations (whether one thinks of this in terms of traditional thematic role labels or not); lexical/idiosyncratic/quirky case is case that is assigned by the verb to the DP argument in a lexically idiosyncratic way that simply requires memorization (see also Woolford 1997, 2006). While the differences between these three categories of case are easy to state in theory, in practice it is somewhat more difficult to decide where each particular case phenomenon in a language lies in this typology.

Nominative case is the case found on SUBJECTS in nominative-accusative languages. It is clear that it does not correlate with thematic role (cf. 'John broke the window' vs. 'The window broke'). Accusative is also considered to be a structural case, as well as some instances of Genitive and Dative, and possibly some instances of ergative (see Chapter 17 for discussion). Instances of inherent case that are supposed to correlate with thematic role include the dative that occurs on ditransive goals in Icelandic (Maling 2001) and German (Czepluch 1988) and on experiencer Subjects in Hindi/Urdu and indeed many South Asian languages (Mohanani 1994).

- (59) eir gáfu konunginum ambáttina (Icelandic)
 they gave king-the-DAT slave-girl-the-ACC
 'they gave the king the slave girl'

(from Maling 2002, cited in Woolford 2006)

- (60) mujhe is baat-kaa bahut dukh hai (Hindi/Urdu)
 I.DAT this.OBL thing-GEN great sadness be.PRES.SG
 'I am very sad about this thing'

As discussed in Chapter 17, many instances of inherent or semantically based case can be analyzed in a similar way to prepositions in languages with less rich case systems.

Instances of idiosyncratic case include special case forms required by certain prepositions, or on themes by particular verbs, where this simply has to be memorized on a case by case basis. In (61), we see the quirky accusative case marked SUBJECT of the Icelandic verb 'drift,' and in (62), we see the genitive marked OBJECT of the German verb 'remember.'

- (61) bátinn rak á land (Icelandic)
 the boat-ACC drifted to shore
 ‘the boat drifted to the shore’
- (62) Peter gedachte der gefallenen Soldaten (German)
 Peter remembered the-GEN.PL fallen-GEN.PL soldiers.GEN
 ‘Peter thought about / remembered the fallen soldiers’

Ergative case marking languages are distinguished by the fact that the single argument of monotransitive verbs receives the same ‘case’ as the internal argument of transitive verbs. This case is the ‘unmarked’ case in those languages and is generally given the label of Absolutive. This means that there is a distinguished case solely for the SUBJECT of transitive verbs, and this is the ergative case. I show examples from Dyirbal below, where 3rd person arguments show an ergative case-marking pattern.³⁰

- (63) a. yabu banaga-nyu (Dyirbal)
 mother.ABS return-NONFUT
 ‘mother returned’
- b. ?uma yabu-?gu bura-n
 father.ABS mother-ERG see-NONFUT
 ‘mother saw father’ (from Dixon 1994)

It has been claimed in some languages that ergative case is a semantically sensitive case, while others have argued that it is a structural case (Wunderlich 1997). Ergative case has also been argued to correlate with the thematic relation of agentivity in languages like Basque (Cheng and Demirdache 1993) and Hindi/Urdu (Mahajan 1994, Butt 1995). In Chapter 17, it is suggested that the disconnect between case and thematic role is more striking with ergative languages, since the SUBJECT of a transitive verb quite often has the ‘same’ thematic role as the SUBJECT of an intransitive (‘unergatives’), yet they are case marked differently. However, the disconnect between case and thematic role is more striking with nominative-accusative languages when it comes to the direct OBJECT position, since the OBJECT of a transitive verb often has the ‘same’ thematic role as the SUBJECT of an intransitive (‘unaccusatives’), and yet *they* are case-marked differently. Essentially, given the empirical fact that event structure does not match perfectly with structuring in the IP domain, any structurally defined case at this level is going to show mismatches with thematic structure.

As discussed in Chapter 17, Case Theory used to have an importance in the theory in the Government and Binding era (Chomsky 1981) that has largely been supplanted by a theory of Agree. An important generalization from that time, *Burzio’s Generalization* (Burzio 1986), makes a direct correlation between having an external argument and the ability to assign accusative case. Burzio’s Generalization is essentially a description of the

fact that in nominative–accusative languages, the hierarchically superior argument moves to SUBJECT position, and claims further that Agents are not possible without (implicit, or incorporated) Themes. It is not clear how to assess the generalization for ergative–absolutive languages.³¹

The issue of structural case vs. inherent case takes on a different hue when we consider it in the light of the latest attempts to make semantic sense of such cases as nominative and accusative. Pesetsky and Torrego (2001) argue that structural case is *not* uninterpretable but that nominative is actually the nominal correlate of tense; Svenonius (2002a) and Pesetsky and Torrego (2004) argue that accusative is correlated with an aspectual event structure notion or lower tense node, respectively. More generally, as we have seen in Section 9.4, structural accusative case has been implicated in notions like specificity (Mahajan 1994), quantizedness, and ‘measuring out’ of the event (Kratzer 2004). Nominative and accusative failed spectacularly to conform to semantic role when our role list looked like traditional thematic role labels; as our semantic categories become more and more abstract, it is less clear whether those ‘structural’ cases really are so semantically innocent after all. From the point of view of argument structure, the question is whether the event structure hierarchies which involve notions like Cause/Initiator and Undergoer correlate reliably with these more abstract semantic notions, or whether they represent an even higher layer of abstraction of semantic structuring, or have no semantic consequences at all.

In sum, case has often been analyzed in such a way as to make it logically independent of argument structure facts. Structural case has been seen as a higher order level of grammatical organization, while lexical case has been relegated to the realm of memorized idiosyncrasy. However, there are a number of reasons to include case marking patterns in the empirical ground that forms the basis of our understanding of argument structure. First, there are many cases of case-marking patterns which have a reliable correlation with semantics. These need to be understood and established whether they reflect event participancy facts or something independent. Second, even the more abstract ‘structural’ cases may turn out to be correlated with semantic notions, once the categories are properly understood. Once again, it is important to understand whether this is a separate kind of semantic entailment or part of what we would want to include in our notion of argument structure.

9.6 Architectural issues: argument structure at the interfaces

The bulk of this review chapter has been devoted to giving a fresh look at the actual data and generalizations that are important to any successful theory of argument structure. Despite current theoretical disagreements, I think there is no doubt that there is now an impressive body of empirical

work that has accumulated over the past forty years, and a considerable amount of progress in our understanding of basic patterns in both familiar and less well studied languages. While I have tried to put these discoveries in some kind of historical perspective, I have chosen so far not to emphasize the theoretical debates that surround the analysis of them. To a great extent, the patterns I have reported in this chapter are acknowledged by researchers of many different persuasions and form the basis of some kind of consensus about what is important.

Throughout this chapter, I have taken the position that what people refer to under the label ‘argument structure’ is the relational semantics of participancy between nominal projections and predicative projections. I have further taken the position that this level of semantic information is best described as a structured representation of event semantics involving notions of Cause, Change, and Result. The evidence that these factors are grammatically relevant comes from generalizations concerning SUBJECT or OBJECT selection, types of constructional alternation, and interactions with explicit morphology including case and verbal affixation.

While I believe the patterns that I have laid out are real, it should be clear that the mapping between ‘argument structure’ as I have construed it and the levels of case and grammatical function are by no means simple or one-to-one. Nevertheless, I have shown that there are clear patterns in the data that any theory will need to deliver. Constructing such a theory however, introduces its own complications due to the interaction of argument structure effects with other modules of the grammar. In the next two subsections, I outline the issues that arise in deciding on the division of labor between argument structure effects and other semantic factors on the one hand (9.6.1), and the division of labor between lexical specification and constructional effects on the other (9.6.2).

9.6.1 Other semantic factors, and the interface with pragmatics

There is ample evidence in the literature that there are other semantic factors that influence case and grammatical function that are not part of what I am considering as argument structure. I mention just a few of these factors here, since understanding them is logically required for a proper delineation of argument structure effects proper, although there is no space to do full justice to all the literature here.

First of all, there is substantial evidence when it comes to SUBJECT selection that many languages pay attention to the inherent semantic properties of the DPs in question to constrain suitability as SUBJECT. Animacy and related person hierarchies have thus been argued to have direct effects in the grammar of certain languages (e.g. Navajo (Hale 1972), Frishberg 1972); Mayan (Craig 1977, England 1991)), where it is essentially grammaticalized and operates as a hard constraint on the expression of

arguments of the verb in the syntax or their relative prominence. For instance, in Navajo (Athapaskan) the possibility of reversing the arguments is constrained by their relative animacy on the hierarchy human > animal > inanimate (cf. Comrie 1989), and in cases of so-called differential OBJECT marking (DOM; cf. Aissen 2003), the relative prominence of OBJECTS in terms of animacy and definiteness is argued to interact with overt OBJECT marking; the higher an OBJECT is on these hierarchies, the more likely is it to be overtly case-marked. Animacy is an extremely salient factor in humans' cognitive awareness and organization. In addition to affecting how we process the world more generally, it has been found to be an important factor in linguistic processing, both in comprehension and production (Stowe 1989, Trueswell *et al.* 1994, Lamers 2005, *inter alia*). It is therefore important and interesting that these factors affect grammatical structuring. The position I take in this chapter is that since these are not relational notions of participancy, but are inherently part of the nominal's semantics, they do not fall under the rubric of 'argument structure.' However, they do compete with argument structure facts in determining syntactic behavior. It might even be argued that there are some languages that pay more attention to such cognitive determinants of relevance and saliency, and that argument structure *per se* plays only a minor role.

Even in languages where the grammar has not been argued to directly reflect animacy features (e.g., modern Germanic and Romance languages), its effects have been shown in the area of 'soft constraints.' For example, Øvrelid (2004) reports that in Norwegian, ninety-seven percent of the transitive clauses in a corpus are those in which the 'SUBJECT' ranks equal or higher than the 'OBJECT' in animacy, and shows that animacy together with definiteness plays an important role with respect to argument alignment. Thus, the very same pattern that gives rise to strict grammaticality vs. ungrammaticality in a Mayan language like Jacalteco (cf. Craig 1977), shows up as a strong functional tendency in a language like Norwegian. One major question that needs to be asked in this domain is whether the observed effects flow directly from a particular language's grammar ('direct' effects), or whether they flow from the general human cognitive system that the grammar is anchored to ('indirect' effects). On the architectural side, in theories of argument structure, animacy is not usually isolated as a feature *per se*, but shows up as part of the definition of roles like AGENT, or EXPERIENCER, or BENEFICIARY. The striking exception to this is Reinhart's 'Theta System' (Reinhart 2002), which explicitly uses the feature $\pm m$ (mental state) alongside $\pm c$ (cause) as the primary feature pair to classify arguments. There is no doubt that animacy interacts with argument structure in certain ways. For example, only animates can be volitional agents, and only animates can be experiencers. However, we have seen that the nature of the structuring according to event participancy does not make a distinction between abstract cause and intentional causer, and that the idea of experiencer as a thematic role often dissolves

into different categories depending on whether the argument is being construed as ‘affected’ (undergoing a change) or ‘possessional’ (holding a particular kind of state). Although the issue is by no means settled, I have therefore put the issue of animacy aside here, given its *non-relational* nature, and in the hope that it will turn out to be an independent dimension of meaning.

Another recognized dimension of meaning is information structuring (see Chapter 23): topicality and obviation being important factors in the SUBJECT selection mechanisms of many languages for example (see Aissen 1997). When confronted with a particular language or phenomenon, it is important to be able to disentangle any effects of event structure from notions like topicality, or newness, or one risks misstating the generalizations. To illustrate with one recent prominent example, the dative alternation is one of the classics of the argument structure literature, spawning many different theories about the mapping between lexical semantics and structure, and the mapping between structure and meaning. However, recent corpus and experimental work on the dative alternation has shown that factors such as ‘heaviness’ and ‘newness’ are strong predictors of choice of alternant, with both ‘heaviness’ and discourse newness of the theme positively correlating with the use of the double object variant (Arnold *et al.* 2000, Bresnan *et al.* 2007). This recent work shows that alternations are less categorical than the earlier argument structure literature seemed to suggest (cf. Green 1974, Oehrle 1976, Pinker 1989), and mean possibly that the mappings between meaning and structure need to be stated more flexibly. Once again I put these issues aside as being beyond the scope of this chapter. Here I think it is clearer even than in the case of animacy that this dimension is a separate module which coexists with argument structure and its effects.

9.6.2 The lexicon vs. syntax

I end this chapter with a brief discussion of the non-lexicalist approaches to argument structure that have regained prominence over the past ten or fifteen years. I will also outline what I take to be the main issues at stake when it comes to the tension between the lexicalist intuitions of the seventies and eighties and the more constructivist agenda.³²

As Levin and Rappaport Hovav (2005) discuss in their recent review monograph on argument structure, it seems clear that what is needed to capture the generalizations we find is some kind of structured representation, probably making core reference to notions of causation and embedding. In addition, the fact that argument structure manifestations in the syntax are so variable, but in systematic ways, shows correspondingly that those representations can be built up and manipulated in systematic ways also. Even if one agrees on all of this, there remains the architectural

question of whether the lexicon itself should be conceived of as a module with some kind of rule-driven or generative capacity or not. The position taken by the constructivists is that meaning resides in structure, and that *syntax* makes structures, while the lexicon harbors only lists. For those lexicalists who entertain structured representations within the lexicon, they must face the question of redundancy, if the principles and vocabulary they espouse bear too close a resemblance to things that are already the proper business of syntax. Much hinges on how much structured meaning one allows in the syntax in the first place.

The resurgence of syntactic approaches to argument structure begins perhaps paradoxically with Larson (1988a), whose analysis of the double object construction actually employs a thematic role list and hierarchy. Larson's contribution is to advocate a system of VP shells, where the direct OBJECT and goal appear in specifier positions of those shells (depending on the alternant in question). This move essentially liberated researchers working on VP internal syntax by offering many potential positions and landing-sites, and opened up the idea of generating arguments (in particular, OBJECTS) in the specifiers of functional heads while still remaining in the domain of the VP.

The important substantive arguments for the syntacticization of argument structure come first from Ken Hale and Jay Keyser, however, in a series of articles beginning in the late eighties, culminating in the influential Hale and Keyser (1993) and subsequent monograph of collected and revised work (Hale and Keyser 2002). Hale and Keyser's intuition is that not all logically possible verbal meanings are actually instantiated in the grammar of natural languages because syntactic facts constrain how they are composed. This leads to the idea of a 'lexical syntax' ("the syntactic configurations projected by a lexical item"; Hale and Keyser 2002:1), which contains the structured decompositions of verbal meaning, built and constrained by the toolbox of grammar, to derive only the forms and patterns that actually exist. They initiated a theoretical programme which, while not complete, set the agenda for many working on argument structure for years to come. While Hale and Keyser were vague about the architectural status of their idea of 'lexical syntax' (sometimes implying that it was a level of syntax, and at other times calling it a lexical representation), their ideas have been most influential on later constructivists who advocate a strongly syntactic approach. The agenda is to use independently attested syntactic principles to understand the properties of the lexicon and how they interact with higher level syntactic facts.

Hale and Keyser also argue for many synthetic verb types in English, where lower predicational structure in the form of N, A, or P elements conflates into higher verbal heads constructing essentially derived argument entailments (denominal, deadjectival, and location/locatum verbs respectively). Deadjectival and denominal verbs arise from what I have

described as Ground material being incorporated from complement position into the head. Thus, in Hale and Keyser (1993), the verb *dance* is covertly transitive: the nominal ‘dance’ can be thought of the complement of the generalized *do* process, which then ‘incorporates’ into the verbal head. In the case of the location verbs, such as *bottle*, the nominal in question is the complement of the PP (a Ground element which further describes the result state achieved by the undergoer of translational motion). In the case of locatum verbs (*saddle*), the ‘incorporation’ occurs from the complement position of an abstract possessional PP ‘ \emptyset_{with} saddle.’ In the case of deadjectival verbs, the incorporation is from the AP scalar complement of the embedded small clause.

The intuition behind the Hale and Keyser account is that the correlation with selection (which determines the complement) and ‘conflation’ reflects a real syntactic generalization. In Hale and Keyser (2000), however, a distinction must be made between conflation and genuine syntactic incorporation (which had been assumed to be constrained by ‘government’). The problem is that ‘conflation’ verbs are compatible with an overt DP in complement position.

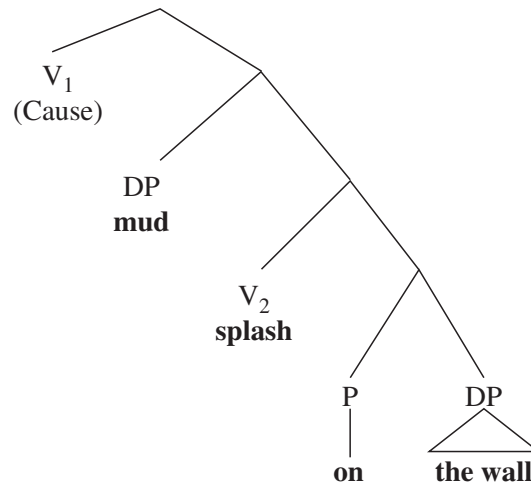
- (64) a. they are dancing a Sligo jig
 b. they shelved the books on the windowsill
 (Hale and Keyser 2002:49)

- (65) *Conflation*:
 Conflation consists in the process of copying the p-signature of the complement into the p-signature of the head, where the latter is ‘defective.’
 (Hale and Keyser 2002:63)

The difference between ‘conflation’ and standard morphosyntactic instances of incorporation shows that the debate between a syntactic locus for these processes and a pre-syntactic one is not yet conclusive (see also Kiparsky 1997).

When there is great agreement on substantive content, the difference between a constructivist approach and a lexicalist one can seem more like notational variance. Thus, while lexicalists like Levin and Rappaport (1998) build structures using the vocabulary of labeled brackets and abstract conceptual ‘constants,’ Hale and Keyser build similar structures in the syntax and attach abstract structural semantic interpretation to syntactic functional heads. Thus both theoretical programs agree on the importance of the notion Cause and hierarchically structured representations, but disagree on whether the syntax and the lexicon use the same or different vocabularies. Compare the representations below, where (66) would be the Hale and Keyser version, and (67) the Levin and Rappaport style lexical representation.

(66)



(the pigs) splashed mud on the walls (after Hale and Keyser 2002)

(67) *splash*: [x Cause [y TO COME TO BE AT z]]/ SPLASH

The variables x, y, and z get filled in by the the DPs ‘the pigs,’ ‘mud,’ and ‘the walls’ respectively in the syntax.

the pigs splashed mud on the walls (after Levin and Rappaport 1998)

In such cases, the differences are conceptual and architectural and are not yet possible to decide conclusively. In other cases, the difference between lexical approaches and syntactic approaches also involve differences of substance and emphasis. One of the points that I hope to have convinced the reader of in this chapter so far is that while ideological and architectural differences are worth arguing about, one can still separate genuine empirical claims and advances from notational choices.

A further seminal paper in the syntactic treatment of argument structure is Kratzer (1996). Kratzer gives an argument based on compositional semantics that the external argument of a predicate cannot be represented as part of the lexical role list, but must be associated with the VP (verb plus OBJECT) as a whole to capture the pattern of selectional restrictions that we find. In doing so, she is essentially agreeing with and following up on data and argumentation in Marantz (1984), in which he shows that the internal argument of a verb can trigger a particular idiomatic interpretation that verb, but an external argument does not (but see also Horvath and Sioni 2002 for arguments against this view). The selectional restrictions on the external argument come from the Verb plus DP OBJECT combination as a whole. Kratzer invokes the recent trend in the logical semantics of events which separates the arguments from the verb itself and introduces them via separate relational predicates (usually thematic role labels are used for these relations but this is not necessary). Under the neo-Davidsonian view, as it is called (after Donald Davidson, who originally proposed an event argument for verbal predicates; Davidson 1967), verbs

have only an event argument, while the DP arguments are related to that event variable by separate thematic relations (see Parsons 1990, Higginbotham 1985). A neo-Davidsonian schematic of the logical semantics for the arguments of a transitive verb like *destroy* is given below.

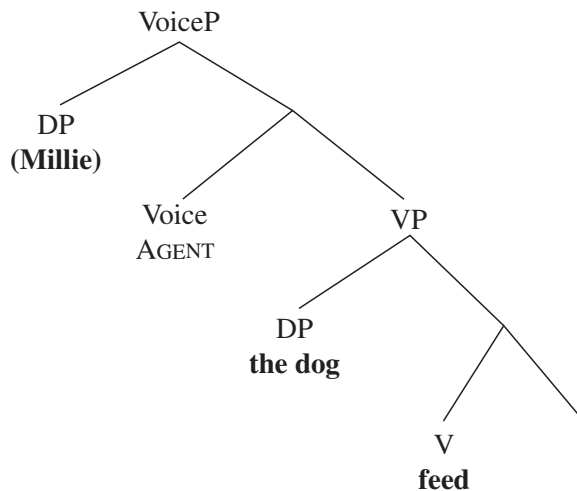
(68) $\exists e, x, y[\text{destroying}(e) \ \& \ \text{Agent}(x, e) \ \& \ \text{Patient}(y, e)]$

The difference here is that Kratzer (1996) argues that the empirical evidence supports severing the *external* argument from the verb, but not the internal ones. Schematically, again, the logic would look like (69) below.

(69) $\exists e, x, y[\text{destroying}(e, y) \ \& \ \text{Agent}(x, e)]$

Importantly, Kratzer's proposal is not just about some formal semantic interpretation language, because she assumes a tight mapping between syntax and semantics, she assumes that the logic above corresponds to a syntactic representation where the external argument is introduced in the specifier position of a functional head which lies outside the VP proper. She calls this projection VoiceP, and it bears some resemblance to the Hale and Keyser highest V head in introducing the external argument, although she does not give it the explicit semantics of Cause.

(70)



In Kratzer's semantics, the event description corresponding to the VP and the event description introduced by the Voice head (which essentially only has the function of introducing the external argument) are combined by event identification as part of the compositional semantics.

In an important set of arguments from distributive quantification, Schein (1993, 2003) shows compellingly that external argument and the internal argument *both* need to be logically independent of the verbal relation, giving rise to an even more decomposed representation (see Lohndal, 2012 for a discussion of Schein's arguments and his case against the classical Kratzerian position).

The modern tradition of syntacticizing argument structure takes elements from one or all of these works, although there is some disagreement about the scope and interpretation of these functional heads. The separation of the external argument is more widely represented in logical structure than the separation of the internal argument, where the latter is often treated as part of the verbal conceptual structure (Borer 2005b). Many researchers simply use little *v* heads (or their equivalent) which both introduce an external argument and have the semantics of cause (e.g., Ramchand 2008). Others use little *v* for Cause but add the external argument separately by means of a Voice head (e.g., Pytkänen 1999). The situation is complicated by the fact that many authors assume that each of these functional heads can come in a number of different ‘flavors,’ with different featural and selectional properties (Folli and Harley 2004). Moreover, while Kratzer’s semantics is very explicit and clear, it is not always so clear what the semantics for the various different types and flavors are, or how the pieces fit together compositionally in this later work. I think it is fair to say that currently there is no consensus on the number of types of little *v* heads, or the role of VoiceP as separate from it (see Alexiadou 2010, Schaeffer 2008, Folli and Harley 2004 for important examples of work in this genre).

The theory of Distributed Morphology (DM) advocates an architecture of grammar that is strongly non-lexicalist (Harley 1995, Marantz 1997, Harley and Noyer 1999). Within the DM framework, we now find a number of analyses of verbs and their argument structure properties which are couched in syntactic terms using Voice and little *v* heads among others, to capture semantic patterns that the lexicalists would place in a lexical entry. These accounts are attractive because of the many cases of variability and patterning that are found at the phrasal, constructional level and cannot be pinned on the verbal lexical item, so they have a strong empirical motivation.

An important theoretical point that the proponents of DM argue for is the idea that the verbal root itself is essentially void of syntactic information, even to the point of being acategorical (Halle and Marantz 1993, Harley 1995, Marantz 1997, Harley 2005). This is in a way the logical conclusion of the move toward introducing all argument structure and event structure features by means of functional heads. The proponents of the acategorical roots view argue that the root contains *only* conceptual information, and that all of the verb’s syntactic behavior (including argument structure patterning, and even syntactic category) comes from the functional syntactic context that the root finds itself embedded in (see also, importantly, Borer 2005b).

The virtue of some of the syntactic work on argument structure is that it takes explicit account of morphology in addition to syntactic patterning in the manifestation of arguments. The real shortcoming of the syntactic work as I see it, is that it has largely ignored the issue of selection and subcategorization that the work on argument structure first started with.

In embracing the constructional patterns and the variable behavior of verbal lexical items, it is easy to underplay the fact that verbs actually do have a character and come with specific patterns of behavior. If we lived in constructivist heaven, every single conceptual verbal root would occur in all possible argument structure environments, given enough contextual support. Many constructivists argue that rigidities in verbal behavior come from frequency effects and/or conventionalization and are not really excluded by the grammar at all. They essentially deny that anything like ‘selection’ is necessary (see discussions, for example, in Borer 2005b and Lohndal 2012). However, as we have seen in this chapter, some verbs undergo the conative alternation and others do not (71); some verbs detransitivize and others do not (72); some verbs can undergo resultative augmentation and others do not (73).

- (71) a. John ate at the apple
 b. John hit at the table
 c. *John destroyed at the city
- (72) a. John broke the stick / the stick broke
 b. John ate the apple / *the apple ate
 c. John destroyed the city / *the city destroyed
 d. John hit the table / *the table hit
- (73) a. John broke the vault open / into pieces
 b. John handed the letters in
 b. *John destroyed the city into cinders
 c. *John rejected Mary despondent

To ignore these issues and not address how the verbal root can constrain the syntactic functional environments that it can appear in, leaves a huge basic gap in descriptive adequacy as severe as the problems the lexicalists have with constructional variability. It is of course possible to build in a notion of selectional frame within a DM architecture (see Harley and Noyer 2000 for an acknowledgment of the use of selectional templates in the post-syntactic component), but it runs the risk of reintroducing the lexicon by the back door.

To summarize the state of the architectural disagreements, I would argue that the established argument structure effects require a detailed hierarchically structured representation within an event semantics, although so far nothing hinges on this complex representation being part of the narrow syntax or part of a dedicated lexical module. The effects and the tools required appear to me to be syntactic in nature, once one believes that syntax maps in a transparent way to certain aspects of predicational semantics. However, this is just a hunch, and there is still a lot of work to be done to understand (i) the interaction of event structuring facts with the details of verbal morphology, case marking, and grammatical functions across languages, and (ii) the nature of the information

on verbal roots so that they are underspecified enough to be flexible and yet specific enough to give rise to distinctive behaviors.³³

I conclude with the claim that despite the great advances in understanding that have been made in (i) above, (ii), the ‘Selection Problem’ still looms as large as it ever did at the beginning of the generative enterprise. This chapter has thus come full circle, starting with a discussion of subcategorization frames (Chomsky 1957), and ending with a plea for linguists to revisit the serious and still unresolved problem of ‘selection.’

Notes

1. According to this view, the Dowty list looks the way it does because of general human cognitive constraints on the mental representation of events, a not a priori implausible position.
2. F-structure is the data structure of LFG that represents grammatical function information such as SUBJECT and OBJECT separately from constituent structure or order (see Bresnan 2001 and Chapter 6 for details).
3. However, the UTAH in particular enshrines the correlation between form and meaning in one direction only – thematic relationships map deterministically onto syntax, but not necessarily in the reverse direction so that there can be a many-to-one relationship between thematic information and structural position. It is possible to go even further, with one-to-one mappings between phrase structure and meaning proposed by, e.g., Hale and Keyser (2000), a move that tends to be favored by the constructivists.
4. See for example, Reinhart’s (2002) role coreference rules for lexicalized ‘reflexives’ such as *shave* or *bathe*, or the analysis of complex verbal forms where the ‘affected argument’ or PATIENT of one event is identified with the ‘causer’ or AGENT of an embedded event, as in Alsina and Joshi (1993) for Marathi causatives.
5. A brief comment about TOPIC is in order here. Many languages have been argued to be TOPIC prominent languages instead of SUBJECT prominent languages, although even in these languages it is often possible to distinguish the grammatical function of SUBJECT *in addition* to the discourse notion TOPIC (Li and Thompson 1976) (see also Chapter 23). Factors that distinguish TOPIC from SUBJECT include the fact that the former has a uniform discourse status in that it is always definite, unlike SUBJECT, and the fact that the SUBJECT bears a selectional relationship with the verb, whereas the TOPIC need not. In turn, it is the SUBJECT that is implicated in grammatical processes such as agreement, reflexivization, and passive within a particular language, and, crucially for us, it is the SUBJECT which is determined on the basis of the choice of verb (Li and Thompson 1976, Schachter 1976). Thus, SUBJECT can be distinguished from TOPIC and the former is the place where argument

structure generalizations can be sought. See also the discussion of the Voice systems of Austronesian languages in note 10.

6. It is true that *within* a particular language, one naturally assumes that morphology mediated alternations have a different status from flexibility alternations. However, when one looks cross-linguistically, both morphology mediated and non-morphology mediated alternations show substantial overlap in their effects. See the discussion of the ‘causative–inchoative’ alternation in the text.
7. But see Cinque (1990a) for an argument for a distinction between different types of stative verbs analogous to the unaccusative/unergative distinction.
8. One often also sees the traditional grammar term Rheme used for elements which are part of the description of the eventuality, in contrast to elements whose properties or changing properties are at issue (Themes).
9. This is consistent with the general consensus from the thematic role literature, where either Causer or Agent sit on top of the thematic hierarchy.
10. Another prominent case of voice alternations that comes to mind here is the voice system of the Austronesian languages, where explicit morphology changes the morphosyntactic representation of the arguments of a verbal predicate (Schachter 1976, Sells 2001a, Rackowski 2002). These systems are also potential sources of evidence for generalizations about argument structure prominence, but I put them aside in this chapter for reasons of space. Part of the problem with understanding the data revolves around resolving the difference between ‘SUBJECT’ and ‘Topic’ in these languages. If the morphological alternations involve choice of ‘Topic,’ then they are not likely to be relevant to argument structure. As Schachter discusses in an important early article (Schachter 1976), the promoted argument (the *ang-* marked argument in the case of Tagalog) is the only argument that can be relativized over, and is the only argument that can launch floating quantifiers (two classic ‘SUBJECT’ properties). On the other hand, it is the Actor argument, regardless of topic marking, which antecedes reflexives and is the referentially gapped DP in controlled clauses (two other classic ‘SUBJECT’ properties). In the end, the Austronesian languages may be more important for understanding the relationship between two different types of syntactically prominent position (‘SUBJECT’ vs. ‘Topic’) than for offering the simplest most direct evidence for argument structure hierarchies. I will therefore not discuss the relationship between Austronesian morphology and thematic role here, but the interested reader should see Rackowski (2002), Travis (2004), and Sells (2001a) for recent proposals.

11. It is a separate architectural question whether this representation is non-linguistic, as it is for Jackendoff (Jackendoff 1983, 1990a); linguistic, but in its own distinct module as in Levin and Rappaport Hovav (1995) and Williams (2003); or a subpart of syntactic representation itself as in most GB approaches to D-structure and in recent constructivist accounts.
12. While many languages show an ergative system of case marking which gives the non-causer priority in getting the unmarked case, and sometimes in triggering agreement, true *syntactic* ergativity is much rarer. Specifically, Anderson (1976) argues that when the syntactic diagnostics of SUBJECT-hood (such as relativization, antecedent of reflexive, controllee position in semantically controlled clauses, etc.) are examined, nearly all morphologically ergative languages turn out to have the same choice of 'SUBJECT' as nominative-accusative languages. In other words, the 'causer' argument is still the controlled position in non-finite clauses and seems to be hierarchically superior for the purposes of the Binding Theory. The only established case of a language which is syntactically ergative in addition to being morphologically ergative seems to be Dyirbal (Dixon 1972, 1994) where the absolutive case-marked argument is systematically privileged with respect to relativization and control. This is nevertheless still not an exception to the generalization stated above unless it can be shown that the ergative case-marked argument (Agent, or Causer) in transitive verbs is not somehow oblique, or demoted.
13. In addition, the dispositional middle seems to have strong contextual constraints on it: it is only felicitous if the derived SUBJECT can be interpreted as bearing an inherent or (modalized) dispositional property facilitating that general event type. Thus, dispositional middles are derived statives (sometimes described in terms of genericity; see Condoravdi 1989), with a dispositional property ascribed to the notional object (Lekakou 2005). The 'property' reading is presumably related to the fact that the implicit agent receives a 'generic' or 'arbitrary' interpretation (Lyons 1995, Lekakou 2005).
14. The source of the labels unergative vs. unaccusative is complex, and the resulting terminology is confusing. Unaccusatives are so-called because, by hypothesis, they fail to assign accusative case, resulting in the promotion of a single internal argument to SUBJECT position. It is now generally used as a label for a class of verbs whose single SUBJECT argument has some properties in common with transitive OBJECTS, and is semantically more 'internal' (independently of what the correct analysis is). Unergative verbs are so-called because of a parallel argument for a hypothetical ergative-absolutive case-marking language. In such a language, the SUBJECT of a transitive verb gets special ergative case marking. However, with an unergative verb (which is intransitive by definition),

its SUBJECT is just as SUBJECT-like syntactically and semantically as the SUBJECT of transitives, but it would *not* get ergative case in an ergative case-marking language. Hence the term unergative. The term unergative as applied to verbs is now simply used to refer to intransitive verbs whose single SUBJECT argument shows no OBJECT-like properties, and is semantically more ‘external.’

15. Subsequent work has cast doubt on the reliability of the *ne*-cliticization test as a diagnostic, with many authors pointing out a number of discourse factors that seem to cut across the distinction in argument structure (Levin and Rappaport Hovav 1995, Bentley 2004).
16. One problem often cited with the notion of unaccusativity is that translations of an unaccusative verb in one language do not always straightforwardly yield an unaccusative verb in another language, even where both languages make the distinction clearly (see Zaenen 1993 for the comparison between Italian and Dutch). However, this only appears to show that behavior cannot be predicted directly from the semantics of real-world situations, but that facts about situations in the world merely feed the way in which events are represented linguistically. Plausibly, only linguistic representations are symbolic and categorical; the real world is messy and open to different choices of representation in many cases.
17. Probably intended to be the opposite of ‘unergative’ in the context of the unergative–unaccusative distinction, this usage adds to the confusing cluster of terminological distinctions, being crucially different from the use of the term ‘ergative’ in ergative languages (which have a distinct ergative case for the SUBJECT of a transitive sentence). I stay away from this usage in what remains of this chapter, merely noting that it was the term originally used for the intransitive member of the verbs in English that show this transitivity alternation.
18. See also Section 20.3.
19. Once again, I state the semantic generalization in the direction from linguistic representation to entailments. The claim about the two different classes of intransitive is that they represent a decision about how a particular eventuality is presented: unergative VP structures contain the representation of a initiating argument; unaccusative VP structures do not. This claim explicitly denies that one can objectively determine event structure from observation of the real world, possibly a contentious point. Most relevantly for this chapter, however, the description of the correlation in this direction is deliberately silent about whether a particular *lexical* item is listed as being specific to one structure or the other.
20. Once again, the correlations here run from syntactic structure to semantic entailments, not from lexical item to semantic entailments. Note also that a speaker may choose to represent the event in either of

these two ways, depending on their communicative purpose, and what features of the event they care about.

21. One must be careful to distinguish this effect from the effect of indefinite plural DP participants, which can give rise to an atelic reading of the VP due to an indefinite number of event iterations distributed over the plural participant. Crucially, this iterative effect shows up for both SUBJECTS and OBJECTS and even the OBJECTS of PPs within the verb phrase.
22. Baker (1988) claims however that this is the only productive case of locative applicatives that he knows of.
23. This kind of classification depends on being able to infer the argument structure of the prefix from the argument structure of the corresponding preposition. Such inferences can be tricky when the prefix is highly grammaticalized or bleached, but give quite consistent patterns when one confines oneself to physical events with clear positional entailments.
24. In Larson's (1988a) account, the *to* preposition, being a pure structural case marker, is absorbed in a kind of analogue of 'passive' and the syntactic movement is required to assign case to the stranded goal argument.
25. Little *v* is the name for the higher V label in a VP shells expansion (see Larson 1988a) of the verbal projection. The terminology comes from the Distributed Morphology tradition (see Harley 1995, Marantz 1997), where a lower case category label is also supposed to contribute syntactic category information to the whole projection. See Section 9.6 for further discussion of this framework.
26. In general, the modern neo-constructivists assume that *all* arguments are the specifiers of some functional head, so maybe the decision does not carry as much weight in those theories as in a more semantically specific theory.
27. The conative alternation, or the PP alternants of direct OBJECT DPs are an obvious candidate for the functional equivalent of an antipassive construction. These constructions, as we have seen, *are* common in nominative-accusative languages like Germanic. They are not strictly antipassive because they do not involve verbal morphology. They are also probably not functionally equivalent because demoting an argument from 'accusative' status is arguably not the same as demoting it from 'absolutive' status. Absolutes in ergative-absolutive languages have some SUBJECT-like properties, like controlling agreement. A complete understanding of the antipassive construction therefore depends on a fuller understanding of Absolutive case. The literature is far from consensual with regard to this particular question (see Legate 2008 for important discussion of the classification of case-marking systems and morphology).

28. In Chapter 17, Baker discusses the connection between case and agreement effects in some detail. While these two morphological phenomena are closely tied in some languages (e.g., English, Hindi), they are completely divorced in others (e.g., Burushaski). In the languages where the case and agreement interaction is set to 'no,' Baker argues that case assignment is probably best stated in terms of the 'relational' theory of case assignment (Marantz 1991), where the case assigned to a particular DP is dependent on what other DPs are present in a structural hierarchy (where I assume this structure is supposed to be in the first, *v*P phase). While this seems a useful description of the facts, it is not clear to me what the actual mechanism is. It seems clear, however, that it is intended to go beyond the syntactic tool of Agree in a Minimalist theory.
29. In some theories, case morphology is even proposed as one of the methods of 'linking' argument roles to the syntax (Kiparsky 1988, 2001). See Butt (2006) for discussions of the role of case theory with respect to argument structure in different linguistic theories.
30. As mentioned earlier, and summarized also in Chapter 17, many languages that show ergative case-marking patterns, show syntactic alignment effects that are identical to that of nominative-accusative languages. This often includes agreement effects as well as the other well-documented effects of SUBJECT-hood cross-linguistically.
31. In the modern theory, Burzio's Generalization is restated as a property of little *v* in the phrase structure: a little *v* which theta-marks an agent, assigns accusative case (or, alternatively, initiates an Agree relation with a DP that it *c*-commands); the other type of little *v*, which does not theta-mark an agent, does not (cf. Kratzer 1996). However, in the absence of a deep understanding of why these two properties should be correlated, the restatement here (for the languages that show the correlation) is just as much of a description as Burzio's original observation.
32. I use the term 'constructivist' here for the research position that sees meaning as residing in structure, but where that structure is produced by a generative module. This is in contrast with Construction Grammar (Goldberg 1995) whose proponents believe in attaching meaning to 'constructions' but where these are listed just like lexical items. (See also Section 3.4.)
33. Ramchand (2008) is an attempt to build such a system using only categorial features on verbal roots, but it is by no means the only way to do it.